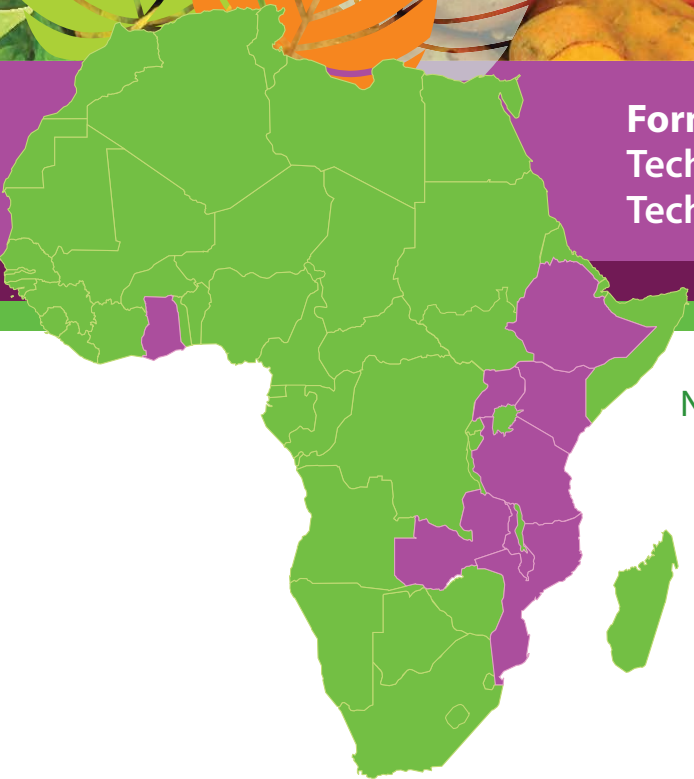




**Formative Gender Evaluation:
Technical Report on the Viable Sweetpotato
Technologies in Africa – Tanzania project**

Netsayi Noris Mudege and Frederick Kobina Grant

VISTA
TANZANIA
Viable Sweetpotato
Technologies in Africa



RESEARCH
PROGRAM ON
Roots, Tubers
and Bananas



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Notes on the contributors

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Acronyms

CIP	International Potato Center
DVM	decentralized vine multiplier
FGD	focus group discussion
FINCA	Foundation for International Community Assistance
HKI	Helen Keller International
NADO	Njombe Agricultural Development Organization
NGO	nongovernmental organization
OFSP	orange-fleshed sweetpotato
PRIDE	Promotion of Rural Initiative and Development Enterprises Limited
USAID	United States Agency for International Development
VAO	village agriculture officer
VICOBA	Village Community Bank
VISTA	Viable Sweetpotato Technologies in Africa
WAO	ward agriculture officer

Executive summary

This report is based on a qualitative formative gender evaluation of the Viable Sweetpotato Technologies for Africa (VISTA) Tanzania project implemented in seven districts in the Mbeya, Iringa and Morogoro regions, which are part of USAID's (United States Agency for International Development) Feed the Future zone of influence. VISTA Tanzania seeks to (1) contribute to improved dietary diversity, food security and incomes in Tanzania, especially among households with children under five years of age; (2) expand the production, consumption, storage, utilization and marketing of orange-fleshed sweetpotato (OFSP) and its products; and (3) create financially viable sweetpotato seed and root enterprises to improve the sweetpotato value chain. This report discusses these aims with the objectives of influencing the project's strategies for training and rollout of technologies and of fostering the development of gender-responsive OFSP seed businesses. The report will be of interest to researchers and policy-makers aiming to expand the production and utilization of the nutritious OFSP.

Threats to food security and the role of sweetpotato

The failure of institutions, particularly those related to access to credit and regulation of the quality of agricultural inputs such as pesticides and planting material, disadvantages both men and women farmers and puts the food security of rural households at risk. In some instances gender and cultural norms also are barriers to family food security. For example, in Tanzania gender appropriation of roles and crops made it harder for men to adopt drought-tolerant crops such as sweetpotato because these were regarded as women's crops and shameful for men to engage in. Social pressure to conform to approved male behavior also may affect men's role in food security. For women, the scarcity of opportunities for off-farm employment and in some cases the limited decision-making power about investments in household agricultural plots are constraints to their contribution to household food security.

The bargaining power of the different members of the household on household food investments affects food security. For example, in Tanzania women did not have a say in how money from men's plots was invested into farming. Thus, interventions promoting household food security should target improving joint household decision-making and increasing women's bargaining power within the household. If women are engaged in decision-making on agricultural investments the food security outcomes may improve. Women in the study frequently said that men often did not invest in food security crops.

Because the threats to food security are varied, food security strategies need to be multipronged, addressing issues such as access to finance, response to climate change, methods to deal with pests and diseases, and access to off-farm income to meet household cash needs. While sweetpotato is not a key crop in many of the districts in the study, its role in food security cannot be overestimated. However, because sweetpotato production and commercial value are limited, the crop was not ranked highly in many of the focus group discussions with women. This does not mean that its food security value should be underestimated but that crops need to have multiple uses to be ranked highly and for farmers to invest in them. Men were not willing to invest in sweetpotato because of its perceived lack of benefits and that it was regarded as an extra crop. Development of value chains that can increase not only the economic benefit of the crop but also its utilization can increase investments in sweetpotato.

Sweetpotato production constraints are highly determined by gender of the crop" and gender of the farmer

Sweetpotato production constraints included prevalence of pests and diseases that attack the roots and vines; inadequate supply of vines especially of the new improved orange-fleshed varieties; weather-related factors, which make it difficult to conserve vines; lack of markets, inputs, equipment, technical knowledge, and storage; theft; labor demands; and lack of access to credit and fertile land. Men were more likely to face production constraints than were women. This may be due to women's higher involvement in sweetpotato farming and therefore higher awareness of how to solve some of the perceived production constraints. Women mentioned that they often had the least productive lands to cultivate the so-called women's crops whilst often men had fertile land parcels and household resources such as fertilizer and other quality inputs. Men were not willing to invest in sweetpotato because of its perceived lack of benefits and also because it was regarded as a secondary

crop or a woman's crop. This shows the need for behavior-change communication to improve the perception of sweetpotato by men. Development of high value markets for sweetpotato will increase its economic benefits and possibly improve the willingness of men to invest in its production. Increasing the use options for sweetpotato also can promote investment in it.

Sweetpotato as a woman's crop and the importance of gender awareness training

Sweetpotato is often regarded as a woman's crop because of its low commercial value and the gender division of labor and responsibilities within families. However, the study showed that husbands assisted their wives in producing sweetpotato. Additionally, trends regarding sweetpotato cultivation are regarded as changing. For example, both men and women perceived collaboration to have risen within households in agricultural tasks for sweetpotato over the years because men and women were targeted with training and were aware of both the commercial and health benefits of sweetpotato cultivation. Men also were interested in improving the nutritional status of their families. The importance of training to raise gender awareness for both men and women in fostering household cooperation cannot be overestimated, as farmers in Tanzania often pointed to training from different organizations as the reason for the improved collaboration within households.

Behavior-change communication and demand creation are key in establishing sustainable medium-scale businesses for sweetpotato planting material

Behavior-change communication and demand creation have critical roles in the sustainability of seed business. Women more than men expressed the willingness to purchase clean planting material for sweetpotato, and they attributed the training they had received on the health benefits of OFSP as a key reason for their interest. This illustrates that men also need to be targeted with behavior-change communication, particularly nutrition messages, which have often targeted women only. Men are engaged in decision-making over the allocation of land and other household resources and so they need awareness on the importance of OFSP for food security and nutrition in order to be willing to invest in its cultivation, including in purchasing clean planting material. Whether a farmer purchases OFSP or the white, yellow or cream sweetpotato varieties is related to the awareness raising that has been targeted towards OFSP and its perceived benefits as well as the fact that the planting material for white sweetpotato is ubiquitous while OFSP is still a new introduction and not widespread. This brings to the fore the question regarding the sustainability of OFSP vine sale as a business if the vines become as ubiquitous as those of white or yellow sweetpotato varieties. There is a great need to train farmers on the need to replace planting material to guard against seed degeneration. Availability of sweetpotato root markets could be important to promote vine sales, as men and women were willing to invest in sweetpotato production if they foresaw a high return for their investment.

Men and women had different perceptions in relation to vine production and demand. For example, women talked about the availability of marketing opportunities for vines and roots as a reason for the increased production of and demand for planting material, while men saw sweetpotato as a minor crop and viewed the demand for its vines to have either stagnated or even declined. These differences may be related to the role of sweetpotato in their lives. While for women sweetpotato was a top income earner, men had other sources of income such as crops like maize and sesame and off-farm employment.

At the time of the study medium-scale enterprises for sweetpotato vines had not been developed, but individuals and communities were already beginning to multiply and sell clean planting material in their localities and sometimes to outsiders. More women than men were engaged in this activity. However, there is doubt that women will be able to become medium-scale vine multipliers on account of their lack of land and other resources. Approaches such as group business, business and market training for women farmers, and strategies that adopt household approaches to farming as a business may be able to increase women's participation at that level. Both men and women who would be vine multipliers stated that if there was a market for clean planting material, they would be willing to invest resources in its production.

Raising the importance of sweetpotato as a food and cash crop may increase farmer investment in the crop

Both men and women respondents perceived maize and cassava to have high seed security, and women perceived better seed security for beans than did men. The study reveals that if farmers regard a crop as important either for food or commercial value they will be willing to buy seed to produce it. For example, farmers

claimed that bean seed was expensive but they still purchased it and often were seed secure, because beans were an important food and commercial crop. Where sweetpotato was regarded as an important crop, the price of its seed was much higher than in communities where it was seen as a marginal crop. There is a probability that sweetpotato seed business will flourish where sweetpotato is regarded as important, but where it is regarded as a marginal crop it may be difficult to establish self-sustaining seed businesses. There may be need for continued awareness raising to raise the profile of sweetpotato as a crop that not only has economic benefits but can also have positive food security impacts in conditions characterized by climate variability. Furthermore, there is a possibility that if sweetpotato value chains are developed and sweetpotato is commercialized, seed businesses also will establish and become sustainable.

Women are custodians of sweetpotato planting material but face obstacles in maintaining the quality and quantity of planting material

Sweetpotato for production of storage roots is propagated from fresh planting stock in the form of vines. There was an overall consensus among men and women that there was more of a general lack of planting material for OFSP than for other types of sweetpotato. Similarly, a low diversity was reported for OFSP varieties, which would affect OFSP production sustainability in case of cultivar breakdown or change in farmer or consumer preferences. Evidently women were playing a central role in sweetpotato vine conservation, thus there is need to strengthen their capacity in vine conservation and introduce technologies that favor them to save their time, improve their efficiency and reduce their drudgery. When developing DVMs, both men and women need to be made aware of the issue of seed degeneration and the need for seed replacement even when OFSP becomes abundant at the community level. DVMs will need to be linked upstream to primary sources of clean seed and downstream to sweetpotato root producers. This will ensure sustainability of OFSP production and enterprises. The majority of the women's groups believed that women had more knowledge in sweetpotato planting material health and quality than did men because women were more involved in sweetpotato cultivation than were men. Thus, women should be seen as custodians of sweetpotato planting material. However, they faced challenges in accessing quality and sufficient starter planting stock, had inadequate knowledge on maintaining seed health, experienced irrigation water shortages, and often did not have adequate cash to pay for labor or buy crucial farm inputs.

Some of the challenges to accessing quality planting material were related to the small volume of starter OFSP material distributed to farmers and DVMs from the project. Men and women farmers opined that using these small volumes had meant that generating enough clean planting material had taken long. Men also mentioned as a big challenge the lack of a system to determine seed quality in the village, as well as the general lack of knowledge on determining seed quality. The project may need to evaluate how it distributes the starter material and may decide to provide more of the of the material to small- to medium-scale seed entrepreneurs who can multiply it quickest. While women often mentioned the lack of money as a constraint to purchasing planting material, the reasons for the lack of access to quality planting material were basically the same for men and women, and included high incidence of pests and diseases, lack of knowledge on maintaining quality planting material, long dry spells, and lack of access to irrigation.

How to engage men and women in improving production practices and nutrition knowledge and practices

Although women were more engaged in sweetpotato cultivation than were men, usually male household heads and group leaders, who often were men, were targeted with agronomic training. Training outside the village tended to favor men. Women preferred to have training within their village owing to domestic demands. Even when women attended training, the quality of their participation was seen by men as low because some women were afraid of talking in public or because the facilitation methods were poor. The study participants suggested that there was need to improve women's participation through using facilitation methods that engaged them directly such as asking them questions and managing group dynamics to ensure that men did not dominate discussions. Follow-up visits could help both men and women farmers in technology adoption and utilization, since, as they stated, they were not able understand everything from the training in one or a few sessions. Women farmers also said that learning visits to other farmers producing sweetpotato could be useful in improving their learning and skills.

Although men also make decisions about household nutrition, they were rarely targeted with nutrition training. The sources of nutrition information differed between men and women. Women's groups often acknowledged the VISTA project and Njombe Agricultural Development Organization (NADO) as their main source of information on OFSP. Men on the contrary tended to get information from other people or members of their groups who had attended training. The differences in the sources of nutrition information may be attributed to the fact that the project deliberately targeted women with that information. Also in many cases nutrition information was given at child welfare clinics, which men did not normally attend. However, from the data, men who had started cultivating OFSP mentioned nutritional benefits as one of the reasons they had decided to adopt it. It is therefore important that men's access to OFSP nutrition information be equal to women's, considering their status and influence in family decision-making on food production and utilization. This can be achieved through the development of appropriate messages that will directly influence men and improving their targeting. In addition, the project should take advantage of community meetings that men attend and use men's peer groups to spread nutrition information through men's networks.

Women prefer storage technologies that increase their autonomy

Women noted that the granary and pit storage structures promoted by the project might increase their dependence on men, particularly in the construction and maintenance of the structures. Traditional methods, which include cutting up and drying the sweetpotato tubers, demand more work from women but they can do most of the work themselves. Women were also worried that sweetpotato stored outside the home or family living space could be stolen, and they preferred keeping it inside the house. Men and women mentioned the lack of cash or materials to construct the storage structures. The project may need to adapt some of the technologies so that fresh sweetpotato can be stored in the family living space. Some farmers gave examples of modifications that could be made to the structures such as spreading sand in a designated space in the house, preferably a corner of a room, for storing the roots. The technologies could be adapted and tested locally and then recommended if viable. The project may also need to invest in other cheap technologies that maintain women's autonomy in the storage of sweetpotato.

1. Introduction

Sweetpotato is an important food security crop in Tanzania and is ranked third after cassava and Irish potato among the most important root and tuber crops. Tanzania is the second largest producer of sweetpotato in East Africa (HKI, 2012). However, viral diseases, weevils and pests (Tomlins et al., 2004), as well as the lack of clean planting material and low soil fertility (HKI, 2012), are major threats to sweetpotato production in the country. Although many studies have looked at the biophysical factors causing poor productivity of sweetpotato in Tanzania (Ndunguru and Kapinga, 2007; Tairo et al., 2004), there has been inadequate attention to gender and other social factors that may limit productivity, access to clean planting material and ability to manage and control disease and pest outbreaks in sweetpotato. For example, some studies have pointed out that in Tanzania sweetpotato is a woman's crop because women are more heavily involved in its production (Badstue and Adam, 2011; Kapinga et al., 1995) but they have not gone beyond this to understand how it might affect investment in sweetpotato or adoption of any new sweetpotato technology.

Orange-fleshed sweetpotato (OFSP) was introduced in some sub-Saharan African countries including Tanzania as an option to combat vitamin A deficiency in particular and food insecurity and hunger in general. Tanzania is said to have a high prevalence of chronic malnutrition as evidenced by its high incidence of iron and vitamin A deficiencies and of anemia among children under five years of age and pregnant women (NBS, 2011). In Tanzania, OFSP is being promoted as part of a balanced diet to address vitamin A deficiency. In addition to the health and consumption focus, a lot of recent work on OFSP is on its utilization, development of its value-added products and upgrading of its value chain. According to Fuglie (2007) there is a need to prioritize post-harvest utilization and marketing of sweetpotato to promote rural employment and also improve rural economies. Similarly, Bovell-Benjamin (2007) suggests that value addition for sweetpotato will increase its utilization and its importance in human food systems. Research in Tanzania has demonstrated high acceptability of OFSP products such as doughnuts and flour, which are liked for their color, taste (Kulembeka et al., 2005) and nutritive value. However, few studies have addressed how gender affects access to nutrition knowledge and utilization of sweetpotato technologies including those for its processing, post-harvest processing, handling, and storage.

This report is the result of a formative gender evaluation conducted for the Viable Sweetpotato Technologies in Africa (VISTA) – Tanzania project. The findings are based on a qualitative study undertaken in seven districts in Tanzania in March 2016. The study sought to address some of the gaps in gender knowledge in relation to production, use, marketing, access to planting material, and nutrition knowledge on sweetpotato in Tanzania.

1.1 Background and research questions

The VISTA Tanzania project aims to expand the production and utilization of nutritious OFSP in seven districts in Tanzania in Mbeya, Iringa and Morogoro Regions, which are part of USAID's (United States Agency for International Development) Feed the Future zone of influence. VISTA Tanzania seeks to contribute to improved dietary diversity, food security and incomes in Tanzania, especially among households with children under five years of age. It seeks to expand the production, consumption, storage, utilization and marketing of OFSP and its products. It also aims to create financially viable sweetpotato seed and root enterprises in order to improve the sweetpotato value chain.

This formative gender evaluation focused on three VISTA objectives and sought to answer several questions under each objective:

- **Objective 1:** Increased production and consumption of nutritious OFSP varieties through an integrated agriculture-nutrition technology set:
 - Do perceptions differ according to gender?
 - What are the gender-related constraints in the production and marketing of sweetpotato?
 - How does gender affect decision-making in the adoption of new improved sweetpotato varieties?
 - Can financially viable seed business be established and are men and women able and willing to purchase clean planting material?
 - What are men and women farmer's perceptions of seed security?
 - What are the constraints men and women face in accessing quality planting materials?
 - Who is a decentralized vine multiplier (DVM)?

- **Objective 2:** Improved nutrition knowledge and practices:
 - What type of training have men and women received in relation to production and nutrition?
 - Who attends the training and why?
 - What other sources of information do men and women have?
 - How can men be encouraged to participate in nutrition training or seek nutrition counseling?
 - How can the project reach men and women equally?
 - What are the positive lessons from the VISTA-Tanzania project?
- **Objective 3:** Root producers and traders utilize improved storage and marketing of fresh OFSP roots:
 - What are the gender-based constraints in using new root storage technologies?
 - What are men and women's roles in marketing of sweetpotato roots?

The report discusses these questions with the aim of influencing the project strategies for training and rollout of technologies, as well as the development of gender-responsive OFSP seed businesses.

1.2 Methods and tools

The formative gender evaluation was a qualitative study conducted in Iringa, Mbozi, Ulanga, Wanging'ombe, Mufindi, Mbozi and Gairo districts in Tanzania. Qualitative tools were adopted in order to understand the social factors that may affect the ability of men and women to participate and benefit from sweetpotato production and marketing, value addition technologies and consumption. While the study adopted mostly qualitative tools using focus group discussions (FGDs) and individual in-depth interviews, quantitative data were collected and generated through group ranking exercises and counts of the number of groups or individual interviews in which certain issues were mentioned. Table 1 gives a summary of the type and number of participants in the study and the tools.

Table 1: Study participants in the VISTA Tanzania project intervention districts in March 2016

Activity	Men	Women	Total participants
FGDs with OFSP farmers/beneficiaries	7 events (56 participants)	6 events (48 participants)	104
FGDs with sweetpotato farmers who did not cultivate OFSP	5 events (30 participants)	5 events (35 participants)	65
Individual interviews with DVMs	7 respondents	7 respondents	14
Individual interviews with extension officers and VISTA focal points (both government and NGO)	9 respondents	2 respondents	11
Total			194

Participants were recruited through farmer groups or associations. OFSP producers were selected from groups that the International Potato Center (CIP) and its partners were working with under the VISTA Tanzania project. Non-OFSP farmers were recruited by OFSP group members and extension officers. Village and ward agriculture extension officers helped in the selection of participants whilst district agriculture extension officers helped in the selection of villages within the districts. Farmers and extension officers and partners were informed that participation was voluntary and refusing to participate in the study would not result in penalization. In this report, FGD quotations attributed to OFSP or non-OFSP participants were from farmers cultivating or not cultivating OFSP, respectively.

2



Response to food and nutritional insecurity
and the role of sweetpotato in the VISTA
Tanzania project's intervention districts

2. Response to food and nutritional insecurity and the role of sweetpotato in the VISTA Tanzania project's intervention districts

2.1 Threats to food security

The FGDs described the stresses affecting food security at the household level and how farmers responded to them. This section outlines these threats and the role of sweetpotato in the response and mitigation strategies. Figure 1 summarizes the threats as perceived by the different groups, disaggregated by sex.

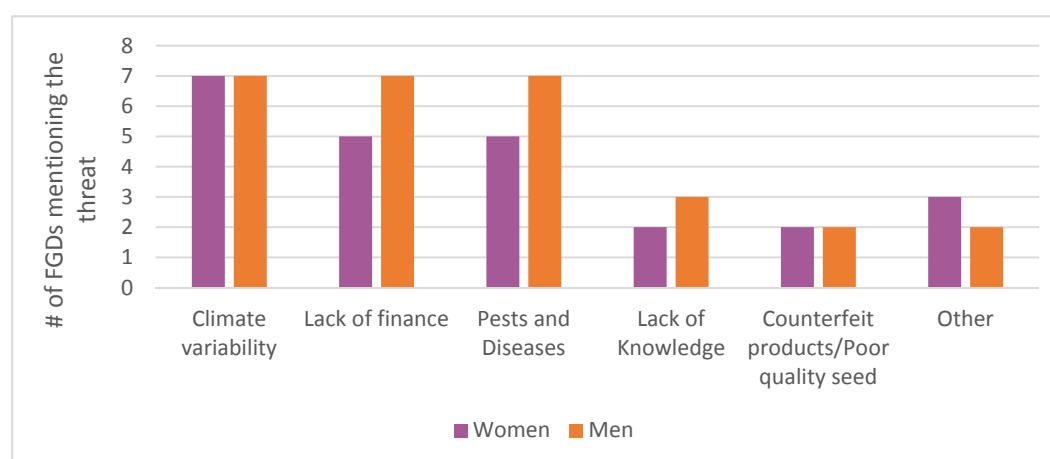


Figure 1: Perceived threats to food security.

Climate variability

Seven women and men's groups mentioned food security threats related to climate variability, particularly prolonged droughts or too much rain. Too much rain resulted in flooding, which destroyed crops and also increased the need to use large amounts of fertilizers if soil nutrients were leached. In some cases, excessive rain was linked to loss of crops through spoilage, as drying them sufficiently for storage was not possible. The farmers also talked about an unexplained yield decline in some traditional food crops.

There have been weather changes where there is too much rainfall followed by extended drought, and maize, as our main crop, has been greatly affected. (Mbozi women FGD participants, non-OFSP)

Stresses include too much rain, too much sun and insect infestation. For example, we received too much rain that resulted in waterlogging and crop loss. (Iringa men FGD participants, non-OFSP).

Weather extremes vacillating between excessive rainfall and severe extended droughts were mentioned in many FGDs as a cause of food insecurity. Such weather leads to crop losses, low productivity, limited food reserves and persistent hunger. Too much rain and prolonged drought are linked with increased pest and crop disease incidents, which also reduce yield. The situation is exacerbated by farmers' limited or lack of access to irrigation and pesticides. For example, men farmers cultivating OFSP in Chunya district attributed their inability to deal with the threats caused by climate variability to their low socioeconomic status.

Lack of technical knowledge

Highlighting the importance of agricultural knowledge, three women's groups and two men's groups indicated that limitations in agricultural knowledge and in appropriate skills, such as lack of training in production and storage, threatened food security for households.

We lack education on how to produce crops and store them, so we end up not having enough food. It is just the OFSP vines that we have received training in. (Chunya women FGD participant, OFSP)

Lack of extension support in crop production ... results in poor yields. (Chalowe women FGD participant, non-OFSP)

Lack of technical knowledge in farming or cultivation skills may lead to low production and lack of food. We just farm, as it is our habit, but without any technical knowledge. (Iringa men FGD participants, OFSP)

These illustrate the recognition by men and women of the importance of knowledge-based agriculture. Both men and women farmers indicated that they might plant crops without using the recommended spacing or appropriate fertilizers or pesticides because they lacked the relevant knowledge. This leads to unnecessary crop losses, low productivity and consequent food insecurity among families. Thus, beyond providing improved technologies, interventions also need to ensure proper skill training and knowledge dissemination to ensure that farmers are able to take advantage and benefit from the interventions.

Lack of finance

Seven men's groups and five women's groups cited the lack of finance as a critical threat to food security, particularly the lack of money to buy farm inputs and to invest in agriculture in order to increase productivity.

A lot of money is required especially for buying farm inputs or equipment for cultivation. We don't always have enough money to invest in the agricultural activities. (Iringa men FGD participant, OFSP)

We lack capital to buy fertilizers and chemicals to prevent pests and diseases. (Mbozi women FGD participant, non-OFSP)

We lack fertilizers because they are expensive to buy. Our lands are not fertile anymore. When we plant without fertilizers we obtain very little harvest. (Wanging'ombe women FGD participant, non-OFSP)

The lack of finance to invest in agricultural production may result in poor crop management practices including the use of poor quality seed and poor agronomic practices. These, according to the farmers, reduce yield and threaten food security at household and community levels.

