

Promotion of sustainable sweetpotato production and post-harvest management through farmer field schools in East Africa

Project titles:

a) Promotion of sustainable sweetpotato production and post-harvest management through farmer field schools in East Africa (R8167)

Project purpose: The project purpose was specifically to increase the returns from sweetpotato enterprise through improved production and post-harvest management by east African smallholders. This feeds into the more general purpose given by the Crop Protection Programme of promoting strategies to reduce the impact of pests in herbaceous crops in Forest Agriculture systems in order to improve the livelihoods of poor people.

Project Objectives:

To increase the returns from sweetpotato through enhancing East African smallholders' capacity in sustainable production and post-production management. This project pulled together the results of over six years of laboratory, on-station, and on-farm research on improved component technologies, and promoted the knowledge to farmers through a process of experiential learning. The project strengthened institutional linkages between the FAO pilot program to promote Farmer Field Schools in north-eastern Uganda and western Kenya, a number of local NGOs and community-based organisations, the Client-Oriented Agricultural and Dissemination Research Project, the Ugandan national research institute (NARO), the Natural Resources Institute (NRI), and the International Potato Centre (CIP). Results and lessons will be extended to other countries in eastern, central, and southern Africa through two networks: PRAPACE and SARRNET¹.

Project outputs:

1. Three drafts of the sweetpotato IPPM FFS “Manual for sweetpotato Integrated Production and Post Management Farmer Field Schools in sub-Saharan Africa” were developed, copies of each draft were given to at least thirty different stakeholders (farmer and extension facilitators, researchers, local government officials, extension staff, FAO staff, FFS coordinators and all project partners) and were field tested during the two pilot seasons of sweetpotato FFS. Comments from all the different stakeholders following their experience using each draft were collected at the annual planning/ evaluation workshops and were then incorporated or acted upon in order to improve the next draft. Two thousand copies of the final version were published with supplementary financial support from GTZ project and disseminated to extension staff, FFS facilitators, adopted by other programmes including Banana Programme in Uganda, Primary schools in selected formal educational primary schools in Uganda and other sweetpotato training programmes in Burundi, Sudan Kenya, Tanzania and Zanzibar.

2. Technical capacity building

More than 1,500 farmers trained in sweetpotato ICM FFSs to manage their sweetpotato enterprise and produce profitably and sustainably. And more than **70 master trainers** trained in sweetpotato ICM FFSs to train farmers to manage their sweetpotato crop and produce profitably and sustainably.

Year	Kenya			Uganda			Tanzania		Total
	Ext.	Africa Now	F-F	Ext.	World vision	F-F	Ext.	F-F	
2002/3	3	-	-	2	-	-	3	-	8
2003/4	-	-	8	-	-	4	-	-	12
2005/6	4	6	12	4	18	8	-	-	52
Total	33			36			3		72

F-F is farmer facilitators

3. Scaling up of sweetpotato FFSs activities (Sustainability issues)

a) Scaling up strategies

A wide range of stakeholders have been involved in sweetpotato IPPM FFS activities and during the planning for integration of sweetpotato FFSs approach after phases 1 and 2 representatives of different community organisations indicated support for integration of sweetpotato FFS activities and developed the following scaling up strategies:

1. Working with established NGOs or other organisations (e.g. feeding programmes) who will be able to continue the activities post project
2. Working with Government extension system and lobby them and policy makers to get them to use their budgets to support FFS approach including SP
3. Revolving fund approach to enable continuity (by pushing the business enterprise side (e.g. vines, processing), linking to soft loan providers (micro-finance institutions)) but need to specify in detail from the setting up of the field school
4. Promoting processing and utilisation of SP and linking to markets to encourage demand for SP and as a result SP IPPM FFS using farmer facilitators
5. FFS networks and associations to form an umbrella organisation that others could link to
6. Proposal writing (from different actors, e.g. FFS farmers, extension staff, researchers) to other interested donors to support more SP IPPM FFS
7. Dissemination and promotion of the manual, the TOT, curriculum and approach within SSA
8. Linking to educational institutions and supporting the inclusion of SP IPPM FFS into their curriculum
9. Identification of stakeholders and then who does what in the scaling up approach
10. Linking with research to provide farmers with clean planting materials

Extent of integration of sweetpotato FFS approach and activities into other institutional programmes