Women also brought up the lack of appropriate credit facilities among the threats to household food security in their communities.

Debt from financial institutions prevents us from having enough food for storage, as much of the produce is sold to pay back loans. We feel like we do not make any profit. (Mufindi Women FGD participants, OFSP)

Even where loans were availed they did not necessarily improve food security, but could serve as its threat if farmers could not produce enough food for both home consumption and for marketing to repay loans.

Pests and diseases

Seven men's groups and five women's groups mentioned pests and diseases as a key challenge to food security. Pests that attack stored maize and beans were regarded as a major cause of postharvest food losses that depleted household food stocks. Diseases such as bean leaf blight or 'ukungu' were considered responsible for high losses in bean crop. In Wanging'ombe men farmers mentioned pests that destroy sweetpotato in the field. Insects, rats and other wild animals that destroy crops were mentioned more frequently than diseases, which were mentioned only in relation to beans.

Counterfeit products and lack of quality agrochemicals

Two groups each of men and women farmers indicated that the prevalence of counterfeit and expired agrochemicals in the market was becoming a serious threat to food security besides being a health hazard. Yield losses due to such products were related to their ineffectiveness to control pests and diseases, leading to crop loss and loss of the money used in the purchase of the agrochemicals.

We have expired products for fighting pests that do not prevent damage to maize and beans. (Wanging'ombe women FGD participant, non-OFSP)

There has been a fake agrochemical for crop storage. It has been a problem; our crops are destroyed by insects. (Mbozi Woman FGD participant, non-OFSP)

Inadequate regulation and quality control of agrochemicals may result in crop and economic losses for smallholder farmers, aggravating household and community food insecurity.

Other threats

Lack of storage facilities especially for sweetpotato was mentioned by women in Wanging'ombe as a threat. They avoided producing more crop than could be stored to avoid post-harvest losses. Women also mentioned the lack of income-generating opportunities as a threat to food security:

We sell the harvests piecemeal to obtain money to meet our children's needs such as school items and health care. This means we do not store enough food for future use (Mbozi women FGD participants, non-OFSP).

Limitations in income generating opportunities would play a significant role in threatening food security if farmers have to sell their food to meet routine family needs.

Women and men in Ulanga mentioned decreased soil fertility as a major constraint to sweetpotato production. In Mufindi men cited health problems as a threat to food security, as illness can reduce active participation in farm activities of those who are unwell or those who look after them or take over their responsibilities.

2.2 Farmers' response to threats to food security

Response to pests and diseases

Five women's groups and one men's group of sweetpotato farmers named crop rotation as an important way of controlling pests and diseases. Women mentioned rotating maize with sunflower, beans, sweetpotatoes or cassava, among others.

We use sweetpotato as a major rotation crop and also during the drought season. Sweetpotato still gives us a fair yield even when we grow it on unfertile lands unlike other crops. (Mufindi women FGD participants, OFSP).

All the women's groups mentioning crop rotation as a way of managing pests and diseases often mentioned sweetpotato as a crop in the rotations. Most men's groups mentioned using chemicals to deal with pest damage for maize and beans as well as following the advice from extension officers. They also used rodenticides and traps for rats.

Coping with climate variability

In response to climate variability women farmers mentioned that they planted their crops near water sources for easy watering during the prolonged dry spells. In addition, they had increased cultivation of crops with a short maturation period like sweetpotatoes, beans and vegetables. Sweetpotatoes, cassava and sunflower were cited as drought-tolerant crops that women were increasingly cultivating to ensure food availability in periods of low rainfall.

We are cutting back on cultivation of poor performing crops such as maize, replacing them with resistant crops such as cassava and sweetpotatoes. (Mbozi women FGD participant, non-OFSP)

In Chunya, men said that it was difficult to reduce the volume of maize grown because maize was a key food crop.

Women in Mufindi stated that they needed to be more involved in irrigated farming to respond adequately to the food shortage shocks caused by weather variability. Some women's groups also talked about the need to

use pesticides for pests and diseases that result from weather extremes. Storage of harvest for the future also was mentioned as a way to respond to food shortages and insecurity related to climate variability.

Women often had more coping mechanisms for dealing with climate variability than men did, who insisted that most weather-related stresses were beyond human capacity to deal. Men also often relied on experts for information regarding the use and application of pesticides and education on environmental conservation. Only one men's group mentioned the use of drought-resistant crops such as cassava and sweetpotatoes as a way to respond to increasing drought.

Response to declining soil fertility

Although farmers did not directly mention low soil fertility, they often talked of the lack of fertilizers to improve their yields in situations where soil fertility was declining. Six men's groups and one women's group mentioned adoption of crop rotation to cope with declining soil fertility, while two men's groups mentioned environmental education as key in dealing with the problem. Some of the men's and women's groups considered the use of organic manure and timely weeding as ways of improving soil fertility. One woman's group mentioned fallowing and the use of land in lowlands and valley bottom, where there is adequate moisture. Women also mentioned expanding land under cultivation to compensate for declining productivity as well as renting land that had been fallowed, since it was likely to be fertile. This approach may not be possible for farmers in Mbozi where land holdings are small and there is land shortage and population pressure.

Response to other food security threats

Men and women said they did casual work on other people's farms to meet their cash needs and to improve their food security. Since agricultural loans are not easily available, in Mufindi men mentioned that they engaged in contract farming or barter trade, exchanging items such as fertilizer for food when they had a shortage in their households. One women's group and six men's groups mentioned adopting improved crop varieties as a way to improve yield and consequently food security.

2.3 Role of sweetpotato in people's lives in Tanzania

Sweetpotato was considered by many as a commodity that ensures food security because it is drought tolerant, often early maturing, adaptable to marginal soils and an important component in crop rotation and farming system in the project intervention districts.

FGDs were asked to list the three most important crops, but because of an error only women's groups were asked to list the three most important crops among those they cultivated whilst men were asked to list just the crops they cultivated (Figure 2).

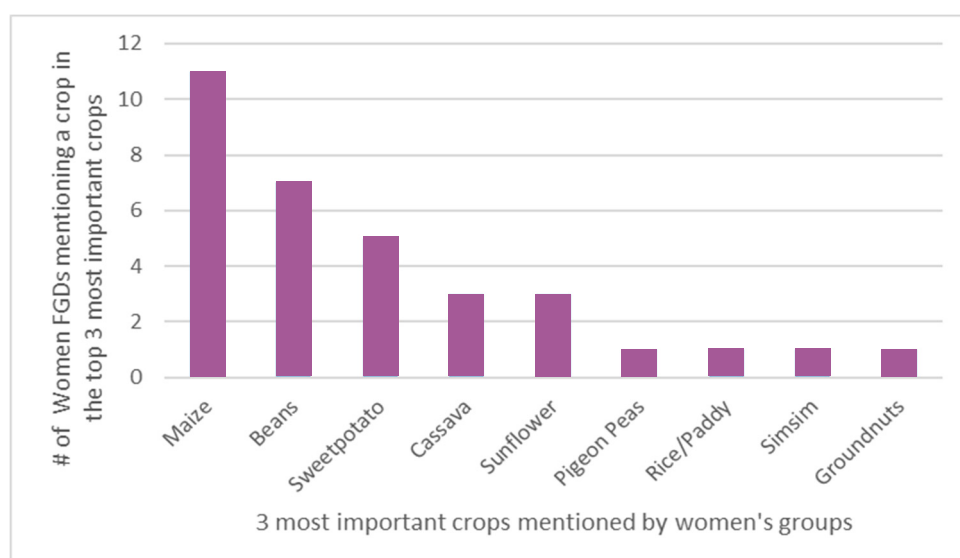


Figure 2: The three most important crops according to women's FGDs.

The diversity of crops that women regarded as important was significant. Maize was among the most important crops for many groups, followed by beans, sweetpotato and cassava. Men listed crops like maize, beans, sunflower, groundnuts, sweetpotatoes, tomatoes, onions, water melon and vegetables (spinach, cabbage, figiri), and cassava as the crops they commonly cultivated. Figure 3 shows the reasons women placed certain crops at the top and Figure 4 focuses on only sweetpotato and cassava.

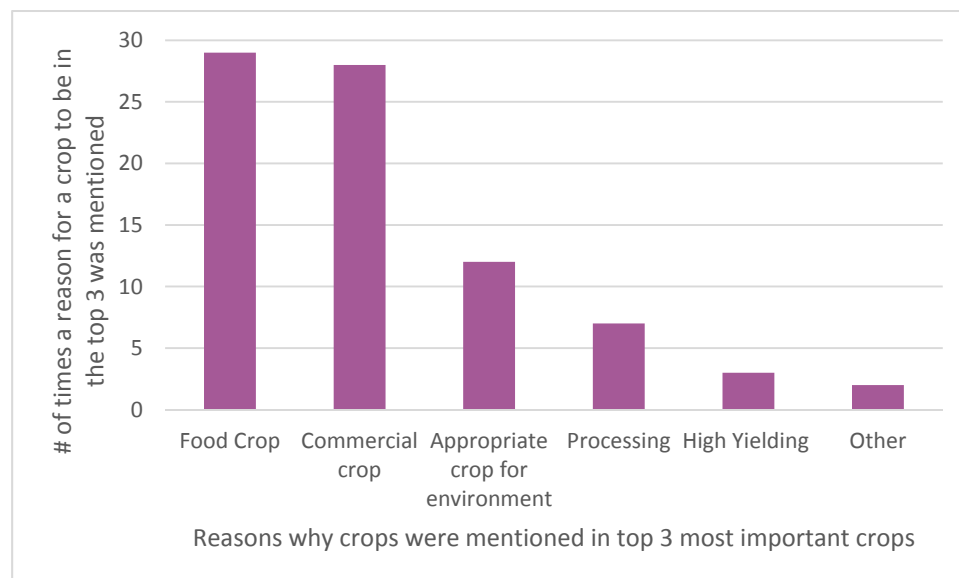


Figure 3: Reasons given by women for placing crops among their top three.

Most women's groups regarded crops as important because of their food value, for example maize, beans, sweetpotato and cassava. Since farmers also have cash needs that they meet through selling some of their agricultural produce, crops that were perceived as meeting both the food and the commercial/cash needs, for example maize, were ranked high. At least two women's groups stated that maize could be processed into local beer, which was a high income earner for women. Sweetpotato, beans, maize and pigeon peas were regarded as suitable crops for the environment and soil types prevalent in the districts. For example, in areas with poor soil types or low rainfall, sweetpotato was considered important because of its high yields in marginal conditions, drought tolerance and early maturity. Just like all crops in general, sweetpotato was regarded as important because of its commercial and food value (Figure 4).

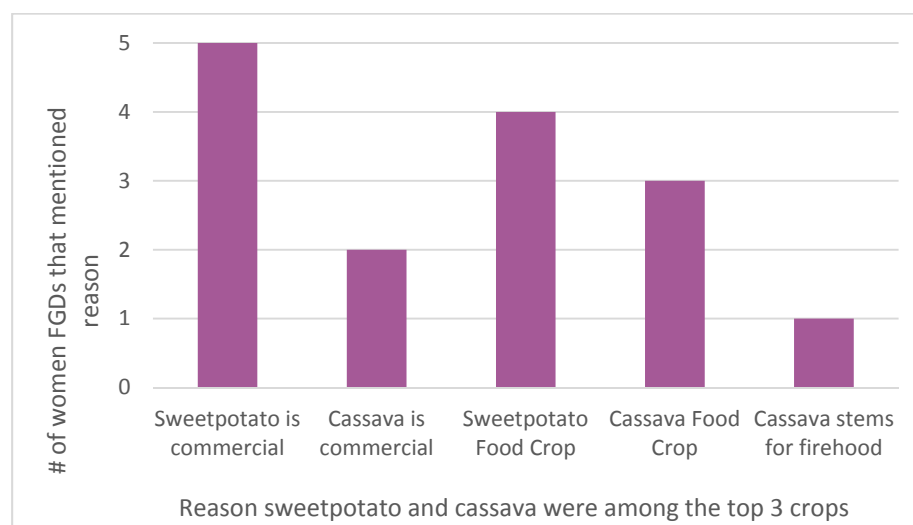


Figure 4: Reasons women's groups selected sweetpotato and cassava among the top 3 crops.

Sweetpotato could be sold or eaten as a snack or with tea in the morning, and its leaves can be used as a relish to accompany 'ugali', a local starchy staple.

Six of the 11 women's FGDs and all the men's FGDs did not regard sweetpotato as one of the top three important crops, for the reasons that (1) it is a food crop only and does not provide cash or have a good market (four groups); (2) it is a seasonal crop and is very perishable, meaning that families cannot depend on it for food security (one group); and (3) it is cultivated on small pieces of land for food only, it does not have many uses, and it cannot be cooked in other ways besides (one group).

Men normally regarded sweetpotato as a minor or support crop, and they gave several reasons for this: (1) it is for only domestic use and is therefore cultivated on small pieces of land (six FGDs); (2) it is very perishable and cannot be stored easily, therefore it is grown on a small scale to avoid loss through spoilage (two groups); (3) it is an 'additional' crop that allows a household to diversify its diet but is not a major staple (one group); and (4) it is not easily marketable compared with maize, sunflower or beans (one group).

Expanding the utilization of sweetpotato, introducing storage technologies and developing sweetpotato products and value chains may be key elements in improving its importance and farmers' investment in it.

3



Gender-based constraints in production
of sweetpotato and decision-making on
its cultivation and use

3. Gender-based constraints in production of sweetpotato and decision-making on its cultivation and use

3.1 Women and men's involvement in sweetpotato production

Farmers were asked to provide details of their activities in sweetpotato production and their resource needs, who was involved and how, and their constraints. The groups were asked to rate by consensus the level of involvement of adult men and women, and male and female youth in the activities using a scale of 0–5, where 0 was not involved at all, 1 was very little involvement, 2 was little involvement, 3 was moderate involvement, 4 was involved, and 5 was very much involved. Men and women were asked also to rate the involvement of members of their own sex in the activities, of members of the opposite sex, and of male and female youth. During data analysis the ratings for each sex and age group were added up by activity, sex and age and then divided to get the average involvement rating for men and women (Figure 5) and male and female youth (Figure 6).

The data showed that both men and women overestimated their own involvement and underestimated the involvement of the other sex in vine preparation, planting and storage (Figure 5). The reason for this discrepancy is not clear. Men considered their providing of money to buy vines or paying for labor as active involvement in the crop's activities, while women believed that they were actively involved because they provided the bulk of the labor needed in sweetpotato production. Women did not consider men's non-labor contribution as active engagement in sweetpotato production.

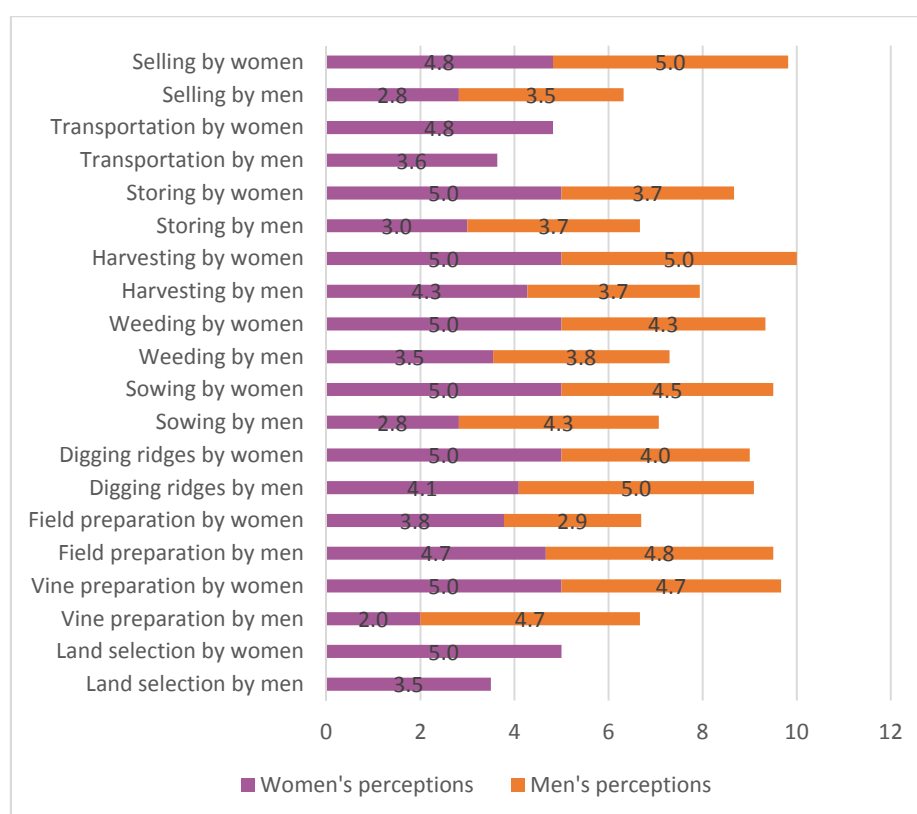


Figure 5: Men and women's perceptions of the involvement of members of their own sex and the opposite sex in sweetpotato production activities.

Men and women generally agreed that for most activities related to sweetpotato, women were more involved than men except in digging ridges, where men's participation was much higher. Women claimed that while men

were not actively involved in activities such as vine preparation because they did not know how to select the vines, and that women were involved in marketing of sweetpotato, men participated in the hard work like making ridges. This shows that while there was division of labor, both men and women played a role in sweetpotato production.

Sweetpotato is often regarded as a woman's crop or a crop that women cultivate and sell for income, therefore they are more highly involved in it, while men are more interested in other crops like maize and beans that give them higher incomes and have ready markets.

Sweetpotatoes are just an additional crop/extra crop. The woman is expected to sell what she harvests and use the money to buy little things like salt, so that she does not have to ask the husband for money for such items. (Mufindi men FGD participants, non-OFSP)

We as women know the problems of the house. Sweetpotatoes help us to solve small problems in the house. Men are only there to provide advice. Also sweetpotato is known as a women's crop. It is not necessarily a food crop; it is just an additional crop. (Iringa women FGD participants, non-OFSP)

The labeling of sweetpotato in some communities as an extra crop meant that men did not regard it highly. For example, in some cases sweetpotato was not regarded as a food or cash crop but as a snack taken for breakfast in lieu of bread. It was seen as an extra crop to diversify the diet but not as a key food crop. In such communities, men stated that they were focused on providing food and cash for the family and so did not engage in sweetpotato production since it was not good at providing either.

The importance of sweetpotato as a source of food or food security for women cannot be overemphasized; women are responsible for ensuring availability of food for the family and sweetpotato meets this need.

Normally women conserve sweetpotato because its leaves are also used as vegetables. Sometimes when they are conserving vines women also harvest roots. Women boil these roots and give them to children as food. They use sweetpotato leaves as vegetables and food for children during the dry months. (Male DVM, Chunya)

Even in normal situations, sweetpotato leaves are used as an accompaniment for local starchy staples. Thus for women sweetpotato has the dual purpose of providing food security and income to meet their daily needs.

The lack of high commercial value was stated as one of the main reasons why men were not actively involved in sweetpotato production and related activities.

Sweetpotato is known as a women's crop. This is because of traditional and cultural habits. In this village many people are of the Sukuma tribe. According to this tribe, women are the ones who cultivate sweetpotato. Most men undermine this crop because it does not generate family income since it lacks a good market. (Chunya women FGD participants)

Cultivating sweetpotato does not generate large financial benefits that would be attractive to men because of its poor market value, so they leave the little income that might accrue from it to women to purchase small household consumables. Men prefer to leave most of the sweetpotato activities to women except the hard work such as digging ridges.

Since men are interested in marketable products, success in involving them in OFSP production in Tanzania may depend on developing sweetpotato value chains.

It is our first year of OFSP cultivation and we haven't yet tested the products. Men are waiting for the results to see whether they will join in the production of OFSP or will continue to despise it. As for us women, we would like food for our children. (Women FGD participant)

While women need markets, they will still cultivate sweetpotato for its food value; but men are interested in its market value. As long as sweetpotato has no market value, men will regard their role in its production as that of

helping women with the difficult tasks and not much engagement otherwise. Men preferred maize to sweetpotato because maize was both a cash and a food crop.

Although men were interested in marketing opportunities for sweetpotato, some participants noted that it was women who were involved in searching for markets and selling the crop. This was so because most of the local markets were near the communities. Also there was no ready market for the crop and women were regarded as having the patience to stay at the market the entire day waiting for buyers. In Wanging'ombe, where sweetpotato was not listed among the top three important crops, the participants said that even when men sold sweetpotato they handed over the money to their wives.

They [men] are not involved. Women take care of the house by providing sweetpotatoes as food and after selling the excess roots, they use the money for the daily family needs such as buying sugar, soap, salt and other household goods. Even when a man happens to sell sweetpotatoes, he gives the money to his wife. It is just that men do not consider sweetpotatoes as their crop. (Wanging'ombe women FGD participants, OFSP)

Where men had other sources of income women could market sweetpotato and use the money to meet their needs, although family requirements took precedence. However, in some communities such as Mufindi men controlled the income women got from sweetpotatoes. The control of revenue from sweetpotato by men and women varied among the districts. This shows that the analysis has to go beyond the involvement in the market by the different sexes to understand who benefits and who has decision-making power over the use of the income generated.

In some discussions the gender division of labor as well as gender discrimination and unfair cultural practices were used to explain why in some instances women were more involved in sweetpotato production activities than were men.

Women are more involved than men because of the patriarchal system (mfumo dume) existing in the society. Women and girls are considered as tools/instruments for work. (Mufindi men FGD participants, non-OFSP)

For the other activities like cultivation of ridges, planting and weeding, women and youth are much more involved than men because sometimes men are irresponsible. It is also due to the regressive norms and traditions in our society that undermine women. (Mufindi women FGD participants, OFSP)

Another thing is that the division of labor in the household may result in women focusing on some crops and men on others. A husband and a wife may discuss and agree to work on different activities. (Wanging'ombe women FGD participant, OFSP)

The high involvement of women in sweetpotato production was linked also to their value as laborers. But this should not always be seen as discriminatory, since, as women confirmed, during the cropping season households distributed their tasks to ensure that they met their family food and labor needs.

Changing trends

There was a sense that although women were more involved in sweetpotato production than were men, in many cases there was cooperation and collaboration between the sexes. In some cases men were not involved in sweetpotato because they were working on other crops or were engaged in other demanding activities.

During the sweetpotato planting time the men are planting maize and so they would not be able to work in two places at the same time. (Wanging'ombe women FGD participant, OFSP)

Men noted that both men and women were involved in planting sweetpotato vines because everyone wanted to ensure that the material was not infected by pests and diseases, and also in harvesting because they wanted to see the quantity harvested. Male participants in Ulanga said that they helped their wives in sweetpotato production because the wives had a lot of work to do in the home such as cooking and caring for children. This

means that to understand what happens with sweetpotato there is need for a whole systems approach that looks also at what is happening with the other crops.

Training in fostering household cooperation is important. In discussions, women expressed the view that men were becoming more and more involved in sweetpotato production and collaborating more with their wives within the household. Women in Iringa stated that nowadays men understood the importance of cooperation and collaboration in the house. Women attributed this to training from various organizations about the importance of collaboration within the family, and particularly training about the importance of OFSP.

For the case of OFSP cultivation, both women and men are very much involved in all activities. The men are highly involved because of the knowledge we received from the training.

He knows that these types of sweetpotatoes have got health benefits, can be cooked and eaten in different ways and also can provide income. (Mufindi women FGD participants, OFSP)

Training about cooperation and also technical training and awareness raising about OFSP can foster teamwork and positive collaboration. The varied uses of OFSP, its potential for income generation and health benefits are increasingly encouraging cooperation between men and women in sweetpotato cultivation.

The data suggest that as sweetpotato becomes commercialized with the introduction and adoption of OFSP, more men will get involved in its production and possibly will increase cooperation with women in an effort to enhance family incomes and health, as a DVM noted when asked whether women would lose out to men if sweetpotato was commercialized.

It will not happen. Men will not take over because we have the same intention of increasing the family income and food and also improving the health of the family. I am saying that because, if I go for postnatal clinic and I am advised that the child has to be fed with nutritious food, we have to work together because we have to look after the child. Using OFSP we can reduce the cost supplementary feeding and do so while improving our health (Female DVM, Mufindi)

Men and women pointed to cooperation between the sexes to meet household health and food needs as something that had become possible with the introduction of OFSP. This was so because OFSP was perceived as meeting not only the family's food needs but also providing for the income and health needs, much more than did the old sweetpotato varieties, which did not have a ready market and whose health benefits were not understood by men and women farmers.

3.2 Youth involvement

Figure 6 shows the perceived involvement of the youth by men and women adults in sweetpotato production. Men consistently underestimated the involvement of the youth in many activities related to sweetpotato production but women did not.

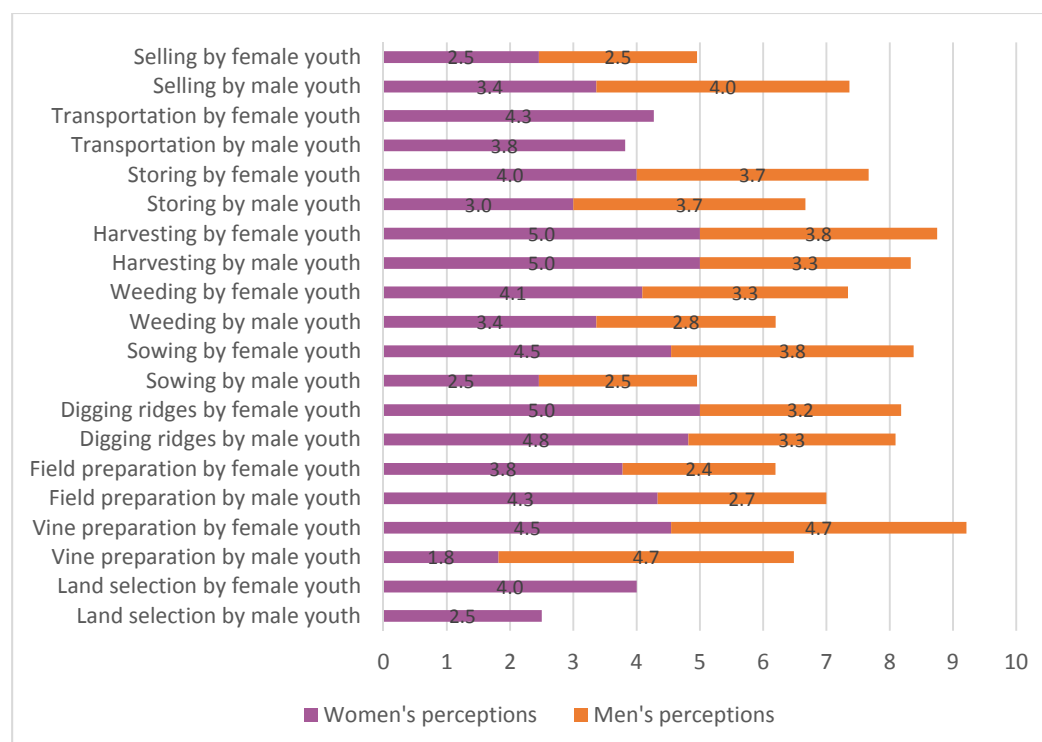


Figure 6: Women and men's perceptions about youth involvement in sweetpotato production.

While the reasons for the discrepancy between men and women's perceptions on youth involvement are not immediately clear, it is possible that since in many instances sweetpotato was regarded as a woman's crop, women were more likely to work with and depend on youth labor for the crop and therefore were more likely to rate youth contribution highly compared with men, who were not actively involved in most of the sweetpotato production processes.

Female youth were perceived to be more involved in sweetpotato production than were their male counterparts except in marketing and vine preparation, where male youth were highly involved. Some FGDs also mentioned that the majority of the youth, especially those 20 years or younger, were in school and so their participation in agricultural activities was lower than that of their parents or the older youth.

Inadequate knowledge on sweetpotato farming limited the extent of youth participation in all the sweetpotato production activities. Women said that male youth were not involved in vine preparation and selection because they did not know how to select the best seed or how to apply fertilizer. During the time of vine preparation men and male youth also had other responsibilities, leaving sweetpotato work to women and female youth. FGD male participants also perceived male youth as not interested in agriculture in general, blaming this factor for their limited involvement in sweetpotato farming compared with female youth.

Most [male] youth do not like farming. They want a quick and easy life so they are mostly found working in small industries. (Mbozi men FGD participant, non-OFSP)

Male youth do participate alongside their parents/fathers. Apart from that, most of the male youth are involved in other matters like working as mechanics. (Ulanga men FGD participants, OFSP).

In Mbozi the local industries provided employment opportunities for male youth. It is possible that where there are other non-farm income generating activities the youth will be more interested in those.

The gender division of labor pattern for adults was also reproduced among the youth. For example, in some cases male youth were regarded as more involved than female youth in land preparation because it was hard work, while female youth were more involved in shifting and preparing vines, planting, and weeding, because these were women's work and were regarded as 'kazi ndogo' (easy work).

The female youth are involved in planting, preparations of 'matuta' (ridges) as well as harvesting. This is due to the fact that the mothers wish to work with their daughters, teaching them work. (Ulanga men FGD participant, OFSP)

In preparing 'matuta' (ridges) and harvesting, both male and female youth are very much involved. This is because each and every family needs to get the work done quickly. (Chunya men FGD participant, OFSP)

The perceived involvement of youth mirrors the gender division of labor, as female youth are prepared for their roles as wives and mothers by their mothers while male youth are prepared by their fathers for their roles as fathers and household heads.

3.3 Overall constraints to sweetpotato production

Farmers' groups and DVMs were asked to list three main constraints in sweetpotato production with a particular focus on OFSP, although farmers tended to talk about sweetpotato production in general regardless of the varieties (see Figure 7). Men mentioned more constraints than did women.

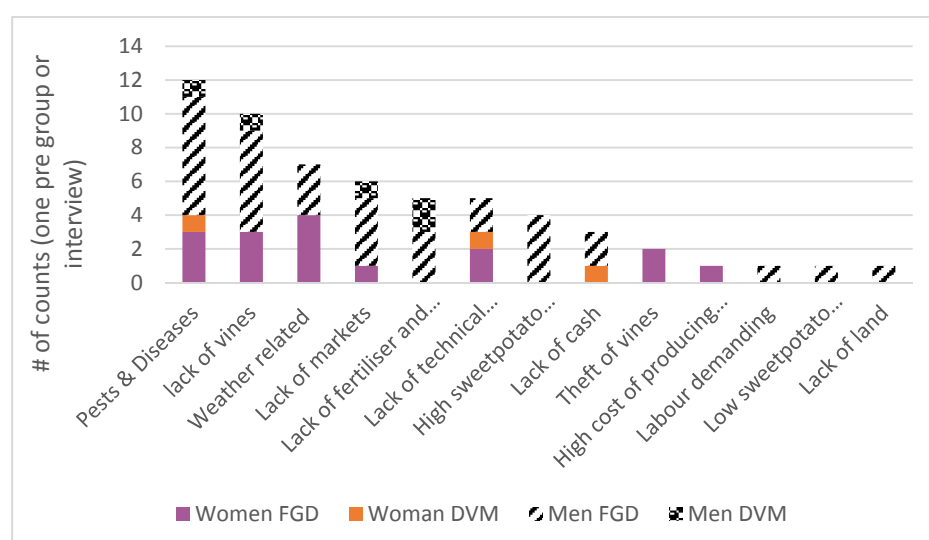


Figure 7: Sweetpotato production constraints by sex.

Pests and diseases

Farmers had problems with pests and diseases but they did not know how to deal with them. Some pests and diseases caused rotting or change in the taste of sweetpotatoes, lowering the quality of the produce. The solutions included training on the kind of agrochemicals to spray, how to prepare the nursery to reduce the incidence of pests and diseases and how to use net tunnels to protect the planting material. Farmers said that there was need for closer engagement with extension workers whom they said should go to the village more often to offer advice. In Mbozi men stated that cheap traditional methods to deal with insects should be explored and used.

Rats, livestock and wild animals were said to destroy sweetpotato and other crops. In Chunya women stated that there were no grazing lands for livestock, while in Iringa men said that animals from the Ruaha National Park destroyed and ate their sweetpotato. The solutions they suggested included closer monitoring of livestock in the village, setting up traps for rats or keeping cats, and collaborating with park rangers to ensure that wildlife did not get into farms.

Lack of vines

Lack of OFSP vines was mentioned as a big obstacle in the production of OFSP roots. In some cases the late supply of vines to farmers was a problem, since farmers could not multiply enough seed for planting before the start of the rains. Some men stated that the volume of the vines multiplied in the community was low since most people produced them only for their own consumption. This meant that most men, who generally did not belong to sweetpotato groups, had difficulties accessing seed. Men suggested that they should be allowed to join such groups so that they also could learn how to multiply OFSP vines.

Weather problems

Weather problems such as prolonged dry spells and flooding make it difficult to conserve vines. The solutions suggested for this included availing irrigation. In Mbozi farmers did not have the money to repair their irrigation pipeline, so their vines were destroyed during dry weather. This suggests that availing irrigation for vine multiplication is not enough; there should also be long-term provision for a mechanism for maintaining the irrigation equipment. To deal with flood water, farmers suggested conserving vines in areas not prone to flooding to ensure enough planting material was produced, digging water channels to carry the water away, and making big ridges that could withstand high water volumes. Reforestation was suggested as a long-term measure to reduce flooding.

Lack of markets

The lack of markets affected the production of sweetpotato vines and roots, since farmers restricted their production volumes to avoid losses. Farmers said that they needed help from the government and NGOs to develop sweetpotato value chains and to grow the market. A market related problem was the lack of transport, which was responsible for the loss of harvested sweetpotato before marketing.

Lack of fertilizer and equipment

Farmers were concerned that the fertilizer they needed to produce large roots such as NPK was a problem to obtain. Women mostly were concerned about the lack of equipment, since, unlike men, they did not have opportunities for casual labor to raise money for its purchase. Both men and women farmers said that they needed financial support to access inputs and equipment. Men also suggested formation of associations through which equipment like power tillers and motorbikes could be made available.

Lack of technical knowledge

Farmers said that they had little understanding of OFSP production and did not even know how to deal with its pests and diseases. Some men's groups blamed their poor knowledge and technical skills on the lack of training and failure to integrate OFSP activities in the extension system. The solutions suggested included availing training to community members even those not in groups.

High sweetpotato perishability and lack of storage

Lack of storage was regarded as a factor demotivating male farmers from engaging in sweetpotato production. Men said that they needed more training on storage.

Theft

Theft of OFSP vines was high according to Gairo and Mufindi women, which meant that they had to spend a lot of time guarding the vines. One solution suggested was to provide enough OFSP vines. Vine theft was not a problem with the white and yellow sweetpotato varieties.

High labor demand

In Iringa men stated that making ridges was labor intensive and needed a lot of effort and energy. As a result of this farmers ended up cultivating only small portions of land. A solution was suggested to mechanize or find alternative and easy ways of making the ridges.

3.4 Constraints related to specific sweetpotato production activities

Land selection

It was only in three FGDs did women mention selection of land before cultivation of sweetpotato as an activity that they engaged in. This was done by both men and women since they both had the necessary knowledge to select the land that was not affected by pests that attack sweetpotato. The youth could be involved but only so they could learn and understand how it was done. The constraints related to this activity included lack of land, which might have resulted in inappropriate land being selected for sweetpotato farming. Some of the problems that arise from using inappropriate land include:

- High prevalence of pests that damage roots;
- Waterlogging of land will impair sweetpotato growth and increase its chances of rotting;
- Hard and rocky land will prevent sweetpotato roots from growing;
- Presence of grass and trees will prevent sweetpotato from doing well.

Women did not perceive access to land as problematic, but the quality of the land they had access to for sweetpotato production was a major limiting factor.

Vine preparation and conservation

Vine conservation methods are the same for white-fleshed and OFSP varieties except the spacing of the vines. Farmers named the activities involved in vine planting as digging small holes for planting vines like those for planting maize, irrigating, and applying pesticides and fertilizers, but local or white varieties did not get fertilizer. Before planting, the vines needed moving from the multiplication site to the planting site. Before being trained on how to conserve OFSP vine farmers used to leave some roots in the ground at harvest time for sprouting after the first rains, and the resulting vines would be multiplied and used as planting material. The constraints associated with vine preparation included:

- Theft of OFSP seed (five women);
- Weather-related damage to vines for example from drought and floods (four women);
- Shortage of money to buy vines (four women);
- Damage from pests and diseases, which could destroy vines turning them brown and curling their leaves (three women and two men);
- Long distance from the areas selected for vine conservation to the water source or the water might not be sufficient (one woman and two men);
- Health-related concerns such as injuries from equipment and tools such as knives during preparation of vines, or from animals such as snakes hiding in foliage (one woman one man);
- Lack of fertilizer or lack of knowledge on how to apply it (two women);
- Insufficient seed in the village as well as lack of healthy planting material to use for vine multiplication (two men and three women);
- Vine delivery delays (one man).

Field preparation

Field preparation involves cutting trees, weeds and grass as well as removing tree roots, and usually it is carried out by men and women together. It was mentioned often that during land preparation men slashed grass, cut trees and pulled out tree roots while women collected and burnt the slashed grass.

[Men] are more energetic and trained to do hard tasks. Also it is part of our norms and traditions for men to do hard tasks like those. Women are involved in doing simpler tasks like collecting grass and burning it. (Mufindi women FGD participants, OFSP)

Slashing is mostly done by men because they are well experienced in handling the 'nyengo' while women are not. (Mbozi women FGD participant, OFSP)

Female heads of households without adult men to help or money to pay for labor could be engaged in some of the difficult tasks related to field preparation.

Women mentioned health risks associated this land preparation as a major constraint, while men mostly mentioned the lack of resources. The specific constraints mentioned were:

- Snake bites and insect stings (six women and two men)
- Injuries from hand hoes, pangas and slashers (five women)
- Injuries from thorns (three women and men);
- Lack of land (five men);
- Lack of funds (six men)
- Lack of farm-appropriate implements such as slashers, machetes, sickles, rakes and 'nyengo', and inputs (three women and six men);
- Difficulty and strenuousness of the work (one women's group);
- Fire outbreaks during land preparation (one woman);
- High speed of weed growth (2 men);
- Sunburn (one men's group).

Digging ridges

Male and female farmers, including the youth, were involved in making ridges, although men were more involved than the other groups. The constraints mentioned included:

- Injuries from farming tools (four women);
- Snake bite and injuries from thorns (two women);
- Lack of money and capital to hire oxen to make the ridges or hire labor (one woman and four men);
- Difficulty and laboriousness of the work of digging out tree roots (one woman and three men);
- Flooding and drought, which made it difficult to make ridges (one women's group and three men's groups)
- Lack of appropriate equipment such as 'sururu' for removing rocks (one women's group and one men's group);
- Lack of technical skills to prepare ridges for high yields (one men's group).

Planting

The main constraint mentioned in regard to planting of vines was the lack of seed. Other constraints were:

- Insufficient and poor quality of seed (two women and five men);
- Snake bites (one women's group);
- Lack of knowledge on proper planting (one women's group and one men's group);
- Lack of rainfall during vine establishment (two women's group and three men's groups);
- Undesirable harm to the body such as development of callouses on farmers' hands (one women's group);
- Hard and rocky fields (one women's group);
- Injuries from thorns (one women's group);
- Lack of skilled labor (two men's groups);
- Theft of seeds/vines from the seedbeds (one men's group);
- Lack of cash (two men);
- Lack of land (one men's group);
- Lack of irrigation equipment (one men's group).

Fertilizer and pesticide application to vines

Application of fertilizer and pesticides was mentioned by men in only two villages. The following constraints were highlighted:

- Lack of cash for purchasing fertilizer, insecticides and herbicides (two men's groups);
- Inability to afford transport (one men's group);

- Too much rain, resulting in leaching/washing away of fertilizer (one men's group);
- Lack of spray cans (one men's group);
- Difficulty in availability of pesticides and insecticides (one men's group).

Weeding

Both men and women were involved in sweetpotato weeding in many of the districts in the study. The constraints for men were labor related, while for women they were health related. Four men's groups did not mention any constraints related to weeding. The other constraints included:

- Drought, which dried the soil making it difficult to weed (one women's group);
- Improper spacing at planting, causing destruction of seeds during weeding or making it difficult to weed (one women's group and one men's group);
- Snake and insect bites (two women);
- Leg injuries from hand hoes (one women's group);
- Hand injuries from grass handling (one women's group);
- Lack of capital to hire people for weeding (two men's groups);
- Fast growth of grass due to rain (two men's groups);
- Lack of labor in general and particularly reliable labor (two men's groups);
- Lack of funds for purchasing herbicides (one men's group).

Harvesting

Sweetpotato harvesting is usually piecemeal, and usually occurs when there is need for the roots for food. This is mostly done by women. Only two men's groups did not have constraints relating to harvesting. The following constraints were highlighted:

- Theft of roots from the farm (two women's groups);
- Destruction of roots by livestock in the farm (one women's group);
- Destruction of sweetpotato roots by moles and insects (three women's groups and one men's groups);
- Improper planting spacing or harvesting technique, which causes root damage during harvesting (three women's groups);
- Lack of money to hire labor, purchase sacks for storage and equipment, or pay for transport (two women's groups and four men's groups);
- Injuries from maize stalk used as manure (one women's group);
- Low harvests due to poor crop growth (two women's groups);
- Rotting of sweetpotato roots due to the lack of storage (seven men);
- Lack of storage bags (two men).

Transportation

Although women and the youth were involved in transporting sweetpotato roots, this was regarded as mainly a responsibility of adult men. The distance to the market and the demand of domestic chores were used to explain why men more than women were involved in it. However, men, women and children transported the roots from the field to the home. Some women noted that some households that did not have bicycles were forced to harvest their sweetpotato a little at a time for home consumption, since they had to carry the roots on the head. The following constraints were listed:

- Poor roads from the farms to the markets (two women);
- High cost of labor (one women's group)
- High cost of transportation and lack of cash to hire transport means (four women);
- Lack of reliable transport. The breakdown of transport on the way to the market could result in the loss of sweetpotato (two women);
- Lack of storage facilities (one woman);
- Lack of bicycles and damage to bicycles during transportation (two women);
- Lack of markets (one men's group).

Storing

Several constraints were mentioned in relation to storage of sweetpotato roots:

- Snakes present in the storage pits posed a danger to farmers (one women's group);
- Sweetpotatoes could spoil or be attacked by rats in pit storage (three women's group);
- Family cash needs made storing enough sweetpotatoes difficult, and more sweetpotatoes than advisable were sold after harvest (one women's group);
- Lack of storage facilities (one men's group);
- Theft of stored sweetpotato (one women's group);
- Difficulty in obtaining money for purchasing sacks for storage (one women's group).

Access to land

Lack of land or appropriate land was mentioned as a constraint to some farming activities such as land selection or preparation of vines. A male DVM in Wanging'ombe was of the opinion that it was men who decided on adoption of new crops because all the land and farms were under their control. This was one of the reasons that the study asked farmers about access to land for sweetpotato cultivation.

Farmers noted in interviews that while in the past sweetpotato farmers did not use manure and relegated sweetpotato to the infertile land, things were changing because sweetpotato had become a cash crop. Farmers were now trying to plant sweetpotato in the fertile red/black loam soils, on land near water, on fallow land, or on land where it was not cultivated the previous season. However, in some cases farmers did not use fertilizer for sweetpotato although they would for maize if it was planted on the same soil, because sweetpotato could do well on marginal land. It was noted that in some cases ownership of the land could affect a person's ability to make decisions, since joint ownership almost always entailed joint decisions over the crops grown.

For the Sukuma tribe, women can own parcels and cultivate and make decisions on what they cultivate. For the Wabungu tribe a woman cannot own land parcels or make a decision on land by herself. If a woman is found to own a parcel of land alone she may get a hard time from her husband or even a divorce. In the Wabungu tribe the husband and the wife own land parcels together and decide jointly on how it will be used. (Chunya women FGD participants, OFSP)

Access to land and the ability to make decisions over it jointly with a spouse or individually may have a bearing on people's decisions over what crops to adopt and where to plant them. Because of the gendered nature of land ownership, while men and women in a household could consult each other over the use of the land, male household heads had the final say.

The distribution of land is done through consensus in the family but to a great extent the husband is involved in making the decision. For example, he can decide that a certain portion or quarter of the land should be used for growing sweetpotato and the rest for maize. (Chunya men FGD participant, OFSP)

Women in Mufindi district said that within families women could be allocated a piece of land to cultivate their own crops. This added to their work, because they still had to fulfill their domestic responsibilities as well as work on the joint land plot. They could make decisions on the land parcel they controlled.

Women's parcels

It is not the norm for women to independently own land parcels although this trend is growing as some women are purchasing their own land or inheriting land from their parents. However, most of the parcels regarded as women's land are the land that their husbands allocate them to use for their own crops. Women often used the income from their parcels to cater for immediate household needs.

We are responsible for all the activities and we make decisions by ourselves without any men involved. Normally we use some of the harvest for family food and the rest gets sold. The income we obtain is used to cover the immediate needs of the family like school items, sugar, salt, vegetables and also any

personal needs a woman has. It is somehow difficult for us. We have many responsibilities in the family, and we have to work in the joint parcels and in our own land. (Wanging'ombe women FGD participants, OFSP).

Those of us who own parcels are responsible for all the farm activities while at the same time we do household work and farming activities in the joint parcels. It is really hard; we have to plan the time for all those activities. We have to give out ourselves and agree to suffer during that time. (Chalowe women FGD participants, non-OFSP)

While women like to have their own land parcels, it often results in them overworking since they have to work on their plots as well as the plots they own jointly with their husbands. In some instances women may own land parcels and decide what to cultivate, but they have to consult their husbands on the use of what is harvested or the income from the parcel.

Women who own parcels in this village are few; about 20%. Some of these women do not involve men in all activities and decision-making on the harvests and income.

Whereas some women don't involve men in the activities, they involve them in the harvests and income obtained. Then both of them make decisions on these and the needs of the family. (Wanging'ombe women FGD participants, OFSP)

Such situations depend on whether a man allows his wife to use and invest her money in the way she sees fit or whether he wants to be consulted on everything. The freedom of women to decide on the money and harvests from their own parcels of land depends on the benevolence of their husbands or the household heads. In Ulanga men stated that even when a woman owned the land through inheritance or other means, it was her husband who made the decision about what would be done with the harvest.

Men's parcels

It was noted that men's parcels of land were often bigger than those of women or the joint land. Men were the sole decision-makers on their parcels and did not need to consult women on their decisions.

For their parcels men select the fertile lands. They also use better farm management practices on them than on the joint parcels like applying fertilizers, spraying to deal with pests and diseases, weeding, pruning and watering.

Men's parcels are used to cultivate commercial crops only. They are responsible for all the activities in their farms without women involvement.

They make decisions by themselves. They do not tell women of their income and how it will be used. They take care of their own priorities like paying school fees, constructing a house and purchasing land. (Mufindi women FGD participants, OFSP)

Men's parcels were usually for commercial crops, which also received better investments than did women's crops, mainly regarded as crops for family food. Unlike women, men had the sole decision-making power over their parcels of land and on how the harvest and income from the crops were used.

Majority of the men own parcels in this village. It is a normal thing for a man to have parcels especially for commercial crops like 'simsim' (sesame).

They are responsible for their parcels' activities and decision-making on the produce obtained. It is different for men; women never ask, because they are not encouraged to ask about what goes on in men's parcels or to intervene in men's decision-making on the produce obtained from the parcels. If a woman insists on asking the man, it can be trouble for her.

Usually men have their own priorities for the family. Once he obtains the income, he goes on to accomplish things he considers important, for example buying cattle or land, paying school fees or dealing with other priorities. (Wanging'ombe women FGD participants, non-OFSP)

It is clear that men have more decision-making power than do women regarding the distribution of land and other household resources; that can have an impact on agricultural production.

Joint parcels

Joint parcels are regarded as plots of land where men and women together farm food for the family and decide on what to farm. Some districts like Mbozi were said not to have men or women's parcels but just joint parcels. However, in Mufindi men and women had individual parcels in addition to joint parcels.

Usually joint parcels are used to cultivate food crops for the family. They are normally located on land with low fertility and given little management attention compared with men's parcels.

We normally harvest little, which is used for food, and sometimes it is not sufficient to feed us for the season. (Mufindi women FGD participants, OFSP)

In many cases both men and women decide jointly on the joint parcels, and money from selling crops from those parcels can be used for household priorities such as paying school fees, health, house construction, buying assets etc.

It may be important to promote household collaboration in agriculture to raise productivity of women's plots to reach the levels of men's and jointly owned plots.

3.5 Access to credit limitations

One of the constraints mentioned was lack of money or cash to invest in various stages of sweetpotato cultivation. To determine the availability of credit we asked men and women whether they had access to credit and loans. Table 2 shows the sources of credit and whether they targeted men or women.

Table 2: Sources of credit

Credit source	Village	Target	
Village Community Bank (VICOBA)	Gairo, Ulanga, Wanging'ombe, Mufindi, Songwe, Mbozi	Women/men	High interest (Mufindi)
Jocoba (Jombe Community Bank)	Wanging'ombe		
Tanzania Women Community (Umoja wa Wanawake Tanzania)	Gairo	Women	
Foundation for International Community Assistance (FINCA)	Iringa, Ulanga women	Women/men	High interest rates at 3%
Promotion of Rural Initiative and Development Enterprises Limited (PRIDE)	Iringa	Women/men	High interest rates at 3%
Mama Bahati Foundation	Iringa	Women/men	High interest rates at 3%
Women's savings groups		Women	
YOSEFA	Ulanga women	Women/men	
Mufindi Community Bank (MUCOBA)	Mufindi	Women/men	
Njombe Community Bank (Njocoba)	Wanging'ombe	Women	
Tanzania Agriculture Development Bank	Mbozi		

It seems that both men and women had access to credit; however, women mostly obtained small loans through women's savings groups and often did not attempt to get larger agricultural loans, for example from the Tanzania Agriculture Development Bank, for fear of defaulting. Women stated that they had access to credit through loans and savings groups that provided low interest loans, such as VICOBA and women's savings clubs.

In our own savings groups, a member is able to get a loan of a maximum of 500,000 Tanzania shillings and a minimum is 100,000 Tanzania shillings, which has to be returned with an interest of 10,000 Tanzania shillings within three months. (Mufindi women FGD participants, OFSP)

Women in this village are able to access credit through local and informal village savings groups. Most of the groups are in the village and run by the women themselves.