Institution	Target activities	Location	Progress
NALEP-SIDA, Kenya	Identify and train groups on sweetpotato FFS approach	Bungoma, Kakamega, Kisumu and Busia districts	No follow up made
	Source clean planting material and identify bulking sites		
	Identify and train community groups on sweetpotato processing and link them to markets		
	Backstop PME activities		
BUCADEF, Uganda	Train extension workers and farmers	Sisa and Kasanje sub-counties in Wakiso districts	No follow up made
NAADS	Link IPPM FFS facilitators to NAADS service providers and train farmers	Kyere sub-county, Soroti district	NAADS has been logistically backstopping the FFS activities and channeling there programmes through graduate FFSs
Soroti district local government	Train extension staff and follow up the activities of farmer facilitators	14 sub-counties	No training for extension staff has been reported but the DAO has been actively in identifying new sites for the expansion FFS phase and following up the activities of both graduate FFSs
World vision	Train extension staff and beneficiaries	Gulu and Kitgum districts in northern Uganda	18 extension staff were trained and 500 beneficiaries from the IDP camps
	Performance monitoring and reporting		Progress reports on field activities were sent to CIP
Teso media Association (TEMA)	Create awareness about the use of the FFS approach through focused journalism, public awareness and campaign, regular news reporting, radio talk shows, press conferences and press day exhibitions etc	Soroti, Katakwi, Kaberamaido and Kumi districts	Follow up not made

b) Soroti Sweetpotato Producers and Processors Association (SOSPPA)

The association is made up 12 graduates of sweetpotato FFS with over 300 members. The association has been registered as a community based organisation with the mandate to train other farmers in modern technologies of sweetpotato production, post harvest handling and value addition and to coordinate marketing of sweetpotato. SOSPPA has emerged into a dependable source of clean planting material to NGOS such APEP, NAADS and World vision, and individuals farmers within their localities. And have been contracted by Harvest Plus Reaching End-User project to produce vines of selected Orange-fleshed varieties for widespread dissemination. The association has established

linkages with the Participatory Market Chain Approach (PMCA) that is promoting marketing of sweetpotato in Uganda.

c) Revolving loan scheme

A competitive loan scheme with low or no interest rates was set up in the expansion phase with 4 graduates FFSs 2 each in Uganda and Kenya. The first beneficiary groups in Uganda (Soroti) recovered the money and handed over to the Project Assistant and DAO as indicated in the loan scheme memorandum but the out-going project assistant on the expansion phase has not passed over the money to other beneficiaries as suggested by SOSPPA. In Kenya, Godrick reported that the money had been recovered on schedule and arrangements had already been finalized to pass it to other beneficiaries by April 2006.

Scaling up challenges

- Enhancement of farmer to farmer information sharing requires continued knowledge updates and logistical backstopping
- Recognition by government programmes for community service delivery
- Wider market linkages for roots, chips and pastry products
- Broadening sweetpotato utilisation by incorporating livestock feed production to minimise on wastages at farm level and pest breeding
- Conserving and multiplying clean planting material especially during dry season
- Copying up with the rate of technology change e.g. variety release

B) Expansion of sustainable sweetpotato production and post-harvest management through FFS in East Africa and sharing of the lessons learnt during the pilot schools (R8458)

Major expected outputs

1. Location-specific sweetpotato (SP) integrated pest and production management (IPPM) farmer field schools (FFS) promoted to other areas where sweetpotato plays an important role in livelihoods including development of two visual farmer focused booklets from the FFS manual sections on pests and diseases and on processing and recipes that are for FFS participants as opposed to facilitators. And development and implementation of small loan/ grant system for SP IPPM FFS farmer graduate groups to access through basic proposals to help sustain the enthusiasm the groups feel upon graduating and enable them to set up some of their schemes (e.g. groups want to process SP chips, multiply and sell vines, produce and market SP food products). Project team to design & share guidelines for the loan proposal and repayment strategy with SP IPPM FFS graduate groups by end April

2. Synthesis of lessons learnt from the pilot sweetpotato IPPM FFS” to share with other FFS stakeholders. Compilation and sharing of list of lessons learnt from the pilot sweetpotato IPPM FFS among the project team



Pest identification

Oxen-ridging



FFS lesson learning issues draft

1. Facilitation

- Who are the master trainers, how were they selected, what are the key skills that facilitators should possess, how much control over whether the facilitators one works with have these skills does one have, what to do if one doesn't have a strong facilitator?

Who is a Master Trainer?