There are very few men in this group too. Generally the village and savings groups can be able to provide credit to about 100 villagers in a year. (Mbozi women FGD participants, OFSP)

In terms of local access to money, women had slightly better opportunities than men did because women belonged to and actively participated in savings groups. Women regarded their savings clubs as better than other lenders because of their low interest rates. It was generally agreed that men did not participate much in savings and credit clubs and therefore did not access loans through these channels. Except for Chunya, women generally had a positive perception about their ability to access loans. Women also mentioned other loan sources, for example those that gave agricultural inputs instead of cash.

We also have the Mufindi Community Bank. In 2014 it provided farm inputs at a low price to group members. (Mufindi women FGD participant, OFSP)

Women alone are also involved with Njocoba (Njombe Community Bank), which has come to our village to provide fertilizers at a reduced price. But it deals with only women in groups. (Wanging'ombe women FGD participant, OFSP)

Although some loan products targeted only women, leaving men out, women still needed their husband's permission to access credit. Mufindi men's main complaint was the high interest rates charged by lending institutions, but men in many of the FGDs complained about the poor credit situation.

The situation is very poor; we don't have groups or associations for credit such as VICOBA. Women are much more involved in credit associations than are men (Iringa men FGD participant, OFSP)

Women access credit easily compared to men as they are quick in returning the cash and also because most associations are formed by women. (Mufindi men FGD participant, non-OFSP)

Loans are given mostly to people who are in associations. (Mufindi men FGD participant, OFSP)

Because men were often not members of associations and did not want to join them, they frequently had problems accessing credit to invest in agricultural production.

Women farmers stated that while they were able to obtain loans from their associations, there was not much credit from formal sources. One woman said that her husband had received a loan from the Tanzania Agriculture Development Bank in the form of fertilizer, seed and cash for weeding and farm management.

We have not been able to access loans from other formal financial institutions like FINCA, PRIDE and banks because they haven't reached us. They came to give us seminars but have not come back since then. (Wanging'ombe women FGD participant, OFSP)

We have not received any agricultural loans or other financial support from outside. (Female DVM, Gairo)

Some of those who received loans from savings and credit societies said that they used the money for maize farming because maize was the major crop both for food and commerce. This also shows that if sweetpotato does not make commercial sense to invest in, farmers will not make huge investments in its farming. In Wanging'ombe, for example, men mentioned that they got loans for maize but not for sweetpotato because it was used for family consumption not for marketing and would not generate revenue to pay back such loans.

Both men and women farmers said that the available formal credit was inappropriate for them because of its high interest rates, which increased default rates. That is why men and women preferred to borrow money from village community banks.

3.6 Marketing constraints

Men and women's groups were asked if both genders were involved in marketing of sweetpotato roots and vines. The general consensus was that it was women who were involved because they were the main growers

of the crop. Also they were involved in OFSP marketing because it was they who mostly had received the training, although men were increasingly becoming involved.

When asked if men and women who were involved in sweetpotato marketing targeted similar or different markets and clients, the general view was in the affirmative for the markets inside or close to the village. In at least one community it was mentioned that men targeted markets outside the village and women markets inside the village. It was stated that men could carry heavy loads far and manage market inconveniences better than women could, whilst domestic responsibilities prevented women from travelling far from home. At least two men's groups and two women's groups stated that they participated in sweetpotato marketing as members of groups.

The groups were asked to name the three most important constraints in sweetpotato marketing. Women listed more constraints than men (Table 3).

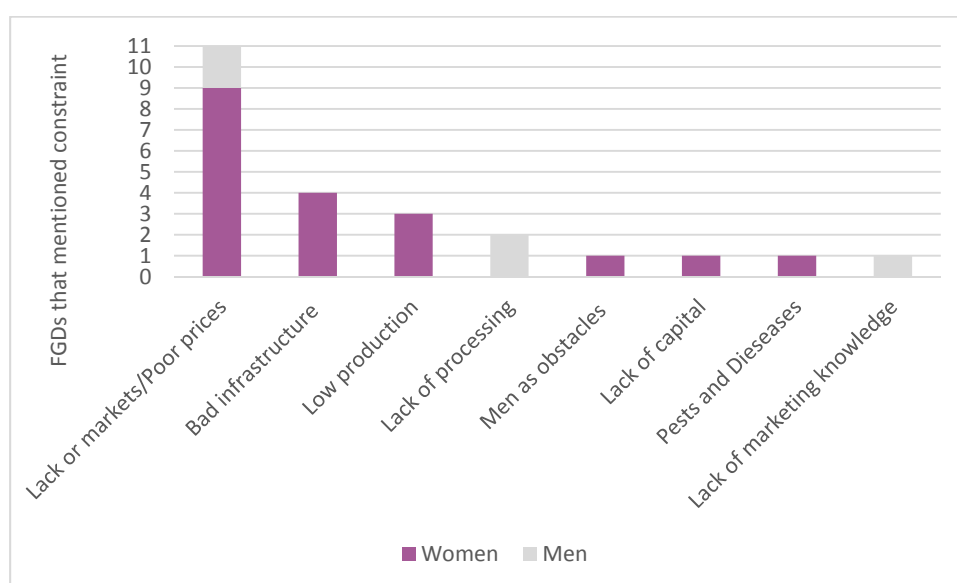


Figure 8: Marketing related constraints mentioned by men and women.

While it is not clear why women raised many more constraints than men, it can be assumed that the fact that women were more involved in sweetpotato marketing than were men made them better at identifying the obstacles.

Lack of markets and poor prices

Many more women's than men's groups mentioned the lack of markets or poor prices as an obstacle. Women said that the low prices undermined their desire to produce more sweetpotato. The reasons for the poor markets included the lack of consumer awareness of the importance of sweetpotato, a sweetpotato glut during harvest time that lowered the prices, few buyers available in the villages and no alternative markets, and the lack of industrial buyers of sweetpotato to ensure a constant demand. The solutions suggested included support from the government, research organizations and NGOs to develop sweetpotato value chains.

Low production

The low production of sweetpotato roots was a function of many factors. For example, people did not understand the importance of sweetpotato and did not have enough capital to produce enough volumes for sale. Sometimes farmers were faced with pest and disease challenges that also reduced the sweetpotato produced and, by extension, the volumes available for sale. As a solution to low productivity, farmers suggested that the proportion of land under sweetpotato be increased, support and training be provided by extension officers and a farmer association be formed to support sweetpotato farmers.

Infrastructure

Women mentioned bad infrastructure as a problem, such as the lack of good roads and transportation means, as well as the lack of appropriate structures to sell the roots from. They suggested repairing existing roads to make them passable.

In one case, men as heads of households were said to sometimes prevent their wives from going to the market. For instance in Gairo women stated that the 'mfumo dume' system was an obstacle for them because it gave men the power as household heads to take responsibility for marketing all produce from the household.

3.7 Gender and decision-making on the adoption of sweetpotato

The study also sought to understand who made decisions regarding new technology adoption. In all the districts except Wanging'ombe, men and women decided together on the crops and technologies to adopt and the land parcel to use for which crop. In Gairo district, women could own personal land parcels and decide what to produce on them. However, the majority of the land was jointly owned, so women and men decided together on what to produce and its fate after harvesting.

Joint decision-making for adoption of crops or even their improved varieties was considered by both men and women as important because such introductions would affect the whole family, and also when crops are adopted by mutual consent it is easier to work and manage them in the home.

There is no difference in decision-making for sweetpotato and other crops. We have to agree or disagree as a family because any new thing will affect the whole family. (Iringa women FGD participant, non-OFSP)

Decisions are made by mutual agreement between the wife and the husband. This is because things become smooth and easier when done by cooperation than singly. (Mufindi men FGD participant, non-OFSP)

We always have a discussion before growing a certain crop. If the wife is interested or the husband is interested then they can discuss and agree to grow or not to grow it. (Female DVM, Mufindi)

The decision comes from me and my husband. After seeing that there was no business in the village we decided to enter the sweetpotato business. (Female DVM, Mbozi)

Although in most cases men as heads of households have the final say in decisions on adopting new crops or varieties, it is better for them if they consult other members in the family. Supporting the idea that men and women make joint decisions regarding adoption of new crop varieties including sweetpotato, a male DVM when asked who had decided to adopt OFSP in his home said:

I discussed it with my wife. I am the one who introduced OFSP and the whole family agreed with me. Now because they are really happy with what they see, especially that the vines are productive and because they like the sweetpotato, I think we will continue to cultivate it. (Male DVM, Mawasiliano Matumbara)

While it was often mentioned that men had the final decision on the adoption of new crops, male OFSP farmers in Iringa and all the men's groups in Wanging'ombe stated that when it came to sweetpotato, they deferred to their wives in regard to the variety to be planted and the soil type in which it was to be planted, since their wives had more knowledge on the crop than they did. A Wanging'ombe DVM differed with this:

Men decide because all land and farms are under men so women cannot decide; they have to get permission from men. Nothing would happen [if a wife planted a new crop without a husband's consent] but the husband would be upset that she did not inform him first. (Male DVM, Wanging'ombe)

Thus, land ownership in some instances determined who in a household could make decisions on adoption of crops or improved varieties. However, in places like Mufindi it was apparent that while men and women jointly

made the crop adoption decision, the partner who had knowledge on the crop depended on the crop. For example for sweetpotato it was women who informed their husbands about the new crops for the men to agree to adopt. This was the reverse for maize.

On sweetpotato production women do make decisions in the family. Women provide men with all the information about the new varieties and the men accept it. For other crops such as maize, rice and so on men make the decision on adaptation of the new varieties by the family and women do accept these (Mufindi women FGD participant, OFSP)

I decide which vines to multiply. Because I have experience with sweetpotato production. I have been cultivating sweetpotato since 1996 ... I have more experience than she (my wife) has. (Male DVM, Gairo)

Thus in some cases decisions on crop or variety adoption depended on who is perceived to have knowledge on the crop in question. That person will heavily influence the adoption of improved varieties or even new crops.

Decision-making also differs by crop and by the gendered division of responsibilities in the family.

Women are the ones responsible for making decisions on adoption of the new sweetpotato varieties. This is because men sometimes do not cooperate or contribute when asked to be involved.

Sweetpotatoes aren't men's food, and some of them do not like to eat them. Women are the decision-makers because sweetpotato is food for their children.

Decision-making is different for other crops such as maize, which men work hard on. It is an important crop for food and for selling.

He works hard because if there will be a shortage of maize at home he will be responsible for providing money to buy what the family needs.

When maize is sold, the money is used to pay for household needs such as school fees. If there is no maize, men will be responsible to find other ways of paying for that. (Mbozi women FGD participants, OFSP)

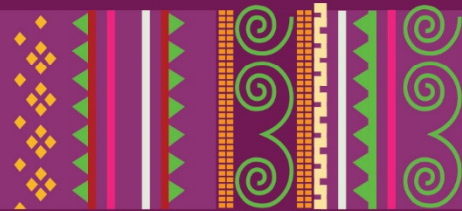
Because sweetpotato is not a commercial crop and is not regarded as an income earner for households, women can decide on the adoption of its improved varieties without needing to overly consult men. Although it is not a commercial crop, sweetpotato has its role as a food security crop. Therefore men allowed women to cultivate it in case there was not enough maize. However, for crops that generate food and income, men and women together decide on their adoption.

For other crops like maize, beans, sesame both men and women decide on the adoption of new varieties because they are for food and commerce. (Wanging'ombe women FGD participant, OFSP)

Decision-making is different for other crops because men work hard on commercial crops such as maize and cassava so that they get money and food to provide for the family. (Mbozi women FGD participant, non-OFSP)

It seems that in some instances the perceived contribution to production in terms of labor could determine who makes decisions about certain crops. Provision of labor by both men and women during production of crops may promote discussion and joint decision-making. However, one woman stated that although men and women might discuss the crops in question, men had the final say on what the household would end up cultivating.

4



Preferred sweetpotato traits

4. Preferred sweetpotato traits

The VISTA project seeks to ensure that OFSP varieties with market attributes are available for uptake by sweetpotato root producers. To understand trait preferences among the producers, the study asked the FGDs to list the preferred sweetpotato traits and then select the top three (see Figure 9). Although men and women had differences in the range of preferences, men and women FGD participants believed that the preferences of both sexes were similar, particularly because men just eat what women cook.

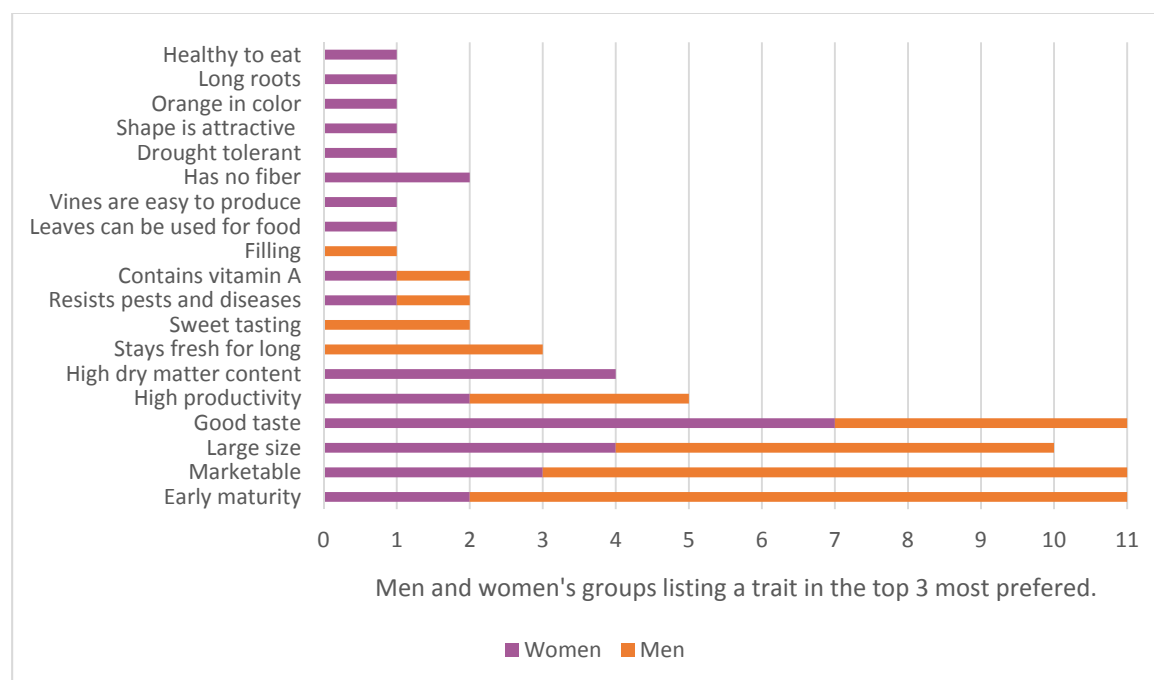


Figure 9: The three most preferred traits mentioned by men and women in FGDs.

From Figure 9 it is clear that women had a wide variety of preferences for sweetpotato roots and men showed a clear preference for early maturity, marketability and large size. Women's preferences were more finely tuned compared with those of men because of their role in food preparation. For example, some varieties might have been preferred for their taste but not their color in some processed food, as one participant said about Kabuluu:

When we cut 'mapalage' with this variety the mapalage appear to be black, which isn't a color we prefer. (Chunya women FGD participant)

Egg sweetpotato matures late. It also takes a large space in the farm and interferes with the other crops when you do mixed farming. You do not get a good harvest (Iringa women, non-OFSP FGD participant)

Women needed a basket of varieties that could meet their numerous needs.

Early maturity

Men showed a high preference for early maturing varieties. Dugu, Kahumbi, Kilombero and Maziwa were the local varieties that were preferred for that trait. In Iringa, Combat (white flesh) and Mbegu Nyepesi varieties also were liked for their early maturity as was Seedco. This means that to be competitive OFSP varieties need to have this trait. A male DVM who multiplied Kabode and Tabor varieties stated that he had selected Kabode over Kiegea and Mataya because its vines grew fast, it was easier to multiply, and it matured within a short time. Asked why they had selected the white varieties that they were cultivating, women in Iringa said that maturity considerations were big on their list.

We have chosen that variety because it grows fast. In the past we had varieties that took long time to grow, as long as one year, so we like this new one because it takes only three months to be ready and its sweetpotato roots are sweet. (Iringa women FGD participants, non-OFSP)

In addition to early maturity, for easy management women need varieties that can be intercropped or planted close to other crops without affecting productivity of either crop.

Large roots and high productivity

Both men and women preferred varieties that had large roots and high productivity. In many discussions Kabode, a new improved OFSP variety, was said to fit the bill.

Kabode has big roots. We like these ones a lot ... you can fill a 20-liter bucket with 7 to 10 roots. The only problem is that the roots are few per plant, maybe 1 to 3. (Female DVM, Mbozi)

We like OFSP sweetpotato varieties like 03/03 and 06/0696. They are big and have good taste. We need more planting material for these sweetpotatoes. We also need Kabode, Kiegea and Mataya. (Iringa women FGD participant, OFSP)

The introduced OFSP varieties such as Kabode fitted farmers' preferences in respect to large root size. In this category they were competing with local varieties like Dugu, Kahumbi, Kilombero, Maziwa, Simama and Morogoro, which also are preferred for their high yield. Farmers also liked varieties that were not easily affected by pests and diseases.

Kabode variety, we have heard, has high production and is not easily affected by diseases. We need to produce more of this kind of sweetpotato. (Gairo women FGD participant, OFSP)

Although Morogoro was normally listed as number 1 in preference, it is perceived as not resistant to diseases and to rot easily when left in the ground for long. Disease resistance and the ability to store for long periods are desirable traits for new improved sweetpotato.

Marketability

Some farmers selected OFSP because of its market component, of which they had been informed by the extension officers.

Because of a data collection error men were not asked to list their three least preferred sweetpotato traits; Figure 10 shows those listed by women.



Figure 10: The three least preferred sweetpotato traits mentioned by women.

It is clear that women did not like sweetpotato with low dry matter, large fiber volume and bad taste. For example, some farmers preferred Kabode over Kiegeya because Kabode was soft whilst Kiegeya was hard and full of fiber.

Other considerations in variety choice

In some instances the choice of a variety did not specifically depend on its traits but considerations such as availability of seed and the farmer's comfort level with the variety. When asked why they had selected the sweetpotatoes they cultivated, for example, women in Gairo said that they cultivated the white varieties because their seed was easily available in the village, while they cultivated OFSP varieties because they had received vines from the project. Availability of seed was the reason Ulanga cultivated most of its white and yellow sweetpotatoes.

We cultivate Dugi and other yellow and white sweetpotatoes. We have chosen those varieties because they are sweet and easy to obtain. These are the varieties that are easily available in our village. (Ulanga women FGD participants, OFSP)

In almost all the FGDs men and women stated that they cultivated white-fleshed varieties because they were used to them, they inherited them from their parents and seed was available, unlike OFSP seed, which is not enough. Most farmers cultivating OFSP stated that they had not selected their OFSP varieties but were just provided them, but their white and yellow varieties had been selected over time and passed on to them by their parents.

Both men and women who cultivated OFSP varieties said they wanted to try the new improved seed to see if it was better than local varieties. Also, from the training farmers had received on OFSP, hopes were high regarding its productivity and other benefits. Some women wanted to try OFSP for the health benefits that they had been told about. This shows that farmers like to experiment with new technologies and that if OFSP performs better than white sweetpotato varieties in the long run and its seed is available, it will be adopted widely.

5



Portrait of a DVM

5. Portrait of a DVM

In the project, DVMs were regarded as some kind of entrepreneurs, as they were expected to sell to other farmers the clean seed they multiplied. It is important to understand who the DVMs are. Since farmers often mentioned that women were the main conduits for sweetpotato planting material and information, the study decided to find out the impact of the project on men and women's ability to multiply vines and become seed entrepreneurs. First the study collected information on the type of people who multiplied vines, then information on why they decided on that work, and lastly the resources and personal qualities needed to be a successful DVM.

Sex of DVMs

In almost all the districts it was stated that OFSP DVMs, whether in groups or as individuals, were predominantly female (Table 3).

Table 3: Sex of DVMs

	Trained group members		DVMs	
	Male	Female	Male	Female
Male DVM, Mbozi	5	15		
Mufindi male extension	39	140		
Iringa female extension	90	15		
Chunya male extension	-	-	3	4
Wanging'ombe	40	80	3	8
Ulanga female DVM				
Male DVM, Mbozi	30	50		
Female DVM, Mbeya	40	50		
Female DVM, Iringa			3	5
Male DVM Gairo	1	21		
Female DVM, Mufindi		16		
Male DVM, Mufindi	55	35	5	1

Women's role in food provision was mentioned as a reason more women than men were multiplying vines. Also, men had other sources of income outside the home.

We have 11 vine multipliers 8 of whom are women and 3 are men. The number of women is larger than that of men because they are the ones who are dealing with farming while men are engaging in mining activities and sawing, and only few of them are farmers. (Female DVM, Ulanga).

Men were also said not to be interested in multiplying vines because they were concerned about markets and keen on ventures with quick cash returns. Women, other the hand, were interested in both the food and market aspects of OFSP.

Women are more than men in our group because when women heard this news they spread it to other women and encouraged each other. Men are afraid about the market because they used to produce sweet pepper but failed to find a market for it. That is why they are refusing to join OFSP groups. Women think that having enough food at home is a good enough reason to grow OFSP. (Male DVM, Mbozi)

If the market opportunities exist men may be interested in joining vine multiplication as well as sweetpotato production.

It was also stated that because in the beginning the project targeted women only and left men out in training and distribution of vines there were fewer men than women in vine multiplication. Additionally, in many instances men were not interested in group participation, and since training mostly targeted groups men were

left out. Women and poor men on the other hand liked belonging to groups for support in farm work, managing the vines and getting access to land if they did not have it. Project documents show that initially both men and women were targeted equally in OFSP activities but women exhibited more interest and availed themselves for training, but not many men did so.

Male DVMs

In Gairo, a DVM who said that he was the only male member in his group, stated that he had always cultivated sweetpotato and other horticultural crops so it was easy for him to engage in OFSP vine multiplication. Another man said that although he participated in sweetpotato production and vine multiplication he faced a lot of pressure from his colleagues to stop it.

The men wonder why I decided to join the orange sweetpotato project. Some say I am just wasting my time doing things that are supposed to be done by women, but I think that it's just a matter of time and education and they will be on board. Some of them are now beginning to understand why I joined because they are beginning to see the benefits that I am getting. (Male DVM, Iringa)

In villages with deep-rooted cultural view of sweetpotato as a woman's crop there may be more need for behavior-change communication to encourage men to be involved and to invest in sweetpotato as a food and market crop.

In Mufindi it was men who decided on the activities that the women could participate in and they could forbid their wives from attending training. Additionally, it was noted that because in Mufindi women had more domestic chores than men did it was difficult for them to join groups and learn about OFSP.

Type of people who multiply vines and why they started doing it

Most men and women involved in multiplying sweetpotato vines stated that they had prior experience in multiplying or at least saving seed for other crops like maize, tomato, onion, and sweetpotato, which made it easier for them to transition to OFSP vines. Female DVMs were more likely to talk about prior experience in sweetpotato production than were male DVMs.

One respondent stated that he was selected by the extension officers to multiply OFSP vines because he was a hard worker and also had experience in seed production. Extension officers cited diligence and experience in producing white-fleshed sweetpotato varieties as one of the criteria for selecting people to become DVMs. Others were chosen because they were group leaders and were expected to train members of their groups and lead by example.

Access to training was a key reason for most OFSP vine multipliers to decide to start multiplying vines. Both female and male DVMs stated that training in the nutritional components of OFSP, on processing OFSP for chapatti, flour, porridge and juice, and the possibility of marketing of OFSP vines and roots had led them to adopt OFSP and become vine multipliers. For both male and female DVMs the nutritional advantage of OFSP as a source of vitamin A was a huge selling point in their decision to be involved.

6



Trends in seed production

6. Trends in seed production

The study sought to understand the trends in seed and root production to determine whether sweetpotato seed business could be viable based on the demand for seed. FGD participants were asked to comment on these trends for the previous three to four years.

6.1 Perceptions on production and availability of seed

The farmers' perception was that production and availability of sweetpotato planting material had increased, mostly linked to the availability of vines for the white-fleshed varieties. Farmers stated that they had increased the production of vines because of the rise in demand for planting material and also owing to the rise in market opportunities for sweetpotato roots.

Yes, there have been changes. Nowadays we produce more vines than before because there are more market opportunities for vines and even sweetpotato roots. The local variety that has seen the most change in production is Kisukuma. (Mufindi women FGD participant, OFSP)

There is an increase in demand for seeds. Nowadays people are producing more of the crop so more seeds are required. The Red variety is liked more, so it has seen an increase in production. (Iringa women FGD participant, OFSP)

The improvement in sweetpotato markets led to a rise in sweetpotato production, ultimately increasing the demand for seed and the production of seed to meet the demand. In Wanging'ombe, non-OFSP women stated that they were producing more vines because of the emergence of seed and root markets both within and outside the village.

The demand for vines had in some instances created a monetary value for sweetpotato. In the past, in some villages sweetpotato vines were given out for free via social networks, but now their increased demand had led to their monetization.

Yes, there have been changes. Nowadays 90% of the villagers must multiply seeds in the wet areas near the river known as 'vinyungu'.

We are satisfied with the price we sell the vines for. We see there's need to multiply more seed so that we get more income.

Currently the production of vines has increased compared to the previous times when we used to give them to each other for free. (Wanging'ombe women FGD participants, OFSP)

There are changes in the productivity of vines. Previously we were producing very little compared to nowadays. Now we produce more. Also there is a good market and we are getting money. Seedco is sold here in the biggest volumes (Mbozi women FGD participants, OFSP).

Vines are now a big source of income for women in some villages. This may indicate the possibility of developing sustainable businesses for producing clean planting material for farmers.

Awareness raising regarding the benefits of OFSP and the increased awareness of the importance of using clean planting material were credited in some FGDs such as Gairo and Mbozi men's groups for creating a demand for sweetpotato planting material.

The demand for seeds or vines is high especially for the improved seeds of OFSP because we have heard of the advantages and benefits it has. We request for more vines from the project if possible. (Iringa men FGD participant, OFSP)

The trend in demand is high, especially from the many people craving for the new variety of sweetpotato, OFSP. (Men Ulanga FGD participant, non-OFSP)

About four men's groups expressed their interest in obtaining planting material for OFSP varieties. This means that there was perceived and expressed demand for planting material for the new improved sweetpotato varieties. It is not clear whether this demand will remain high when the OFSP varieties become ubiquitous.

The perceived increase in demand for sweetpotato planting material was not uniform for all new varieties but depended on trait preference. The planting material with the most preferred traits was in high demand while that with the least preferred traits was in low demand. For example, in Chunya varieties like Makabuli, whose shape was liked, Sinia, whose leaves are edible, and Mwananzega, which had high productivity, easy processing and a nice shape, were in high demand. Those like Mwanahela, whose smell was disliked, and Majinasasa, with high fiber volume, low dry matter and unpopular color, had very low demand. In Mbozi Seedco vines were in high demand because their roots had high dry matter content, good taste, early maturity, ease of cooking and good market. In Iringa the demand for the vines of the red sweetpotato variety rose with the market demand for its roots.

In some cases vine demand in the villages could increase if, for example, there was a drought or flood that destroyed planting material. In Mufindi the extension worker noted that there was a high demand for vines because of the long dry spells the village was going through, but the vines were simply not available, particularly for OFSP varieties. Vine multipliers were not able to meet the demand.

In some instances farmers perceived a decline in the demand for vines for purchase over the years. It was noted that while in the past sweetpotato was not regarded as important and many people did not conserve their own seed and would instead buy or ask for it from friends when the time to plant came, the growing sweetpotato markets made it necessary for many people to conserve their own seed, bringing down the demand for seed for purchase.

The demand isn't the same as before. At this time everybody is sure of access to seed.

Previously we used to sell to the neighboring village but at the moment they also have enough seed. (Wanging'ombe women FGD participants, OFSP)

Nowadays many people multiply the vines themselves and only a few of them buy. This is because now the production of sweetpotatoes has more benefits than in previous years.

We are able to get food but also sell and get money for taking our children to school (Mbozi women FGD participants, non-OFSP).

Improved sweetpotato root markets may decrease the demand for planting material in the short term as farmers begin to save their own planting material anticipating to benefit from the market. However, as was the case in some villages, the decline in demand for planting material may be offset by their demand from outside the village. It would be interesting to follow up on this perceived external demand to assess its source and sustainability in the long run.

At least three men's groups were of the opinion that there had been no change in vine productivity in their village in the previous three to four years. They said that because sweetpotato was cultivated on a small scale there had been no need to increase production of planting material.

There are no changes. The reason is that the type of growing done is small-scale, where a person has two to three lines; no one has even a quarter of an acre of sweetpotatoes. (Iringa men FGD participant, non-OFSP)

There have been no changes in productivity of the vines in the community over the past three to four years because sweetpotato is just a subsidiary crop grown for home consumption. Only a little bit is sold to obtain cash to meet other financial needs in the household. (Iringa men FGD participant, OFSP)

Other groups stated that the high pest and disease prevalence had led to the low production of sweetpotato, low demand for vines, and low production of the planting material.

In many of the discussions women perceived an increase in sweetpotato production, which they attributed to a variety of reasons, but availability of markets topped the list.

These changes are due to the fact that nowadays ... there are customers for sweetpotatoes unlike in the past, so we are able to sell and get money.

In the past our parents perceived sweetpotatoes as food for dogs, so they didn't care much about producing it. (Iringa women FGD participants, non-OFSP)

Men and women had different perceptions regarding vine production and demand. For example, women talked about the availability of marketing opportunities for vines and roots as a reason for the increased production and demand for planting material. On the other hand, men stated that sweetpotato was a minor crop therefore demand for its vines had either stagnated or even declined. Some groups of men, though, expressed interest in the new sweetpotato varieties. The differences between men and women's perceptions may be related to the role that sweetpotato plays in their lives. Sweetpotato was a top income earner for women, but men had other sources of income such as crops like maize and sesame and off-farm employment.

6.2 Perceptions on farmers' ability and willingness to buy seed

In order to assess the viability of seed business, men and women FGDs were asked to estimate for 10 men and 10 women in each of their communities how many could afford seed and would be willing to buy it. Figure 11 shows that men's FGDs viewed the ability of men to buy planting material much more positively than women FGDs did for women.

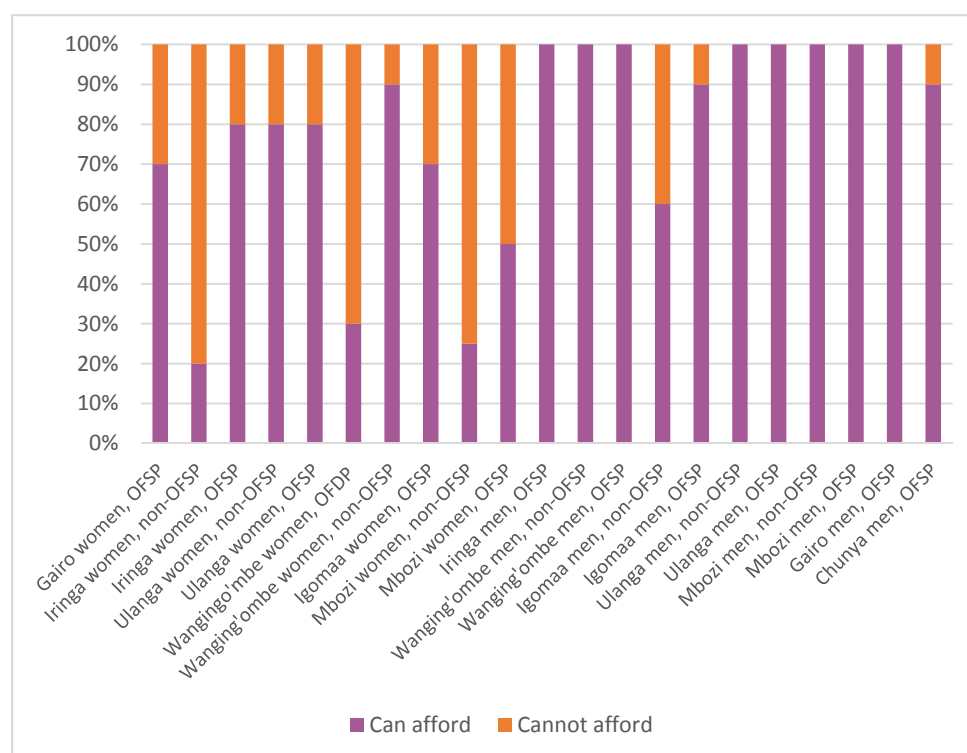


Figure 11: Men and women's perceptions on whether members of their own sex could afford to buy seed.

Women said often that women could not afford the cost of vines and preferred to save their own seed. Men stated as household heads they controlled household finances so they could afford to buy vines if they wanted to. However, in Mufindi it was noted that whilst most men could afford to purchase vines they needed to be influenced or encouraged by their wives to do so. This brings to the forefront questions about the sustainability of sweetpotato seed business if its women only who are targeted with training and information on quality seed.

Farmers in FGDs were asked about their perception on whether men and women in their community would be willing to buy sweetpotato planting material. In general, it was noted that women would be willing to buy vines if they could afford them while men would be willing to buy them if they were assured of a market for their sweetpotato roots. In Chunya, where people were already selling vines to each other, farmers said that both men and women farmers would continue buying vines even after the full introduction and adoption of OFSP varieties.

Figure 12 illustrates the perceived willingness of villagers to purchase sweetpotato vines of white, cream and yellow varieties.

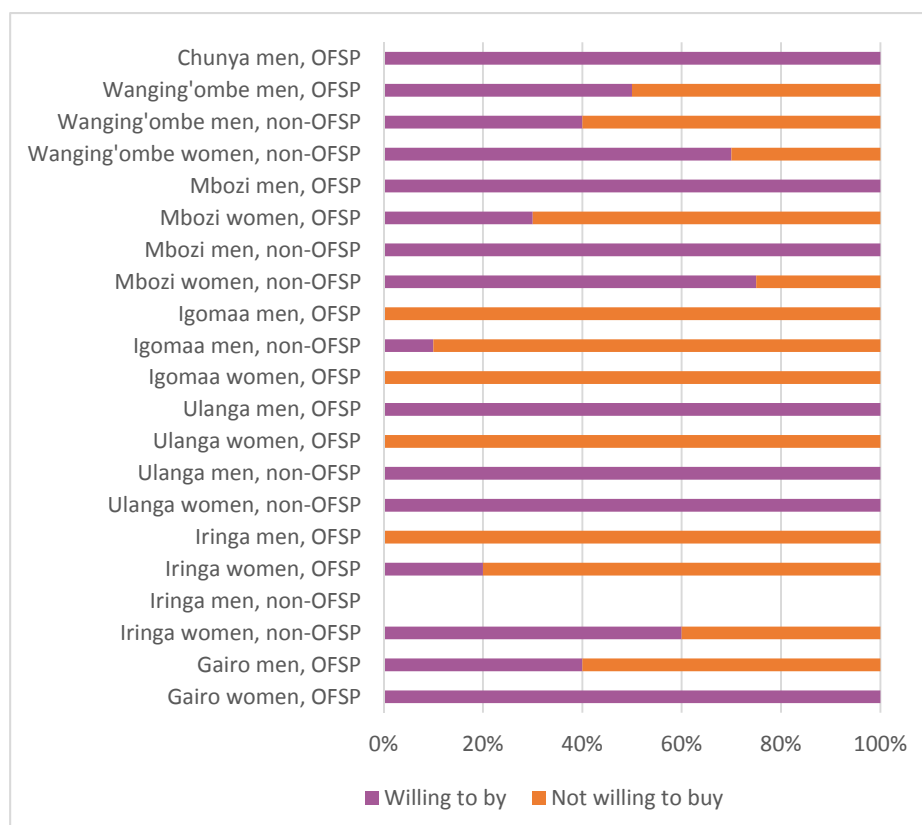


Figure 12: Men and women's perceptions on whether members of their communities were willing to buy seed of white, yellow or cream sweetpotato varieties.

Men in Chunya, Mbozi and Ulanga and women in Mbozi, Ulanga and Gairo stated that almost all the men or women in their communities were willing to purchase the seed of white, yellow or cream sweetpotato varieties, whilst in the other communities the willingness to buy these varieties ranged from 0% to 75% for women and 0% to 50% for men. Women were perceived as more willing to buy sweetpotato vines of local varieties because they obtained food and income from these crops.

In Chunya the willingness to buy vines depended on the season. For example, a male DVM in Chunya noted that they sold vines in the first agriculture season and gave them for free in the second season. During the first season not many people had vines as these would have dried up during the long dry spell, so people were willing to buy them. But in the second season the planting material was plenty and available, so not many people were willing to pay for it.

Those who were not willing to buy planting material for white, cream and yellow varieties gave several reasons for this:

- Not having enough land or not willing to cultivate sweetpotato that season (two women's FDGs);
- Availability of plenty and free seed of these varieties (two women's FDGs, two men's FDGs; one female DVM);
- No economic benefit (two men's FDGs);
- Low productivity in terms of quantity and quality of the crop (two men's FDGs).

Figure 13 shows people's perception about the willingness of members of their own sex to purchase planting material of OFSP varieties. Men and women perceived higher willingness of people to purchase OFSP vines compared with white-fleshed sweetpotato varieties.

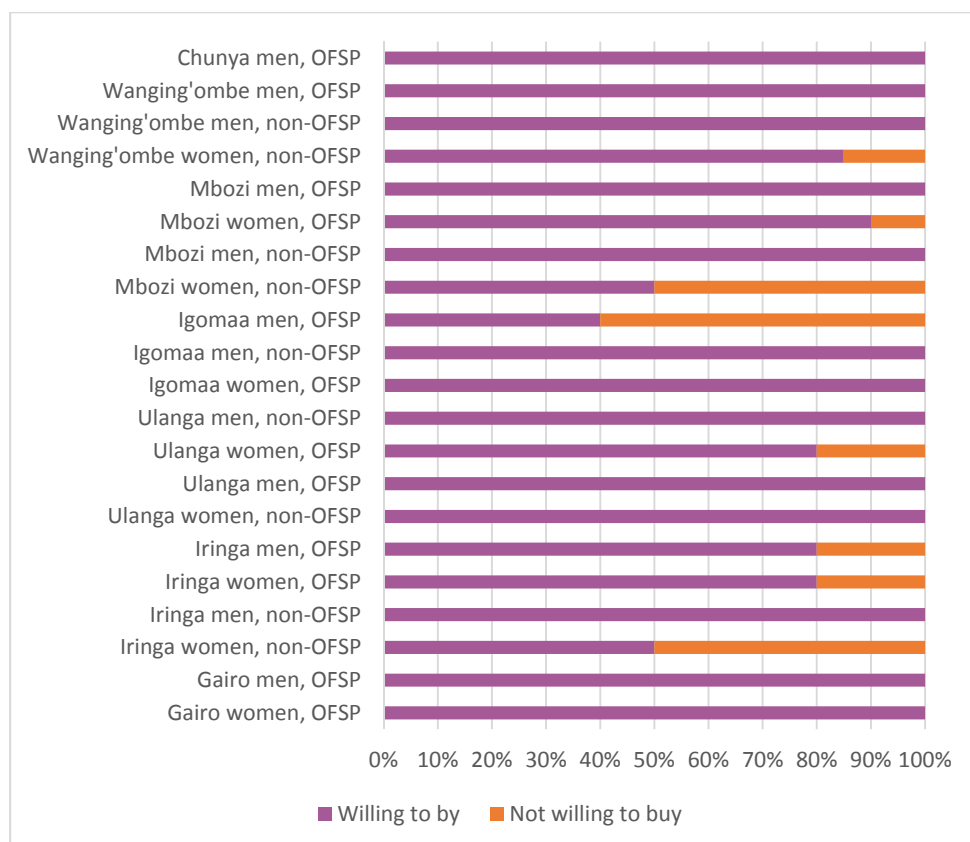


Figure 13: Men and women's perceptions on the willingness of members of their own sex to buy seed of OFSP varieties.

The following reasons were given by men and women for their willingness to purchase OFSP varieties:

- They are aware from training of the benefits of OFSP or had seen others who had cultivated the sweetpotato and benefited from it (one woman, one male DVM, two female DVMs, one male extension worker);
- To try the new improved varieties for their benefits in terms of quantity and quality of produce (two men, one male DVM);
- Other OFSP benefits such as vitamins (two men, one male DVM, one female DVM, one male extension worker);
- OFSP roots are marketable (one male DVM);
- There is a culture of selling sweetpotato planting material in the area (one male extension worker, Chunya).

While men positively evaluated men's willingness to purchase OFSP vines, when asked to compare men and women's willingness to purchase the vines, women and extension workers were often of the opinion that men were not as enthusiastic as women. In some instances farmers said that women were more interested in OFSP vines than were men because the project had initially targeted women.

This is because women are mostly responsible for family food and also because in the beginning the project targeted women who had children under five years of age. That is why women seem to be engaged in OFSP more than men are. (Female DVM, Ulanga)

Men are not interested in this new product, OFSP. This is because many men think that this product is especially for women. That is why they don't want to engage in it more. (Female DVM, Mbeya)

While the project targeted women and children and households with children under five years of age, farmers perceived the most direct beneficiaries to be women, since it was they who mostly took care of children. The project should also design messages directly targeting men since they play a role in purchasing planting material and making decisions about what crops to plant and the varieties to adopt.

In one community in Mufindi where people were not used to purchasing vines, the extension worker stated that people would be surprised if they were asked to pay for vines, but he noted that there was a possibility that people, even men, would be willing to purchase OFSP vines because they had received training on OFSP and were aware of its benefits. Thus, training and awareness raising for both men and women were essential. In Gairo women stated that men needed to be educated on OFSP to be willing to purchase its vines. This may mean that there was some need to deliberately target men with training in some districts.

In some cases farmers who alluded to the potential for a market for OFSP vines also highlighted the need for a marketing strategy. One female DVM said that in her first year she gave the vines for free so that people could be exposed to the OFSP varieties and be encouraged to buy them in the next season.

Why was it important to you to give seed for free in the first year?

I gave them for free for them to test and multiply the vines for themselves to show they will benefit. It is better to give them to do it practically rather than to tell them that this is OFSP but without having seen it or experienced it. They can multiply and keep it in the irrigation scheme during the dry season.

Do you think people will buy OFSP?

They will be ready to purchase because now they already know it and are aware of the benefits of OFSP. (Female DVM, Wanging'ombe)

Demand creation through training or giving away vine samples was important to allow farmers to experience the benefits of OFSP before committing to purchasing the vines.

One extension worker noted that women would be more willing to purchase OFSP vines because they understood the benefits of sweetpotato but men would not be that willing or forthcoming unless they saw that the crop could be marketed and was profitable. In Mbozi women were adamant that men would not be willing to buy OFSP vines because sweetpotato was not an important crop for them in the sense that it could not be marketed and was not a significant food crop.

While the majority of the groups stated that the members of their own sex would be willing to buy OFSP planting materials, in discussions women were usually of the contrary opinion in regard to men. Some women's groups in Iringa, Wanging'ombe, Mbozi and Ulanga and men's groups in Mufindi and Iringa stated that some of the members of their own sex in their village would not be willing to buy the planting material of OFSP varieties.

The role of behavior-change and demand-creation communication was highlighted. For example, women in Mbozi and Wanging'ombe stated that the women who did not have enough information or training about OFSP and did not participate in groups where they could get such information were not willing to purchase the planting material. In Wanging'ombe a female DVM stated that although men were not in the forefront in purchasing OFSP vines this could be changed if they were targeted with awareness raising training. Mbozi women believed that if men were not assured of markets they would not be willing to spend their resources to purchase OFSP planting material.

Some of the people were not willing to purchase OFSP seed until they had seen the results from others in the community who had planted it. If productivity from OFSP was high, for example, those who were perceived as not willing to purchase the seed would be willing to.

Some women are waiting to see the results from those who planted earlier. If the results are good most women will be willing to buy the planting material, try to get it for free or even steal it. (Wanging'ombe women FGD participant, OFSP)

In Mufindi men believed that a large proportion of men, about 6 out of 10, would not be willing to buy the seed since they were used to conserving and multiplying their own seed. This may showcase the need to train farmers on seed degeneration to ensure their willingness to use new and clean planting material for higher productivity.

The difference between the willingness to purchase OFSP and white-, yellow- or cream-fleshed varieties is related to the awareness raising targeted towards OFSP and its perceived benefits as well as the fact that planting material of white-fleshed sweetpotatoes is ubiquitous while OFSP is a new introduction and not widely spread. This brings to the fore the question regarding the sustainability of the sale of OFSP vines as a business. There may be great need to train farmers on the need to replace planting material to guard against seed degeneration. Availability of root markets could be important to promote vine sales, as men and women are willing to invest in vines if they foresee a high return for their investment.

6.3 Seed dissemination and information networks

To determine the structure of the seed information networks, DVMs and FGD participants were asked to name those they usually provided seed information to and those from whom they received it. For sweetpotatoes in general it was women who spread the vines and information about them through their networks, while for OFSP men were increasingly becoming involved in information sharing, since they had received training. Since it was women who were mostly interested in sweetpotato, the networks were mostly female dominated:

Women are the ones who visit us several times. (Female DVM, Iringa)

Women usually visit our place because they want to learn more about OFSP from our group nursery. (Female DVM, Ulanga)

At the beginning more women used to visit my farm to get information on OFSP and where they could get the vines. I told them about how OFSP differs from our local sweetpotatoes and about its uses, so they are attracted. But nowadays men seem to be involved and they are visiting my place to learn about OFSP. (Male DVM, Mbozi)

While seed networks for sweetpotato have been generally dominated by women, the advent of OFSP and accompanying awareness raising training have meant that men are increasingly becoming involved. There may be need to keep monitoring how this develops to ensure that women do not lose out to men in sweetpotato farming.

FGD members mentioned the more diffuse networks of family and friends, while for DVMs the information networks were more diverse (Figure 14).

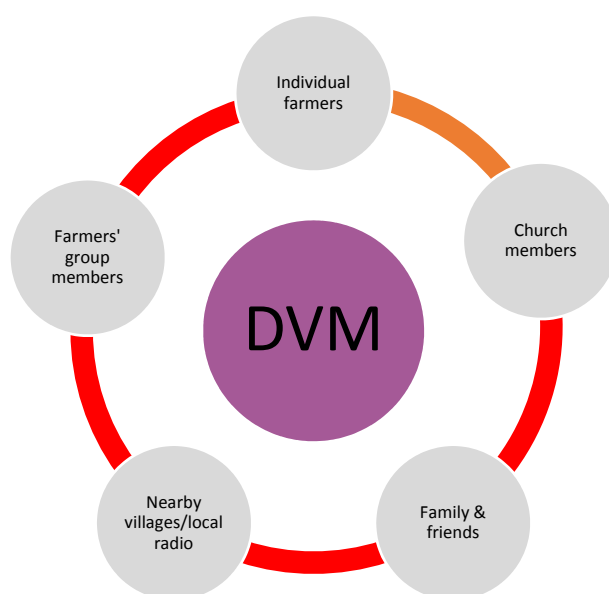


Figure 14: Seed networks identified by DVMs.

The DVMs said that they provided seed information mainly to farmer group members and individual farmers who sought such information, because they had been trained to provide that service.

I provide information to my group members because I am the leader and I attended the whole training, so it is my responsibility to provide the information about OFSP. (Male DVM, Mbozi)

All the DVMs stated that they had not provided any OFSP planting material because there was not enough to distribute.

Villagers and church members were channels through which seed information could be passed from one person to another. After information had been spread through local radio stations, the Igomaa village in Mufindi, where DVMs had been trained, received some farmers from nearby villages seeking information on OFSP. Most of those actively seeking information were women.

Family and friends were another key source of information as well as a channel for sharing planting material. This information and planting material flowed through kinship and friendship networks.

We are always exchanging seed. I give seed and I also receive seed from others. This season I gave sweetpotato vines to one person; my brother. (Male DVM, Iringa)

Three people asked for OFSP vines. My mother, my husband's relative and a friend. (Female DVM, Mbozi)

Farmers actively sought information on OFSP even when they did not belong to farmers' groups. For example they would visit DVMs to ask for information on new sweetpotato varieties.

[My] plot is near the road. When we are working a lot of people pass there and ask. Most people are interested because they ask if they can be given plant material for free or even if they can buy. Both men and women are interested and ask. (Male DVM, Ulanga)

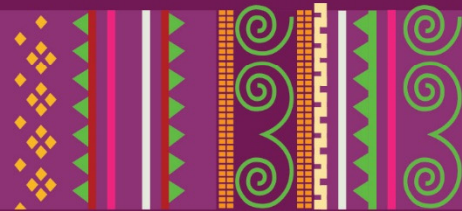
Where the vine plots are accessible and near roads it is easy for vine information and even vines to be distributed to villagers and other passersby.

6.4 Challenges to seed dissemination

Since almost all DVMs said that for OFSP they were mostly disseminating information not vines, they were asked to list the challenges that compromised their ability to disseminate vines at the same time as information. Some of these challenges were:

- Lack of money, which prevented DVMs from renting adequate land or purchasing pesticides and much-needed fertilizers to increase production.
- Shortage of starter material. The few vines provided by the project were not enough to share, and multiplying them could take long. Men had a problem in accessing starter material, since it could only be obtained through groups and men were not interested in joining groups.
- Prevalence of pests and diseases and lack of know-how on how to deal with them. Kabode variety was regarded as tolerant to pests and diseases.
- Vine damage by pigs and other wild animals, leaving inadequate vine volumes to share.
- Peer pressure for men to treat sweetpotato as an unimportant crop, which prevented them from actively seeking seed.
- Lack of appropriate technologies such as net tunnels to help deal with pests and diseases, which could reduce productivity of vines and ultimately their accessibility.

7



Seed security

7. Seed security

The project aims to ensure that smallholder and medium-scale farmers grow OFSP and realize increased productivity from the crop. However, this may not be possible if farmers are not guaranteed seed security or are not able to access quality planting material. This section discusses the issues related to seed security and maintenance of quality planting materials.

7.1 How farmers access sweetpotato planting material

Local sweetpotato vines circulate from parents to children and within the communities. New improved varieties such as OFSP are acquired from research organizations, NGOs and the government before they start spreading in the community through the same channels as other sweetpotato varieties, including family, friends and community members (see Annex 1).

FGD participants were asked how they accessed vines in their communities and also to discuss the sweetpotato seed security situation in their village. Seed security was defined to them as the situation where a household had the seed it needs (in house stocks/harvest) or it could get the seed it needed, for example through purchasing or bartering. The question went further to probe the seed security status for different varieties of sweetpotato and for other crops that the participants listed among the top three most important crops. In general farmers had a positive perception on seed security for sweetpotato, whose seed they said was always available if they wanted to cultivate the crop. Three ways of accessing the planting material were mentioned: conserving or purchasing vines or obtaining them from friends and neighbors.

Conserving vines

Conserving vines was the most common way to obtain sweetpotato vines. In many communities it was not common for people to purchase vines as they usually saved some from their previous harvest. Only those without access to wetlands or irrigation to conserve vines during the dry season bought vines. After harvesting sweetpotato, farmers planted some of the vines in wetlands or near irrigation canals. In Mbozi, for example, vines were moved to the irrigation canals in March to be ready for planting in June. In Iringa and Wanging'ombe women also saved their vines close to their houses, watering them with waste water.

Conserving vines in the wetlands or near irrigation canals reduced the labor demand for their management, since it was easy for women to water and weed the vines as they took care of beans and vegetables planted near the canals. Women usually weeded the vines and checked for pests and diseases until the vines were taken to the field for planting.

Because farmers always conserved sweetpotato planting material, farmers in many communities stated that there was always enough planting material for the households and for those who wanted to purchase it.

The availability of vines in the last few years was not difficult because most of the farmers, especially women, know how to protect vines and they are able to produce them in their own place where there is a flow of water, especially on the river bank. (Female DVM, Mbeya)

Specific concerns were raised about men who faced challenges obtaining vines because they did not conserve their own.

The situation of men is different. Because they don't save vines after harvesting for the next season, during the planting season they visit women to ask for free vines. This is because men are not careful with sweetpotatoes. (Female DVM, Ulanga)

Seed security situations are different for men and women since men are not careful in preserving vine seeds for future use, which makes the seed security situation for men to be poor. (Male DVM, Mbozi)

This did not seriously threaten men's seed security since they could always buy vines if they wanted to or get them for free from women who conserved them.

Purchasing vines

Most households did not purchase but conserved seed. However, those that did not have seed or access to wetlands or were affected by dry spells or too much rain could buy seed from others in their village or outside. In Wanging'ombe for example, a women's FGD said that their village usually did not buy seed but sold seed to people from neighboring villages that did not have access to a river to conserve vines easily. Table 4 gives the estimated prices that farmers in FGDs said they paid per 100 kg bag or sack of seed.

Table 4: Price estimates for sweetpotato planting material mentioned by men and women

District	Women	Men	Female DVMs	Male DVMs
Mbozi	Tsh 10,000–15,000	Tsh 10,000–15,000	Tsh 15,000	Jan to Dec: Tsh 15,000 February to May: Tsh 3,000-5,000
Gairo	Tsh 8,000–10,000	Tsh 15,000–20,000*	7 tins = Tsh 25,000 (OFSP) 100 cuttings = Tsh 7,500	
Iringa	Tsh 5,000–8,000	Tsh 7,000	7 x 20 L buckets = Tsh 3,000	
Chunya	Tsh 5,000–7,000	Tsh 10,000–15,000		18 kg bucketful = Tsh 10,000-12,000
Mufindi	Tsh 5,000	Tsh 2,000		
Wanging'ombe	Tsh 1,000–4,000	Tsh 5,000		Tsh 4,000–Tsh 5,000
Ulanga			10 x 20 L bucket = Tsh 15,000	

*This is the price per bag/sack that usually can carry 100 kg of maize.

In Chunya seed was not given out free, so those who did not save seed had no option but to buy it. Gairo and Mbozi seemed to have much higher seed prices than the other communities. The price given by men in Gairo was for the periods when the planting material was in short supply in the area. However, a DVM stated that because of long dry spells and lack of irrigation water in the village they often purchased seed from nearby villages such as Tumbatu, Ngayaki and Kitange. This made planting material expensive in Gairo. In Mbozi, which had the highest price for both OFSP and local varieties, the women FGDs stated that sweetpotato was among the top three important crops, as did women's FGDs in Gairo, Ulanga and Iringa. The perceived importance of the crop by women may influence the price of the vines, with the prices being higher in areas where sweetpotato is regarded as important than where it is not seen that way.

Neighbors and friends as source of planting materials

In Chunya there was no free seed, while in Mbozi it was not common for farmers to get free seed and even if they did, it would not have been enough to plant so they still would have had to buy more. In other communities such as Iringa, Ulanga and Mufindi, sometimes those without enough planting material asked friends, family or neighbors to give them some. The local varieties, which are said to be easily available, could particularly be accessed this way. In Wanging'ombe, women stated that people in their community could get seed for free because sweetpotato was just food without commercial value. In Wanging'ombe sweetpotato planting material was not regarded as valuable as seed for other crops.

There was a general consensus among men and women that farmers had access to enough planting material for local varieties but not for the OFSP varieties. For example, a female DVM in Wanging'ombe stated that they had not been able to produce enough OFSP for the market even though they had been cultivating OFSP for three years, because they did not receive enough starter seed.

7.2 Seed security for important crops

Farmer groups were asked about seed security in general for their three top-ranked crops and sweetpotato. They were asked to indicate what proportion of the households in their community would be considered potentially seed secure in the coming seasons. The options were 9–10 households (almost all), 6–8 households (a high number) and 3–5 households (only a few). Figure 15 combines the responses from the groups that considered almost all households and a high number of households to be seed secure.

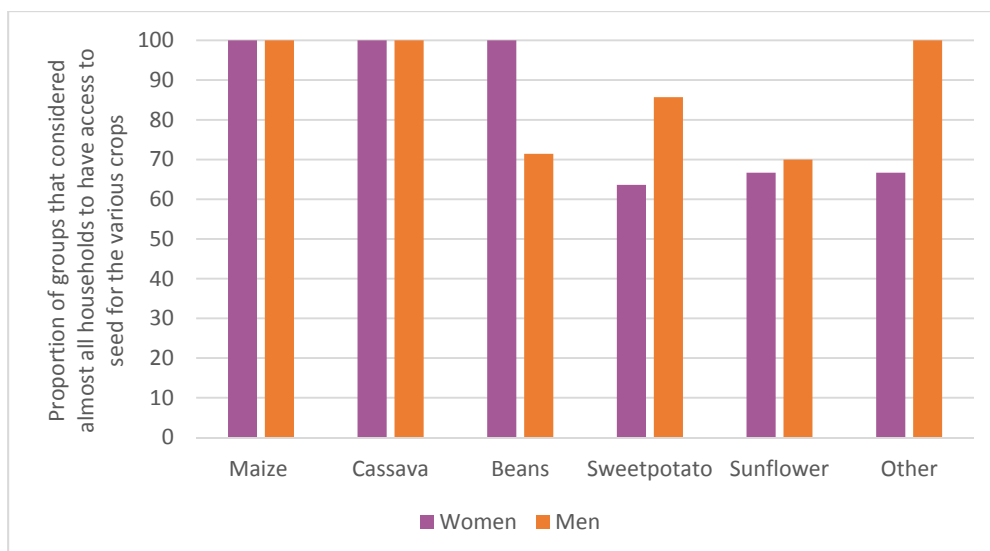


Figure 15: Men and women's perceptions regarding seed security for different crops.

Both men and women respondents perceived farmers to have high seed security for maize and cassava, but more women than men perceived beans to have seed security. For sweetpotato, men were more likely to perceive higher seed security than women were.

The study also tried to understand why farmers perceived maize, cassava and beans to have better seed security than other crops. Both men and women said that almost all farmers were seed secure in respect to maize because it was a major food and commercial crop and so people always made sure to select and reserve seed after harvest. However, saving seed was not regarded as ideal in the sense that it compromised productivity.

For maize, 100% of the households depend on planting the seed that was harvested in the previous season. The crop yield isn't good and abundant.

To have better seed you need money to buy it, and very few are able to buy the best seed.
(Wanging'ombe women FGD participants, OFSP)

While farmers perceived their access to adequate seed when they needed as assured, the seed itself was not necessarily of high quality. The high number of families who cultivated beans purchased the seed from outside the village. Although bean seed was expensive to buy, the value of the crop for food and commercial purposes made it important to use quality seed. However, because of diseases like 'ukungu' beans performed poorly, so some farmers had stopped cultivating the crop.

A high proportion of the groups stated that many households usually saved sunflower seed after harvest. However, farmers in Mufindi said that only a few of them had access to seed because sunflower was very difficult to grow, had low yield and needed a lot of fertilizer, so they did not often harvest enough to save. Gairo and Mufindi farmers said that they were not assured of seed for the next season because they had had poor harvests and had not saved much seed. In Wanging'ombe, however, women said that most families had adequate seed because they planted sunflower as an alternative when maize failed, it was a commercial crop and they could make cooking oil from it.

Cassava was easily available and sometimes people got free planting material from friends, except in Mbozi, where women stated that cassava was a commercial crop and its seed was not given out for free. But people could buy seed from others in the village.

Other crops included among the top three were sesame, rice paddy and groundnuts. Women stated that groundnut seed was difficult to store because children liked eating groundnuts, and also it was expensive. Men stated that they always kept or had access to sesame seed because it was a commercial crop.

If farmers regard a crop as important for either food or commercial value, they are willing to buy seed to produce it. For example, while farmers claimed that bean seed was expensive they still purchased it and were convinced that households in their communities were seed secure for beans. Also, where sweetpotato was regarded as an important crop, the price of its seed was much higher than in communities where it was seen as a marginal crop. There is a possibility that sweetpotato seed businesses will flourish where sweetpotato is regarded as important but not where it is regarded as a marginal crop. There may be need for continued awareness creation to raise the profile of sweetpotato as a crop that not only has economic benefits but also can have a positive food security impact in conditions characterized by climate variability. Furthermore, it is possible that if sweetpotato value chains are developed and sweetpotato is commercialized seed businesses will get established and become sustainable.

7.3 Quality of planting material

Planting material quality attributes

Farmers in FGDs were asked how they identified quality planting material. Figure 16 shows some of the qualities they considered important for healthy seed.

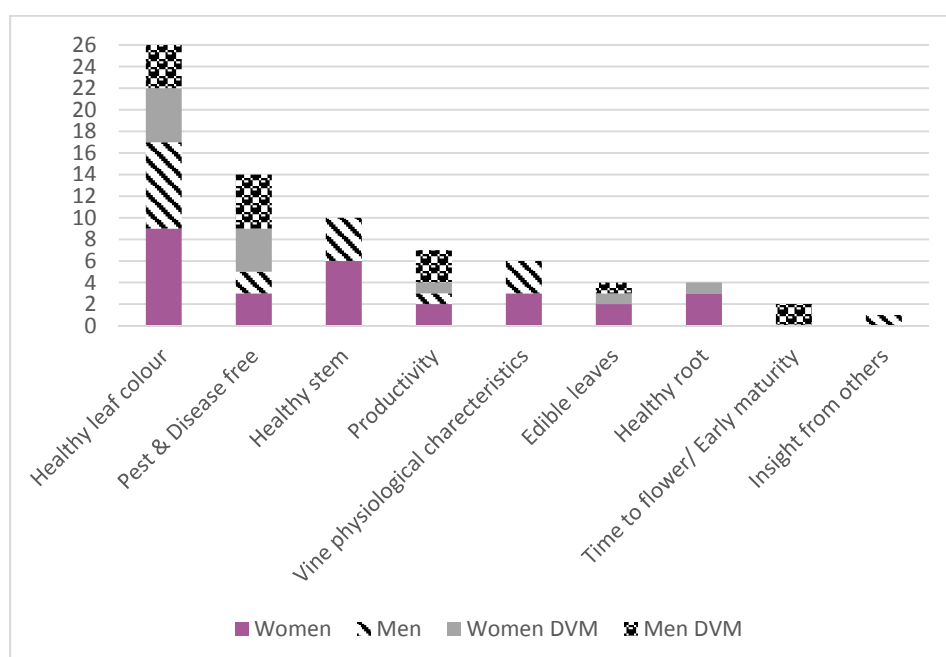


Figure 16: Qualities farmers considered important for quality planting material.

Healthy leaf color

Majority of the groups and DVMs mentioned the color of the leaves and its broadness as indicators of good seed health. Leaves that were green, broad and without spots or insect damage were generally regarded as indicators of good quality planting material. Vines with yellow, shriveled, shrunken or rolled-up leaves were not to be used as planting material as these attributes were regarded as symptoms of disease, unless the yellow in the leaves was caused by too much water. Farmers stated that they avoided planting vines in waterlogged areas to ensure their good health. At least two DVMs said that they had learned how to determine vine quality from leaf condition in the training they had attended.

Disease and pest absence

The high quality of leaves can be used to indicate absence of disease. Pest attack on vines compromises their quality. Farmers should check for insect eggs in the leaf base, and vines found to be infested, or vines with fungal diseases should not be used as planting material. DVMs were more likely than FGD participants to talk about the absence of pests and diseases as an important quality for planting material. This may be attributed to the training that DVMs had received for their role.

Stem health

A healthy stem is supposed to be long, green and thick. Vines with thin stems are not used as planting material. In Gairo, women said that sap should ooze from a healthy stem when cut, and if not, the vine should not be used. The nodes on the stem are supposed to be wide apart if the stem is healthy.

Productivity

Vines that have big and prolific roots at harvest are to be selected to be conserved for planting material for the next season.

Vine physiological characteristics

Vines should be long, supple and healthy looking. Check the vine observing the characteristics of all its parts including the color of the stem and of the leaves, broadness of stem and the leaves, and length of the vine.

Leaf edibility

Some farmers expressed the need for sweetpotatoes with leaves that could be eaten as a vegetable. Leaf health improves leaf palatability. Wide leaves were preferred for vegetables. In Wanging'ombe women said that before buying vines they asked the seller if the leaves were edible.

Root health

Women stated that the roots of the vines to be used as planting material should be healthy. Thick roots were preferred since this was a sign that the vine could produce large sweetpotatoes.

Early flowering/early maturity

In Mufindi men stated that vines that flower earlier than others were considered to be of good quality. Some farmers said that they asked whether a variety was early maturing before buying it.

Proven yield performance

Sometimes it is not easy to identify quality vines so farmers find out about a variety's performance from growers who have grown it previously before using it as planting material.

Men and women's knowledge on vine quality

All men's groups stated that there was no difference in the knowledge that men and women had on vine quality. Only three women's groups were of this view; the majority of women's groups believed that women were more knowledgeable than men on vine quality. Some women said that men 'despised' sweetpotato as a women's crop and women had more knowledge about it because it was they who were responsible for growing it.

Women have more knowledge than men because sweetpotatoes are despised as a women's crop. Most men know about cassava and maize. (Mbozi women FGD participants, OFSP)

Women are the ones who cultivate sweetpotatoes mostly and so men have little knowledge about them.

Normally men follow women's ideas because they are the ones who know much about sweetpotatoes. (Chunya women FGD participants, OFSP)

Women noted that since they worked with sweetpotato from a young age and were also the main cultivators of the crop they had more fine-tuned knowledge than men did.

Farmers' methods of maintaining vine quality

Agronomic practices

Both men and women farmers stated that vine quality was maintained through practicing good agronomic practices such as weeding on time, ensuring that the vines had adequate water, ensuring that healthy vines were planted by following a rigorous selection process, not planting the vines in flooded areas, and applying pesticides when needed.

Monitoring

The men and women farmers said that they had to keep monitoring the vines to ensure that they were not attacked by pests and diseases, that they were flowering and that they were planted in fertile soil. If the vines were not flourishing they could be transplanted elsewhere, especially if the problem was judged to be low soil fertility.

Choosing the best vines

Men mentioned that to ensure the quality of the planting material, farmers had to select the best vines without pests or disease problems, as well as teach the family, particularly children, how to do that.

While some men stated that together with their wives they were responsible for monitoring vine quality, the consensus was that women were responsible for that activity. Women were seen as having the greater responsibility for this since they were in charge of sweetpotato cultivation. Women also monitored the health of the vines when picking leaves from the vines for vegetables. Some of the FGDs mentioned that for OFSP varieties both men and women were involved in monitoring the vines because men had received training and were becoming interested in OFSP production. One male DVM stated that he was responsible for monitoring OFSP vines because these were a commercial product; he left the local vines to his wife.

Farmers' methods of dealing with diseases and pests

Both focus group participants and DVMs were asked if they had had to deal with pests and diseases in their area and how they had done it. People mostly used pesticides and rodenticides for pests and diseases followed by good agronomic practices (Figure 17). Men were more likely to say they would use pesticides than women were. No women's FGD mentioned the use of pesticides.

Pesticides and rodenticides

Pesticides were used particularly for pest infestation. Both men and women who used them noted that they had been trained on the pesticides to use. For rats, farmers, especially men, used rodenticides.

Agronomic practices

More men than women mentioned the use of good agronomic practices such as weeding on time and covering sweetpotatoes with soil to ensure that pests did not enter and damage the roots. In some instances, women just replaced the affected plants with healthy vines. Weeding was said to work for fungal diseases. Women in Wanging'ombe stated that they also multiplied their vines in wet lands known as 'kitope' instead of the river, which suffered from high incidence of pests that damage the vines. The agronomic practices also included the use of clean planting material.

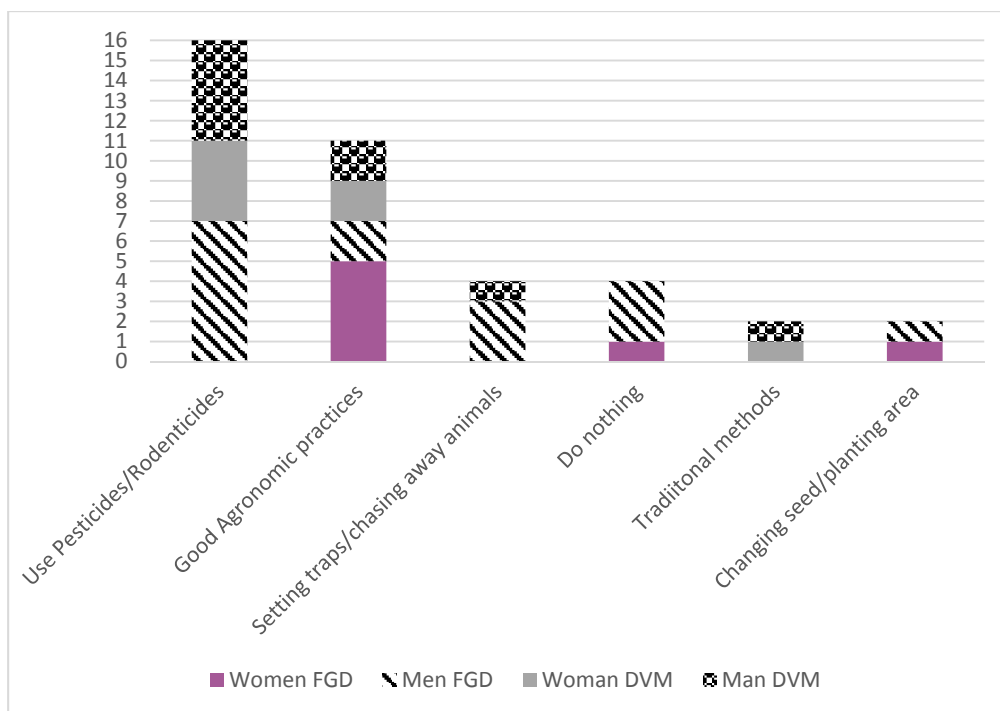


Figure 17: How men and women farmers deal with sweetpotato pests and diseases

Trapping or removing the animals

Traps were normally used for rats and rabbits.

We were instructed to drill some holes and to insert into them buckets filled with maize or husks so that we can trap them [rats]. Also the extension officer advised us to make sure that we kept our environment clean. (Gairo men FGD participant, OFSP)

In Iringa larger animals such as hippos and antelopes were normally reported to the Ruaha National Park rangers to have them removed. Monkeys were simply chased away.

Ignoring the pests and diseases

In quite a number of FGDs the participants stated that they left the pests and diseases alone, because they lacked the knowledge on how to deal with them. In Mbozi women stated that their biggest pest was the ‘viavi jeshi’, which chewed up vine stems, causing them to dry up. They did not know how to deal with this pest so they let it be. Men said that they had not been trained on how to deal with pests and diseases so they did not know what to do when their sweetpotato became afflicted.

Traditional methods

Traditional methods included spraying ashes on affected vines or simply uprooting them.

Changing the seed

To deal with pests and diseases farmers sometimes could drop their sweetpotato varieties for improved varieties or plant sweetpotato in an area where they had not cultivated it before.

Challenges in accessing quality vines

- Scarcity of OFSP vines was as a challenge, especially for quality planting material.
- Lack of knowledge on how to maintain quality planting material particularly for OFSP. Men said that the big challenges for them were the lack of a system to determine seed quality in the village and the general lack of knowledge to determine seed quality.

- High incidence of pests and diseases on vines during the dry season or when vines were planted in the river valley.
- High incidence of pests and diseases affecting the local varieties in particular.
- Lack of adequate water for irrigation during the dry season or drought times, leading to a shortage of quality planting material, as pests and diseases increase during the dry months.
- Lack of cash to purchase quality vines.

8



Improved nutrition
knowledge and practices

8. Improved nutrition knowledge and practices

This section covers both production training and nutrition training.

8.1 OFSP training

Training and awareness raising played a central role in people's ability to adopt OFSP. Farmers mentioned several kinds of training in which they had participated (Table 5).

Table 5: Types of training farmers took

Type of training	What was covered
Production	• Planting distance and fertilizer application • Vine multiplication • Agronomic practices (preparing seed and dealing with pests and diseases) • Net tunnels • Nursery preparation • Selection of quality vines
Nutrition	• Vitamin A and other health messages • Prevention of cholera • Keeping the body healthy
Processing	• Processing for home consumption (chapatti, flour, juice, cake and mandazi) • Making vegetables from leaves • How to cook OFSP to maintain the vitamin A content
General knowledge about OFSP	• The importance of OFSP • What OFSP is and how it is different from other sweetpotato varieties

In some cases although sweetpotato was regarded as a women's crop, men attended the training because they were household heads and needed to represent their families. It was noted that if the training was held in the village both the husband and the wife could attend, but if it was far from the village, the lack of transport money and women's engagement in domestic chores prevented them from attending.

I normally attend the training and my wife too would like to attend but because the two trainings I attended were held far from our place and she is supposed to take care of the children she could not go. At the same time we did not have enough fare for two, so I attended. She attended only one training that was held near home. (Male DVM, Mbozi)

Attending training depended on many factors including household headship status and where the training was held. However, in some discussions it was pointed out that it was better if both men and women attended the training because they both make decisions about food and children's health in the household. However, for groups, it was mostly group leaders who attended the training on vine multiplication.

I am the one who usually attends because I have time and I am a leader of the group and my husband doesn't have time because he is a plumber. (Female DVM, Iringa)

I am the one who has time to attend and also because I am a leader in our group (Male DVM, Mufindi)

I told my husband that there was training about OFSP so he told me to attend because I am responsible for production of sweetpotatoes. Also because I am a leader, it is important that I attend since my group members depend on me to teach and guide them about what I have learnt. Usually I am the one who attends the training, not my husband. (Female DVM, Mbeya)

According to the culture and traditions, if a man gets an invitation to go he does not need to ask for permission from somebody else, he can decide to go or not go. But for women the case is not like that. If a woman is married, according to our culture she has to ask for permission from the husband to attend a function. If he says no, you cannot go, you have to stay and look after the crops. Married

women have to ask for permission and they are not always permitted to go. When they know that if they ask for permission the husband will not give it, they choose not to attend the training. So sometimes they are not there when they are needed. They do not have decision-making power. Sometimes they have small children to look after, and they will need to remain at home for that. (Male extension, Iringa)

Since women usually led sweetpotato groups, it was very easy for them to also attend the training. However, they needed to ask for permission from their husbands to do so.

It was also noted that men did not usually attend sweetpotato training in as large numbers as women because sweetpotato was regarded as a minor crop. Women were interested mostly in the nutritional qualities of OFSP, while men, although interested in nutrition, were keener on the profit motive. It seems that as long as men do not regard sweetpotato as a profitable crop they might not attend training on it in large numbers. In addition, the emphasis on pregnant women and children under five as the primary targets for OFSP meant that men regarded OFSP cultivation as a women's job. According to the respondents, men preferred to engage in other income generating projects like herding cattle and engaging in remunerated work such as construction and working in the local mines.

Suggestions to improve training

Find ways of improving women's participation

It was noted that although more women than men might have attended some training sessions, during the training men participated more in asking questions and seeking clarification. It was suggested that since women were afraid to talk in public the trainers need to encourage them to talk by asking them directly to participate and assuring them that there were no right answers. In addition, in choosing who should respond to questions, facilitators should not only pick men who raise their hand but can also directly ask women questions or alternate responses between male and female trainees.

Provide follow-up training

Farmers requested that follow-up training become the norm so that the concepts that they do not catch in a training session are expounded on later with support from extension officers.

Increase training days

Farmers and extension workers said that the two days allocated for farmers' training were inadequate and farmers were expected to learn a lot of new things at the same time, which made it hard to remember the material.

Introduce learning visits

Women farmers stated that learning visits to other farmers producing sweetpotato and sweetpotato vines could help them and add variation to the training sessions. They said that they learnt better by seeing.

Increase practicals and visualization

In many FGDs and individual interviews farmers said that increasing practical sessions would make the training better and much easier to follow.

8.2 Nutrition knowledge and practices

Almost all farmers who were not producing OFSP stated that they were not aware of its nutrition and health benefits. However, farmers belonging to OFSP groups listed many health and nutrition benefits attributed to OFSP (Figure 18).

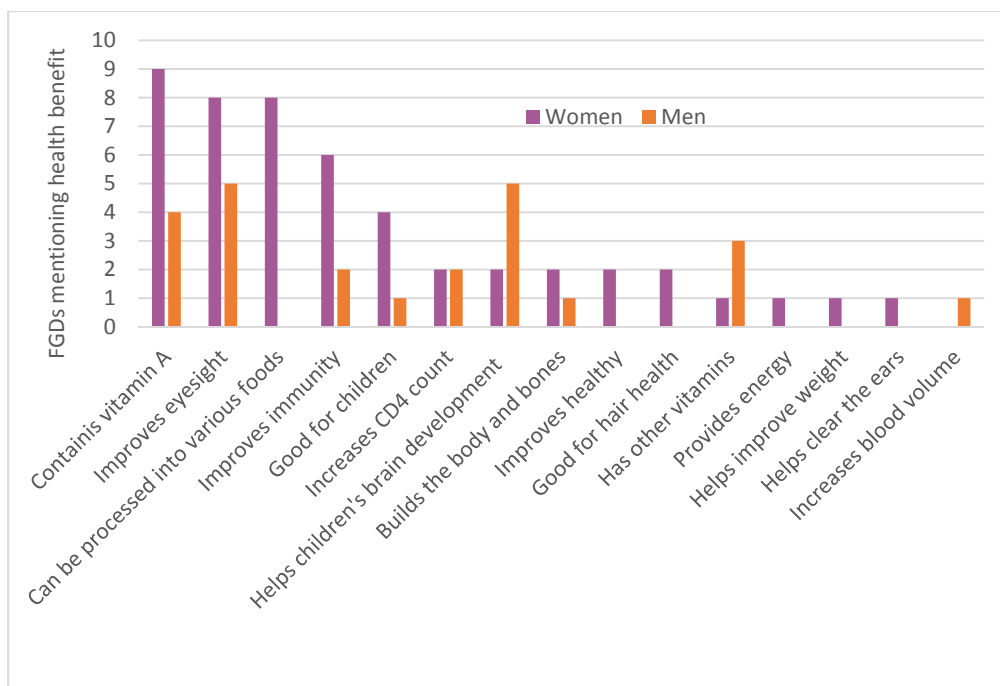


Figure 18: Nutritional benefits of OFSP according to women and men farmers.

Women provided a more diverse list of benefits than men. For men, the value of OFSP in brain development for children was the most cited benefit. Women considered OFSP processing into other food stuff among the three most important benefits but men did not mention it at all.

The source of nutrition information about OFSP differed for men and women (Figure 19). For women's groups, mostly the VISTA project and NADO were the sources of the information while for men it was other farmers and members of their groups who had been trained. This agrees with the facts that the project mostly targeted women and children under five years of age and that it was women who were likely to get nutrition training. It also shows that there was a flow of information through nutrition information networks within the village that allowed men to get access to the information. There is need to understand the nature of these networks so as to fully exploit them to pass relevant, timely and useful information. Extension officers added that women had more access to nutrition knowledge than men did because the training was sometimes given to them at child welfare clinics.

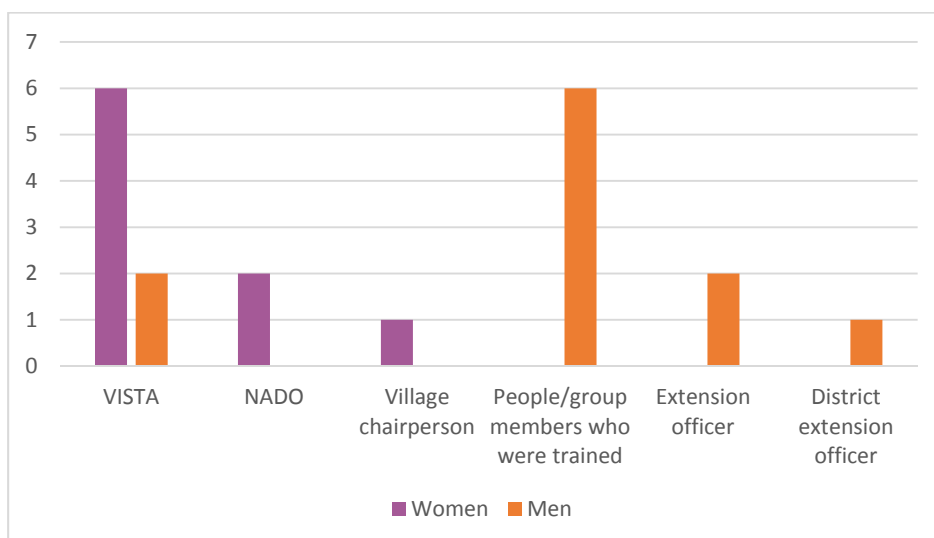


Figure 19: Sources of OFSP nutrition information by sex of FGD

Encouraging men to participate in nutrition training and to seek nutrition information

Improve targeting

The extension officers remarked that it was difficult to involve men in a project without direct and immediate financial benefits. However, it is important to target men since they too are involved in making decisions about child rearing in the home. Therefore, during training on OFSP marketing, which men will likely attend, a module on nutrition could be included.

Take advantage of community meetings that men attend

It was suggested that trainers could take advantage of community meetings that men attend to give practical demonstrations on processing of OFSP roots or a talk about the nutritional benefits of sweetpotato. This may encourage men to be more involved in sweetpotato cultivation or to provide their wives with resources for it.

Use men's peer groups

Use men's peer groups to spread information on OFSP and nutrition as well as to encourage them to attend nutrition training.

9



Sweetpotato storage

9. Sweetpotato storage

9.1 Current storage methods

The project aims to introduce and disseminate technologies for improved storage and marketing of fresh sweetpotato roots (see Annex 3). The FDGs considered the lack of storage as a threat to food security, since sweetpotato was a seasonal crop and could not be depended on for food for the family for long periods during the year. In all the FDGs except one women's FGD in each of Ulanga, Mufindi and Chunya and one of men's FGD in each of Mufindi, Ulanga and Mbozi, farmers said that they did not store sweetpotatoes but harvested them as needed, either daily for cooking or in bulk for marketing immediately. The reasons cited for the failure to store the crop were the lack of knowledge on how to do it, lack of storage space and low sweetpotato productivity.

The few groups in which storage was mentioned alluded to two kinds of storage: keeping the roots in sacks after cutting them up and sun drying them, and using the traditional method where the sweetpotato roots are kept in a pit or some kind of granary.

Three women's groups, three men's groups and two female DVMs said that sweetpotato roots left over after selling may be cut up and dried in the sun for a number of days, ranging from 2 to 14. When completely dry sweetpotato roots can be stored for five to six months before spoilage sets in. There are two methods of drying the roots, either removing the skin and cutting up the sweetpotato into small pieces before sun-drying it, or chopping up the sweetpotato into small pieces, boiling briefly and then sun-drying for two weeks. Dried sweetpotato pieces are called 'mapalage' or 'vibade'. Two men's groups said that while in the past dried sweetpotato was stored in a granary ('kichege') outside the house, the preference now is to store the sacks inside the house because theft had increased. Men and women FGD participants in Mbozi and male DVMs in Mbozi and Mufindi said that they stored sweetpotato in a pit, which they dug in a dry place.

... place poles on either side and thatch it with grass and mud. Inside the pit we put sand and ashes and arrange the sweetpotatoes. Seedco varieties can stay for two months and white variety for five to six months. (Mbozi women FGD participant, non-OFSP)

Pit storage was regarded as safe for the cold season, but the sweetpotatoes start rotting with the coming of the hot season. Pit storage required collaboration between men and women. All men's groups said that women were responsible for storage but men could assist with some tasks such as digging of pits where these were used for storage. An alternative to the pit was arranging bricks in a square in a dry area in the house. Farmers thatch the square structure with banana leaves smeared with mud to keep the temperatures low. They put ash and sand inside the structure and then the sweetpotato for storage for two to six months depending on the variety.

Women stated that since OFSP was a new variety they were not yet sure whether their old ways of storage would work well with it. Some of them were worried that over-drying OFSP could deplete its vitamin A content.

Both the farmers and the extension officers stated that it was women mostly who were responsible for storage for not only sweetpotatoes but also other crops. This is because they took care of the household food requirements, and also because storage and processing work was regarded as light work or 'kazi ndogo'. Kazi ndogo by definition is work that can be and should be done by women. In some cases men were responsible for preparing the storage equipment and materials like sacks and needles and for sowing the bags after women had them packed. Several constraints were associated with the current storage methods:

- Snakes get into the storage pits, which is dangerous;
- Sweetpotatoes could rot or dry in pit storage;
- Sweetpotatoes stored in a pit or granary outside the house could be stolen.

9.2 Comparison of granary and pit storage

The survey intended to undertake a formative evaluation of the two types of sweetpotato storage methods that the project introduced, that is the modified pit storage and granary storage (see Annex 3). After the storage methods were introduced farmers were asked to state the method they preferred and the constraints they foresaw in using it.

A female DVM who had been trained to store sweetpotato but had not yet done so because she had not produced enough to store preferred the granary because she was concerned that rats could burrow into the pit storage structure and damage the sweetpotatoes. A female DVM in Mufindi who preferred the granary said that she feared that the pit would need a lot of sand to construct, which would require hiring transportation to ferry it from the river. There was fear also that the pit storage was less secure than the granary. Another female DVM was worried that a pit storage structure could easily be broken into by thieves or that children could dig up the sweetpotatoes and consume them.

Familiarity with the storage type played a role in its perception and preference among farmers. In Wanging'ombe a female DVM stated that the sweetpotato granary was similar to the one they had for maize so it would be easy to build and manage, meaning that although people in Wanging'ombe did not store sweetpotato, the granary was regarded as more acceptable. Two male DVMs had a similar perspective.

I admire both storage technologies but prefer the first method, the granary storage. I like that one because it is not strange in this area since we use it for other crops. The second one is unfamiliar so we may hesitate to adopt it. (Male DVM, Iringa)

The granary will be easy to adopt and use by the community because we use it for maize. I don't know what the difference will be but by just looking I can tell it will be easy to adopt this one ... The pit one may be difficult for us because it uses sand so it might be easy for pests to get in and attack the tubers. Even moles can enter inside and start eating the roots without your knowledge. We have problem with moles. (Male DVM, Wanging'ombe)

This may mean that for faster and easier adoption, the technology to be pushed should be one that aligns with what people are already used to. In that case, pit storage could be introduced in Mbozi, where farmers already have experience with it, as it would be more preferable and familiar to them than the granary. There may also be need for more training on storage to address people's fears with regard to pit storage owing to their lack of familiarity with it.

In Gairo where people mostly stored maize in sacks inside the house, some farmers preferred pit storage because they considered it less complicated to construct than the granary.

9.3 Constraints in introducing new storage technologies

FGD participants and DVMs were asked what they perceived were their likely constraints in adopting any of the two project technologies. Three men's groups could not respond to this question since they had not yet observed the technologies in use or used them.

Men mentioned mostly cash-related constraints while women had diverse constraints including lack of construction materials, their high dependence on men for some of the tasks such as building and roofing of the structures, and concerns about the security of the stored crop whether in the granary or the pit (Figure 20).

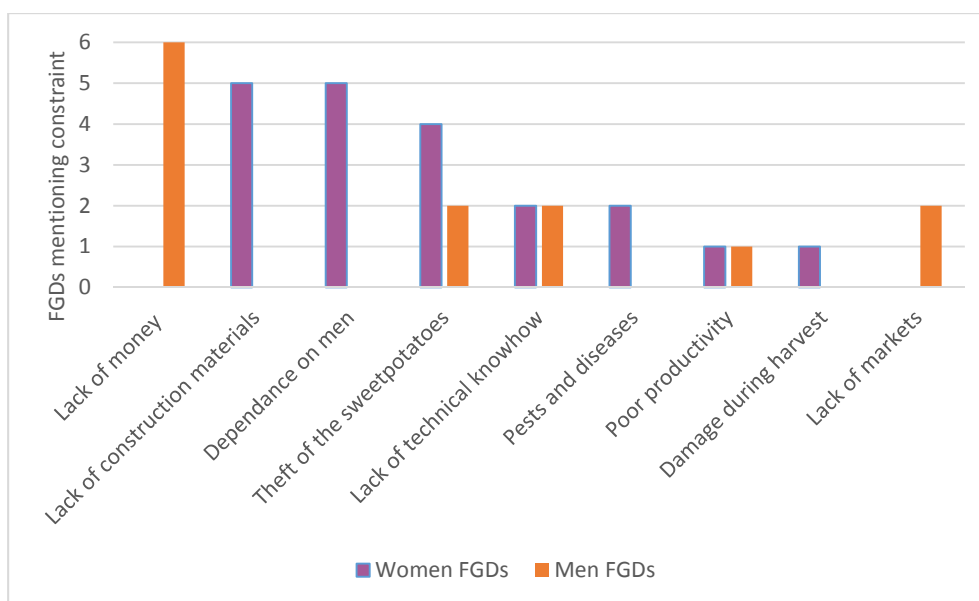


Figure 20: Constraints foreseen by men and women farmers in using granary or pit storage.

Women said that wood for roofing the structures was not easy to find and sand had to be fetched from a long way from the village, both of which would be hard tasks for them to do. They would need the support of men. Also the storage would increase women's dependence on men because many women did not know how to build or roof the structures. This was a major concern for the women who believed that men had low regard for sweetpotato and could refuse to help them construct the granaries or prepare roofing material for the pit. Women were also afraid that the lack of support from men could end up diverting their meager resources towards construction of the storage structures through hiring male laborers.

All women's plans for the use of money will be destroyed. Instead, women will end up using their money to construct storage facilities. (Chunya women FGD participant, OFSP)

Women stated that without men's support they could not construct the storage. Furthermore, they would still need to depend on men for maintenance of the structures, for example if they leaked during the rainy season.

Women worried about the security of the sweetpotato stored outside the home or family living space, where they could not keep an eye on it. Some FGD participants preferred to store sweetpotato inside their house where its safety was assured.

If sweetpotato is damaged by pests or diseases it can easily rot in storage. It was noted that pest and insect damage resulted from delayed harvest.

9.4 Solutions suggested for the storage constraints

The solutions men suggested for the lack of the needed cash included getting help from the government or NGOs, forming or joining savings and credit organizations to access cash, and improving the sweetpotato crop quality and marketability to raise money to construct the storage.

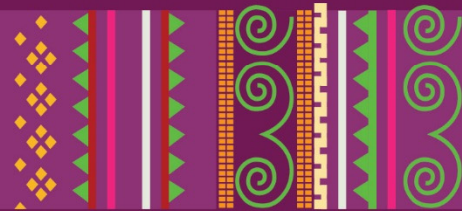
As a solution to the lack of materials, some women suggested that some of the technologies could be modified to use ash instead of sand, as well as having women join groups for sharing construction material.

In regard to the dependence on men for construction of the storage structures, women said that there was no way they could dispense with that but it could be reduced for example by having women work with men during roofing to ensure that it was done properly to prevent water leakage and by involving women's groups during storage construction, for example to help provide cash to hire male laborers.

As a measure against theft, some men and women suggested using alternative storage techniques such as chipping and drying the sweetpotato because these products could be stored in the home. Others suggested constructing the pit storage near the house.

There was a call for intense training before the technologies were introduced and rolled out so that men and women could implement them appropriately. To prevent sweetpotato rotting during storage women suggested early harvesting of the crop to avoid insect attack on the roots, introducing cats to control rats, and ensuring proper harvesting to avoid cuts and bruises on tubers.

10



OFSP root marketing

10. OFSP root marketing

Farmers sold sweetpotato in their villages, in the local markets and to outsiders. Currently OFSP and white roots are sold in the same or similar markets. Sweetpotato root clients included men and women from within the villages and neighboring villages, businessmen and businesswomen from Morogoro and Dar es Salaam (for Gairo), a secondary school (Regina Mundi in Ulanga), city markets such as Mbeya (Mbozi) and passersby. Women mentioned that money from selling sweetpotato roots and vines would be used for buying clothes and food, hiring labor, paying school fees or medical bills and buying farm inputs such as pesticides.

Root pricing

Almost all women's groups stated that they sold some sweetpotato. However, not all the groups were asked about prices. Pricing of the roots was not uniform (see Table 6).

Table 6: Prices of sweetpotato roots

	Women FGDs	Female DVMs	Male DVMs
Iringa		1 x 20 L bucket = Tsh 5,000	
Mbozi	2½ bucket Tsh 10,000 April–June = Tsh 18,000		Per bucket June = Tsh 10,000–12,000 July = Tsh 7,000 January–February = Tsh 25,000–28,000
Mufindi		Per bucket: White = Tsh 4,000–5,000 OFSP = Tsh 10 000	Per bucket White = Tsh 5,000 OFSP = Tsh 10,000
Ulanga		5 medium roots: In the village = Tsh 200 In the market = Tsh 500	

Pricing depended a lot on negotiation between the buyer and the seller, the type of market targeted and, in some cases, the season, where they were low during glut periods. For example, in Mbozi prices ranged from Tsh 7,000 per bucket during glut times to Tsh 28,000 during periods of scarcity. This suggests that there is need to prioritize the introduction of processing or storage systems for sweetpotatoes to stabilize prices. The data, which are limited, suggest that there may be some price differentiation between OFSP and other varieties with OFSP selling for higher prices. There is need for further investigation on the price regimes.

Men and women's participation in root marketing

Both men and women FGD participants and DVMs stated that women were more involved in sweetpotato markets than men were. The extension officers in Gairo and Wanging'ombe stated that since sweetpotato was regarded as a women's crop, they usually did its marketing.

Women are the ones who normally sell vines and roots because sweetpotato is a supplement on the farm. After women and their husbands plant maize, the women plant sweetpotato around the farm in the areas not occupied by maize, so the husband will not be concerned about what they are planting because the main portion of the plot has been planted with maize. Women will plant the sweetpotato on the edges of the cropland so they are free to decide what they want to do with it. (Male extension officer, Wanging'ombe)

For the white variety it is women who are involved in its marketing. When you pass through to Mbeya you see only women selling sweetpotato. But with this project, men will come to dominate sweetpotato marketing. But women are doing a good job. The 11 women's groups are doing a good job, but only a few of the men's groups are doing a good job. (Male extension officer, Mufindi)

Currently sweetpotato markets are regarded as women dominated, but men may be involved later. The extension officer in Mufindi opined that because vine conservation needs a lot of work, patience and dedication, men may not be able to completely take it over since they might not be able to conserve enough vines to produce enough quality roots for the market.

Decision-making on income from the sale of sweetpotato roots and vines

A male DVM in Mufindi stated that although women were the ones involved in selling the sweetpotato roots and vines they involved their husbands in deciding how the money from the sales would be used. In Mbozi women said that although it was their work to sell vines and roots, men made the decision on how to use the money because they were the household heads.

In this village who normally markets vines?

The women, because it is the work of the woman.

Who decides on how the money is used?

The man, because he is the head of the family so he will make the decision and the wife will accept it.
(Mbozi women FGD participants)

Women felt that they could influence how this money was used. In general both men and women agreed that they collaborated in making decisions on the money from sweetpotato.

11



Extension workers' perspectives on
development of strategies to reach
men and women farmers equally

11. Extension workers' perspectives on development of strategies to reach men and women farmers equally

11.1 Potential consequences of the project for men and women

There has been concern in gender literature that when a commodity that is regarded not to be very profitable and women dominated becomes profitable, men will tend to take it over. This study explored the potential negative impacts of the project on men and women. Two extension officers, two female DVMs and one male DVM mentioned some negative consequences but the rest of those interviewed did not foresee any negative impacts on men or women. The project overall was positively evaluated for its gender impacts.

A female DVM pointed out the project could increase the work load for women if men were not involved.

If men leave us alone to produce sweetpotato we will have a lot of work to do. Watering and maintaining vines in the dry season especially, can be a lot of work for women to do in addition to their other household responsibilities. Men do not help at all. (Female DVM, Gairo)

As the project is promoting conservation and production of vines there should be accompanying action to develop labor-saving technologies to reduce drudgery for women and possibly attract men. Raising awareness on sweetpotato among men and promoting joint work and decision-making will promote shared responsibility between men and women and reduce the burden on women. Exclusive targeting of women would tend to preclude men's participation, but men may prevent their wives from participating in training meant for promoting the production and use of the crop. This may build tension in families, especially if husbands prevent their wives from attending meetings and training that the wives deem beneficial to them and their families. Involving men as equal partners could make women's participation easier and technology uptake faster.

Some extension officers believed that women could lose their income from sweetpotatoes to men if the crop became profitable. The conflict over such income could also lead to household violence.

We think that women can be caught in trouble when the money comes. Men will come up with a strategy to take the money claiming it is all theirs. [For example] most of the men after getting money from tobacco marry another wife or go to town to spend the money by themselves and come back with empty hands. There is a lot of trouble and fighting in the family at harvest time. However, there are also a few men who cooperate with their wives and manage to send their children to school. (Male extension officer, Chunya)

The extension officers suggested that training on improving the family management of income and cooperation targeted at both men and women could go a long way in mitigating some of these issues and lead to improvement in household livelihoods and family harmony. Gender awareness raising training modules could be included in the current farmer training modules on production and utilization of sweetpotato. Extension officers stated that households where the husband and wife collaborated had better outcomes.

Among the DVMs, only four cited some potential negative outcomes for men. The project had adopted a group operations approach, which is not attractive to men and they were left out of most project activities since they prefer to work as individuals. However, this was not regarded as a serious problem in the long term because once OFSP planting material becomes abundant and the enterprise more profitable, men would easily adopt sweetpotato cultivation by purchasing the planting material. Another concern for the male DVMs was that participating in the project by men led to loss of face among their peers, who pressurized them to drop out of the project as sweetpotato was regarded as a woman's crop and processing it for home consumption as women's work. This was not regarded as a long-term problem since perception about sweetpotato could change if other men began to understand its role and importance as a healthy food and an income earner. Some men indicated that while they could produce sweetpotato roots they would not want to be involved in processing it for home consumption since that was women's responsibility.

Some respondents believed that it would not be possible for men to take over sweetpotato when it became profitable because women, who also have business skills, would want to be engaged in the sweetpotato business and would not easily allow men to take over. Furthermore, sweetpotato was not like crops with a long growth period such as coffee for which people might not know who planted it.

Men can't kick women out of sweetpotato. ... The husband can say I planted this coffee, how come now a woman is claiming it. In the case of sweetpotato men and women work together so the crop will belong to both of them. ...Nowadays the government has in place laws that would see a husband jailed if he did that [runs off with family money] and he is reported. The government also started a program to give traditional land leases and some women are getting them. Now the government is everywhere. We have a VEO (village extension officer) here for example. If anything happens here it is reported to the district. Social education has spread a lot. (Male extension officer, Mbozi).

Thus, the history of the crop and the laws (if implemented) could help protect women's interest in sweetpotato. Additionally, social education has a critical role in promoting women's rights.

Women farmers mentioned increased incomes as a benefit of cultivating OFSP, since the orange varieties sold at higher prices than the white varieties. Additionally, women increased their knowledge from the training that they received. Extension officers noted that since the project sometimes targeted men and women with training, it would create a generally positive relationship between them when they learn together, and the women would not feel segregated. Because of its nutritional content and ease of cultivation since it demands little fertilizer and has low disease pressure, sweetpotato will be cheap and easy to cultivate for women and to prepare into nutritious food for their families.

11.2 Improving the project's appeal among men and women farmers

Although some extension workers were of the view that they could not reach men because men did not like to work in groups, they still focused on group-based extension and did not come up with other ways to reach men. When asked why she did to appeal to men and women, a female extension officer who had previously stated that men did not like working in groups said that she worked only through groups and sometimes she responded to individuals who asked for help. The extension workers suggested some strategies to involve men and to assure them that sweetpotato was not only a women's crop but it could be marketed and health benefits could accrue from consuming OFSP.

We can achieve this through emphasizing to men the need to participate and by removing the mentality that sweetpotato is a woman's crop. We also need to assure them that there will be a market for their crop. (Male extension worker)

Women will adopt sweetpotato because of its vitamin A. They cook the leaves and roots. But if we consider the market we will see the number of men go up; most men are interested in cash. (Male extension worker, Chunya)

While both men and women were interested in sweetpotato markets, markets were regarded as the single most important factor to encourage men to engage in sweetpotato production or training, while women were attracted by both markets and food needs. The use of the village hamlets to advertise training to the community and encourage men to attend it was regarded as a potential way to enable men and women to attend training and engage in or support the production of OFSP.

To engage women in vine multiplication, using farmers' groups is preferable because it is difficult for women to undertake the work individually since they lack control over land and other requisite resources. Also, according to extension workers when men and women are in a group together they support each other as they learn.

Close follow-up and supervision was regarded as one of the key ways to encourage men and women to participate in sweetpotato production and storage.

Liaising and partnering with the local government should be sought to use their meetings to raise awareness about OFSP to men. These meetings are usually led by village leaders who are mostly men. If the village leaders speak to other men about OFSP it may raise the profile of OFSP and encourage men to invest more in its production. Engaging men will encourage them to feel comfortable enough about the project to be willing to participate in it.

A husband may not even allow you to talk to his wife. Just the two of you seated and spending hours and hours talking will never be agreeable to the husband. In some cases you are even a stranger in that village so people do not know you. He will even start demanding that the wife tell him everything that you talked about. (Male extension officer, Mbozi)

If husbands are well informed and if familiar local government staff are involved to promote the project it will be easier for extension workers to do their work.

Use of practicals and demonstration plots during training was mentioned as a way to motivate both men and women farmers to participate in sweetpotato production.

More training and sensitization are needed for men to appreciate the importance of OFSP, especially understanding that it can be used to produce different products like flour, cakes, juice and porridge. In places like Iringa, where more men than women may attend the training even if they are not involved in producing sweetpotato, the extension officers suggested being firm about the recruitment procedures, such as insisting that groups send equal numbers of men and women for training, and also liaising with men to allow their wives to participate in the training. In some cases men have been known to prevent their wives from such events. In particular, if farmers' transport costs are covered or they receive other incentives, it is necessary to be strict with the fifty-fifty recruitment and selection policy, otherwise only men will attend the training.

11.3 Improving the project's performance

Provide means of transport

The extension officers cited the lack of transport means as preventing them from providing follow-up support to farmers or carrying out monitoring visits when needed. While it may be too late for the VISTA project, it may be desirable in future to budget for motorcycles at the beginning of project to ensure that extension officers are able to implement and monitor the project effectively.

Government vehicles can be busy. The geography of a district may mean that during the rainy season cars are not able to reach some of the villages. So you have to hire motorcycles. If you have your own motorcycle it will be easy to supervise. Other projects provide motorcycles. (Male extension officer, Gairo)

In this project we are working like volunteers. It is a bit of a challenge for me because the WAOs and VAOs say that I am required to visit this group to do this and that with the group. I do not have a motorbike to go there or fuel or even airtime to call the groups. (Male extension officer, Wanging'ombe)

The problem with developing countries is that there are always budget problems. We depend on development partners. When they introduce projects some of them provide motorcycles. The country is very big and there is demand everywhere. Sometimes through the district budget we have managed to buy 2 or 3 motorcycles, but imagine how inadequate that is in a district where we have 90 to 100 workers all of whom need motorcycles while the ability of the district is to buy 2 or 1 (Male extension officer, Iringa)

Mbozi is large. We need motorcycles for monitoring instead of waiting to be given a large sum of money to rent a car. A motorcycle does not need a lot of money but it helps things move quickly.

Doesn't the government provide motorcycles for you?

The motorcycles that people have are project related. JICA (Japan International Cooperation Agency) gave Honda motorcycles to the team dealing with coffee quality. If we had 2 to 3 motorcycles, monitoring would be nice. We could visit farmers, follow up with them and train them anytime we wanted. (Male extension officer, Mbozi)

In all the interviews the extension workers mentioned the issue of transport as a major factor preventing them from providing the much-needed services on OFSP to farmers. The government has motorbikes but these are inadequate so not all extension officers have access to them. Having motorcycles could strengthen the project monitoring and evaluation component since extension officers could easily visit villages for monitoring.

Provide hardware support

The focal points mentioned the lack of working computers in the government offices for use in writing project reports and for facilitating their timely submission to enable proper monitoring and follow-up of the project.

We have one laptop per district. Office laptops are shared and always busy. We also don't have money to easily connect to the Internet to send our reports. Whatever information I collect from the village I have to put in a report and send it to somebody. Without a laptop and Internet, that becomes slow. (Male extension officer, Mbozi)

We have one computer that we use in the office that is about to collapse. But they say the project does not fund laptops. (Male extension officer, Gairo)

Thus, lack of computers and Internet services limited the ability of project focal points to deliver data to project management on time.

Expand targeting

Expanding targeting of the project from households with children under five years of age to reach primary schools was recommended as a way in which the project could quickly reach some of its nutrition outcomes.

Invest more in vine multiplication and dissemination to meet demand

A key constraint mentioned was that the project had created a demand for OFSP vines but was failing in meeting it, causing interested farmers to drop out or to become disillusioned.

The vines are a big problem because during the training we said that the VAOs had to register farmers and children below five years of age, and we registered a lot of farmers, but only a few have received the vines. Now some of them are accusing us of lying to them, saying, "You asked for our names and we gave them to you and now we have nothing. The rains are here but we don't have material. Where are the vines that you promised us?" For us, this is a problem. (Male extension officer, Wanging'ombe)

The extension officers cautioned against creating a huge demand and expectations in future if there was no guarantee that the project would meet these in a timely manner. The extension officers expressed the fear that the same thing could happen during marketing if the project emphasized that markets would be available for OFSP and then they did not materialize. They suggested investing more in vine multiplication and dissemination.

Improve partner coordination

The extension officers noted that better coordination between the government and NGO partners could improve the project. Currently work is not clearly delineated between these parties and in some cases there is duplication while in other cases the NGO extension workers are overworked.

Improve timing of training

The timing of the training should be conducive for both men and women to attend. Because of the division of domestic tasks and responsibilities, the trainers and facilitators need to find a favorable time for the training to ensure that both men and women participate.

If we call farmers in the afternoon, it is difficult for women to attend because they are in their houses cooking. If you invite farmers after 3 p.m., you will mostly get women; few men will attend. Most men will have gone to drink the local beer, 'wanzuki'. You can invite farmers between 8 a.m. and 10 a.m. (Male extension officer, Chunya)

Training within the village should be timed appropriately to have balanced participation of men and women. Additionally, the training days for farmers could be expanded from one to two days to slow the pace and allow practicals to improve farmers' comprehension.

Improve budget stability

When budget lines are changed or a budget is reduced, it affects the implementation of the project, since extension officers have to reduce their activities or cut them out completely from the project.

Short project time

It was noted that in districts where sweetpotato was a minor crop, three years was too short a period to ensure behavior changed in its production and consumption.

11.4 Positive lessons from the VISTA project

The extension workers regarded the training of trainers offered by VISTA as a positive component that other projects could learn from.

Taking the farmers to be trained away from here, maybe in Morogoro, and even WAOs and VAOs, is good because it encourages people to work well. Some NGOs give you a document to show the work will do, but VISTA trains you so you know what you have to do. You meet with different people and get new ideas and also improve what you are doing. If you are not going to meet people from different places you will not change your ideas but will remain unexposed. (Male extension officer, Mawasiliano)

District level and regional training of trainers' events were praised because they allowed the participants to learn how to conduct certain activities and also to meet with others and share ideas on how to implement the project. Involving both men and women in the project was regarded as a positive factor because during the training activities the men and women learned to work together.

With some NGOs you will find that they are interested in women only. ... But with VISTA, we are talking about men and women. That's why you see that even men are feeling comfortable working with the project. That is a good thing because you encourage cooperation in the families. If both of them are trained they will both be aware. If you choose certain groups to train, you will be creating gaps between them and others. (Male extension officer, Mawasiliano)

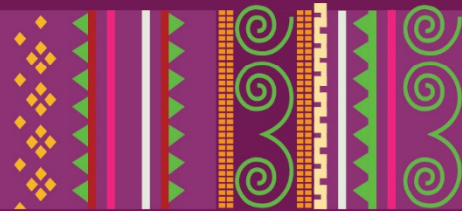
Offering gender awareness raising training to both men and women was regarded as important since it led to cooperation in the household in work and decision-making on the crop. When men were trained and became aware of the health and other economic benefits associated with cultivating the crop they were more likely to invest in it as well as cooperate with or allow their wives to cultivate it.

Participation was mentioned as a strong characteristic of the way VISTA operates, which is inclusive and creates buy-in from partners.

VISTA is very participatory and I think they should continue with that. They try to involve partners as much as possible. Other projects before VISTA come with their plans and are reluctant to change according to the environment. But VISTA involved us in the planning session and asked us to include other partners that we were working with. They also asked what the project could learn from the work we had already done. ... We have time to plan together with the VISTA team and our partners. (Male extension officer, Iringa)

Participatory approaches that take into account the environment and respect their partners and appreciate the knowledge that they already have about the situation and environment are appreciated. The fact that VISTA was flexible and took into account contextual situations to come up with strategies to meet targets was positively evaluated by the extension officers.

12



Conclusion

12. Conclusion

Sweetpotato as an important food security crop

Both men and women were generally in agreement on the key threats to food security such as climate variability, lack of finance, and pests and diseases. Because the threats to food security are varied, food security strategies need to be multipronged, addressing factors such as access to finance, response to climate change and methods to deal with pests and diseases. Access to non-farm income will go a long way in promoting food security in the home since families will not need to sell their food reserves to their meet cash needs. While sweetpotato is not a key crop in many of the study districts, its role in food security for households should not be underestimated.

Sweetpotato was considered in most of the men and women's focus groups as a commodity that ensures food security because of its drought tolerance, early maturity and suitability as a rotation crop in the farming system. However, because its production and commercial value are limited, sweetpotato was not ranked highly in many of the women's FGDs. Men too regarded sweetpotato as a support crop for domestic use and often allocated small pieces of land for its cultivation. Thus, to expand and encourage the uptake of sweetpotato cultivation in Tanzania, there is need to expand its uses and consumption; develop its value chains; and design, test and promote postharvest technologies that will extend its shelf life. Despite its high food security and nutritional value, sweetpotato has received low farmer investment in the project intervention districts. Improving utilization of the crop and introducing value addition processing to increase sweetpotato's economic value in ways that favor both men and women farmers will encourage household level investment in it. Developing multiple uses for sweetpotato will improve the uptake of its technology in Tanzania and its ranking as a major source of family livelihoods, especially in rural farm settings.

Sweetpotato as a women's crop and the importance of gender awareness training

Sweetpotato is often regarded as a women's crop because of its low commercial value and the gender division of labor and responsibilities within families. However, the study showed that men assist their wives in production of sweetpotato. Additionally, trends regarding sweetpotato cultivation are seen as changing. For example, both men and women perceived that there was more collaboration within households in agricultural tasks related to sweetpotato than before because men and women were targeted with training and were aware of both the commercial and health benefits that could accrue from sweetpotato cultivation. Men also are interested in improving the nutritional status of their families. The importance of training both men and women to raise gender awareness in fostering household cooperation cannot be overestimated, as farmers often pointed to training from different organizations as the reason for the improvement of collaboration within their households.

Gender-related production constraints and investments in sweetpotato farming

The sweetpotato production constraints mentioned by farmers included prevalence of pests and diseases that attack sweetpotato roots and vines; inadequate supply of vines especially of the new improved orange-fleshed varieties; weather-related constraints that made it difficult to conserve vines; lack of markets, inputs and equipment, fertile land, technical knowledge and storage facilities; theft of the vines and tubers; labor demand; and lack of access to credit. Men were more likely to raise production constraints than women were. This may be due to the higher involvement of women in sweetpotato farming, which might have exposed them more than men to ways of solving some of the perceived sweetpotato production constraints. Women mentioned that they often had the least productive land to cultivate the so-called women's crops while men's land parcels were often fertile. Also, household resources such as fertilizer and other quality inputs were spent on men's land parcels. Men were not willing to invest in sweetpotato because of a perceived lack of benefits from cultivating the crop as well as their regard for sweetpotato as a secondary crop or a women's crop. This shows the need for behavior-change communication to improve the perception of sweetpotato by men. Developing high value markets for sweetpotato will increase its economic benefits, possibly increasing the willingness of men to invest in its production. Increased utilization options for sweetpotato can increase investments in the crop.

Viability of seed business opportunities

Men and women had different perceptions in relation to vine production and demand. For example, women talked about the availability of marketing opportunities for vines and roots as a reason for the increased production of and demand for planting material, but to men sweetpotato was a minor crop and demand for its vines had either stagnated or even declined. The differences in perception may be related to the role that sweetpotato played in their lives. Sweetpotato was a top income earner for women, but men had other sources of income such as crops like maize and sesame and off-farm employment.

It was not obvious that seed businesses could be successfully established. For example while men and women said that they would be willing to buy OFSP vines, most of them were not willing to purchase vines of white, cream or yellow sweetpotato varieties because these were available freely in the community, and farmers could also save their own. They were willing to purchase orange varieties because their planting material was not yet available in enough quantities in the community and also because they had been targeted for awareness raising on the health benefits of OFSP. This brings to the fore the question of sustainability of OFSP vine selling as a business if farmers do not intend to buy planting material once there is enough of it circulating in the community. There may be need to train farmers on the need to replace planting material to guard against seed degeneration. Availability of root markets could be important to promote vine sales, as men and women were willing to invest in the crop if they foresaw a high return for their investment. Men should also be targeted because, as was evident from many women's FGDs, men provided the money to buy planting material when that was needed.

If farmers regard a crop as important either for food or commercial purposes they will buy seed to produce it. For example, in the study even when farmers claimed that bean seed was expensive they still purchased it. Also where sweetpotato was regarded as an important crop, the price of its planting material was much higher than in communities where it was seen as a marginal crop. There is a likelihood that sweetpotato vine businesses will flourish in areas where the crop is regarded as important. To have similar impact in districts where it has a low profile there is need for aggressive behavior-change communication, awareness creation on the health benefits of OFSP, promotion of sweetpotato's importance in coping with climate change variability, investment in OFSP value addition and processing, and improvement of sweetpotato marketing and value chains.

Sweetpotato seed security

Sweetpotato for production of storage roots is propagated from fresh planting stock in the form of vines. There was a general consensus among men and women that overall there is a lack of planting material for OFSP but not for the other types of sweetpotato. Similarly, there was a low diversity of OFSP varieties, which would affect the sustainability of OFSP production in case of cultivar breakdown or changes in farmer or consumer preferences. Evidently, women were playing a central role in sweetpotato vine conservation, and so there is need to strengthen their capacity in vine conservation and introduce technologies that favor them, in order to save their time, improve their efficiency and reduce their drudgery. When DVMs are being prepared they need to be made aware of the issue of seed degeneration and the need to replace seed even after OFSP becomes abundant at the community level. Therefore, DVMs will need to be linked upstream to the primary sources of clean seed and downstream to root producers. This will ensure the sustainability of OFSP production and enterprises. The majority of women's groups perceived women to have more knowledge on sweetpotato planting material health and quality than men had because women were more involved in sweetpotato cultivation than men were. This means that women were the custodians of sweetpotato planting material; however, they faced challenges in accessing quality and sufficient starter planting stock, had inadequate knowledge on maintaining seed health, dealt with irrigation water shortages, and were often cash-strapped and found it difficult to pay for labor or buy crucial farm inputs.

Access to training and extension services

Access to and participation in training by women was enhanced when the events were held in their village; training held outside the village tended to favor men. Women preferred training to be within their village so that they could attend to their domestic demands easily. Even when women attended training, the quality of their participation was often regarded by men to be low, since some of them were afraid of talking in public and the facilitation methods did not address this. The study participants stated that there was need to improve women's participation through facilitation methods that engaged them such as asking them questions directly and managing group dynamics to ensure that men did not dominate the discussions. Follow-up visits could help both

men and women farmers in technology adoption and utilization, since they said that they were not able to take in all the content of a training event in one or a few sessions. Women farmers stated that learning visits to other farmers producing sweetpotato could be useful in improving their comprehension and skills.

Improved nutrition knowledge and practices

The sources of nutrition information differed between men and women. Women's groups mostly acknowledged the VISTA project and NADO as their main sources of information on OFSP. Men on the contrary got information from other farmers or members of their groups who had attended training. The difference in the sources of nutrition information may have arisen from the fact that the project deliberately targeted women with nutrition information. It was also found that in many cases nutrition information was given at child welfare clinics, which men did not normally attend. From the data, however, men who had started cultivating OFSP cited its nutritional benefits as one of the reasons for doing so. It is therefore important that men and women get equal access to OFSP nutrition information, considering their status and influence in family decision-making in food production and utilization. This can be achieved through developing appropriate messages and improving their targeting to directly influence men. In addition, the project should take advantage of community meetings, which men attend, and men's peer groups to spread nutrition information.

Sweetpotato storage

Currently women more than men are responsible for sweetpotato postharvest processing and storage. While the main constraint in adopting sweetpotato storage for men was the lack of cash, for women it was the lack of construction material, high dependence on men to construct the storage infrastructure, and high risk of loss to theft of sweetpotato stored in a pit storage or granary outside the house. To address these constraints the technologies being promoted by the project can be modified to use locally available material that women can access easily. The project may also consider introducing technologies that women can manage on their own without relying too much on their male relatives, and technologies that could allow sweetpotato to be stored in the home to reduce the risk of theft.

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Annexes

Annex 1-a: Preferred varieties and their source

Variety	Origin	Flesh color	Women	Men
Morogoro	Morogoro Urban	Yellow	2	
Shingazi	Singida	White	1	
Sindani	Local	White	1	
Songea/Masongea	Songea	White Yellow	3	1
Mataya	Kenya Not known Men: Outside the country/Mbeya	Orange Carrot Men: yellow	2	2
06/0696	Kenya	Orange	1	
Red	Songeya	White	1	
Dugi	It has existed in the village for a long time	Yellow	2	1
White	It has existed in the village for a long time	White	1	
Red leaves	It has existed in the village for a long time	Red	1	
Maziwa	It has existed in the village for a long time	White	1	
Kahumbi	It has existed in the village for a long time	White	1	
Mwanahela	It has existed in the village for a long time	Yellow	1	
Majina sasa	It has existed in the village for a long time	White	1	
Kabuluu	It has existed in the village for a long time	Black	1	
Kabode	Not known Men: Outside the country/project	Carrot Men: White	1	2
Kisukuma	Mbarali-Mbeya	Yellow	1	
Lubhishi	Songwe	White	2	
Seedco	Uyole Agricultural College/ neighboring villages	Yellow Men description: Milky white/white	2	2
Yellow sweetpotato (njano)	Uyole	Yellow	1	
Kigoma	Not Known	Yellow	1	
Masukuma	Usangu Mbalari, Mbeya Usukumani/ Sukumaland; Mwanza city	white	2	3
Red Skin	Songea/Mwanza	White		1
Combat (white flesh)	Songea	White		1
Mbegu Nyepesi (yellow flesh red skin)	It has existed in the village for a long time	Yellow		1
Kiegea	Outside the country/Project	One group says white color others did not state color		3
Masamkang'a	Unknown	Yellow		1
Salikenuli	Unknown			1
Sabung'u	Wahenga			1
Midera	Sukumaland; Mwanza and Shinyanga	white		1
Kilombero	Kilombero	White		2
Kaumbi	Village	-		1
Yellow Flesh	Inherited	Yellow		1
Rubisi	Inherited	White		2
OFSP	VISTA	Orange		1
Polister	Project	Orange		1

Annex 1-b: Least preferred varieties and their source

Variety	Origin	Color of variety	Women
Mandawe	It has existed in the village for a long time	White	1
Hali ya mtumwa	It has existed in the village for a long time	Carrot (orange)	1
Egg potato	It has existed in the village for a long time	Yellow	1
03/069	Kenya	Carrot	1
Madwidwi	Iringa	White	1
white	It has existed in the village for a long time	White	1
Nasheri	It has existed in the village for a long time	White	1
Kienyeji	Mufindi-Mufindi	White	1
03/03	Not Known	Carrot	1
Kiazi Chekundu	Uyole	White	2
Masalukanuli	Not Known	white	1
Masabungu	Not Known	white	1
Mandoro	Not Known	white	1
Mawawa	Not Known	white	1

Annex 2-a: Preferred traits

Trait	Why trait is preferred	Women OFSP	Why trait is preferred	Men OFSP
Good taste	Appetizing; good market	10	Highly acceptable; marketable	3
High dry matter content	Fills you up quickly; customers like it	11		
Its leaves are edible	Provides a food accompaniment	1		
Vines	Provides get vines for next season	1		
High production	Gives high yields	3	Provides food security; can be sold for cash; does not need fertilizer; gives large harvests; promotes rapid family wealth growth	3
Suitable for making other food products	Provides different types of food; good for business	2		
Has a market	Provides money; increases income	5	Easy to trade and has good prices; quick profit	6
Early maturity	Provides many harvests in the year, which is good to obtain food and money; helps in case of change in the weather; you will be able to harvest something even when you plant late	4	Can start harvesting early; allows easy and early marketing; provides food security	8
Pest and disease free	Good for eating; attractive to customers; easy to sell; good taste; nice appearance	3		
Vitamin A	It is important for our body	1	Takes care of malnutrition; keeps diseases away; health for under 5s	2
Good color	Attractive to consumers	2		
Does not have fibers	Appetizing; easy to eat	3		
Does not spoil easily	Fresh when you are eating; preferred by customers	2		
Big	Even a few roots are enough for the family; more weight from few roots; easily sold in the market	6	Appealing to people's eyes; fills you up quickly; highly demanded; marketable	6
Good shape	Attracts customers to buy	2		
Long storage time	It can keep for long and used for food later	1		
Good skin color	It attracts customers	1		
Long	Easy to pile up neatly when marketing	1		
Easy to cook	Uses little firewood or charcoal	1		
Good for the diet	Prevents disease, promotes health	1		
Very sweet tasting			Needs little sugar when eating; people like sweet things; allows people to save on sugar because not much sugar is needed for a beverage accompanying it; high demand; can be eaten raw or cooked	7
Filling when you eat			Improves health; assurance of presence of food in the home	1
Low cost			Needs to be weeded only once; needs few inputs	1
Flour			Healthy; provides energy	2
Can store for long/does not rot fast			Marketable	2
Orange color			Has vitamins	1

Annex 2-b: Undesired traits

Trait	Why trait is not liked	OFSP women	Non-OFSP women
Watery	Doesn't satisfy you quickly and also doesn't have taste or market	7	3
Low production	Loss, hard work but little payment; low harvest	1	1
Has fiber	Not pleasing to eat Fibers stick to your mouth when you are eating, and it does not taste good; not liked by customers	6	4
Late maturity	You are late in getting food and money	3	1
Bad taste	Not appetizing; has no market	5	4
Does not cook fast			1
Very soft	Does not taste good		
Does not have good shape	Is not attractive to the eye	2	
Color is not attractive	Does not have good a market	1	
Affected by pests and diseases	Causes you loss; cannot be eaten or sold; is bitter; has no vitamin	2	1
Not drought tolerant	Spoils quickly; does not do well in prolonged drought		1
Small/thin	Not attractive to customers; difficult to peel	1	1
Bad skin color	Not attractive to customers in the market		1
Bad shape	Cannot be sold; cannot be piled up neatly for selling	1	
Has scars	Cannot be sold	1	
Spongy and too fine	Not liked in the market	1	

Annex 3: Technologies for improved root storage

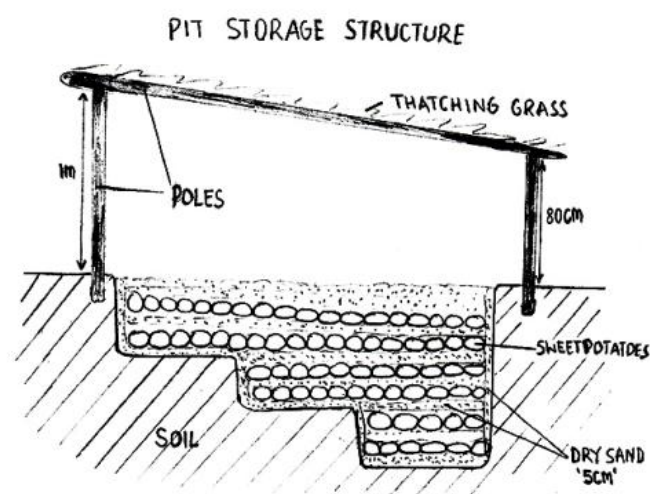


Figure 21: Pit storage for sweetpotato roots.

Source: *Breaking postharvest bottlenecks: Long-term sweetpotato storage in adverse climates: Ghana and Malawi.*

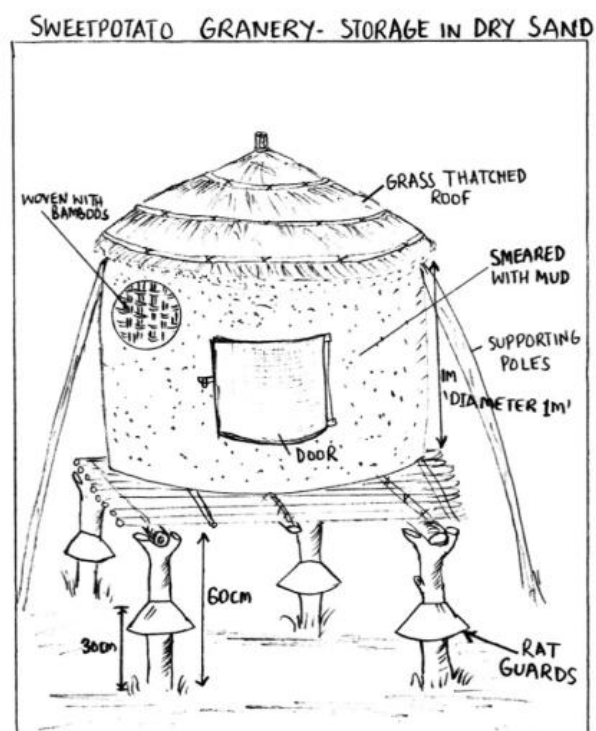


Figure 22: Adapted granary structure for storage of sweetpotato roots.

Source: *Breaking postharvest bottlenecks: Long-term sweetpotato storage in adverse climates: Ghana and Malawi.*



The International Potato Center (known by its Spanish acronym CIP) is a research-for-development organization with a focus on potato, sweetpotato, and Andean roots and tubers. CIP is dedicated to delivering sustainable science-based solutions to the pressing world issues of hunger, poverty, gender equity, climate change and the preservation of our Earth's fragile biodiversity and natural resources.

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