An active Technical Extension/Field Agronomist selected by the head of the district Agricultural Officer/Farmer Field Coordinator (DAO/DFFC) in liaison with project implementing organisation preferably from the project area and tailor-trained on detailed technical understanding of target crop management and post harvest handling, and Field School Facilitation Approach. He is a technical expert who besides guiding participants to develop skills to investigate and discover answers to their identified farm problems, is expected to arouse their enthusiasm for coherent participation and provide technical information to fill the emerging gaps. Normally submits reports to the District farmer Field coordinator and occasionally the Project Assistant (PA) and copied to the DFFC but remains more answerable to the DAO/DFFC because he continues to be a full employ of the District extension department. Occasionally, the Project Assistant makes follow up visits to schools after lieu notice. Specifically in the Sweetpotato FFS the PA conducted monitoring and evaluation of the facilitators through field visits without prior communication in addition to the normal scheduled visits, and training schedules that were to be filled by the facilitator after every training session. Participants were supposed to approve and meet the transport costs and subsistence of the facilitator after every training from the funds extended to the school by the project.

During the initial pilot phase, the SPFFS PA discovered that there was laxity on the part of MT that led to incomplete coverage and the report presented did not match the extent of learning that participants had received, and worse still the register books had been signed and facilitation payments made. Even the activities that had been done were facilitator rather than participants decided. The training schedule tool was rendered less effective because the facilitators filled them for purpose of justifying their payments. Participants could not courageously report the missed sessions because of possible intimidation by the the MTs. The DFFSC could not accurately follow up the reality on the ground because they too signed for all the funds for facilitating their monitoring as soon as they were disbursed and remained remote monitoring and relying on the incorrect reports from the facilitators.

The PA engaged in more frequent abrupt visits to schools, back-facilitated whenever the the MT was not available and eventually the participants became more open to raise the weaknesses of the MTs. In subsequent season the PA enhanced the follow ups and the project piloted farmer facilitators (FF) alongside MTs. The stringent measures instituted resulted in the extremely none performing MT being dropped and

encouraging more FFs who also underwent tailored training to empower them with adequate skills to share their experiences with fellow farmers.

- Advantages of having extension staff operating as FFS facilitators, disadvantages.
 - Extension staff are agri-technicians employed by the government agricultural department to disseminate agricultural information to the farmers and provide appropriate reports that often a basis for planning community-oriented programmes.
 - The extension staff are the key entry technology channel to the community and farmer facilitator have been created from extension facilitators
 - The extension facilitators make the cost of running the schools less expensive because they receive a salary from the government and the project only supports their cost of facilitating the school on selected days.
 - The TOT is just to update them with the recent technologies because they are already trained personnel otherwise it would be very expensive to train people who are technically ignorant.

Problems

- Raising a lot of expectations
 - Dodging facilitations
 - Not being creative and tending to revert to the training approach that they have been used to for a long time although they know it is ineffective
 - Dishonesty – fake reporting and conniving with key leaders of the groups to cheat on the funds directed to the group
 - Preference to articulate critical issues in English instead in local languages
- Advantages of having a specialised project assistant operating as FFS facilitator?
 - Provides proper direction of the project objectives and activities
 - Proper monitoring of the activities and review of the activities
 - Project communication is direct to the beneficiaries
 - Creates a closer project-beneficiary linkage

Problem

Not easy to reach all the schools as a single person

May create project isolation unless the PA is tactically cautious to embrace other community stakeholders/organisations

- Facilitation skills, if you learn with a poor facilitator (i.e. graduate from a school with a very top down ‘facilitator’ or an absent one!) can you then become a good one? Or do you end up thinking lecturing is the way you are supposed to do it. How do you avoid getting into this situation, and if you realise a facilitator is poor what can you do about it?
- Most MT have been deficient in one way or another and obviously their graduates would be even worse given that no individual can grasp all that s/he is taught. The way to put the programme on track by grooming some FFs. After

realising daunting task , I undertook a clandestine monitoring to at least identify individual participants who would potential be groomed to become FF. During my monitoring visit I made sure that I addressed/facilitated the visited school and one of the points emphasised was the issue of choosing among them potential participants who would also train fellow farmers and what it was involved. During group evaluation process, I spared some time to talk to the the participants about the obligation of identifying participants who would become future facilitators. The same message was given to the facilitators. The trick was to portray the FF output as a competitive and an indicator of excellence. I should say this trick worked out well because towards the end of the first phase one all facilitators were panicky including Mr. Stephen Emuria, George Otando, Jerad and Ruth got engaged in extra facilitations/couching to ensure that they produced graduates that would qualify. It was clear that they had been delivering below expectations. Other than exposing to participants what they should have gone through, the last minute input could make significant changes in methodological adoption. Individual participants were interested and made a lot of consultations with me during the last monitoring visit. Since I was vested with the final decision to approve the selected participants for NAARI, I managed to explain to the objectives and the training expectations and key issues they should try to watch out during the NAARI workshop to address the gaps/weaknesses. Also, talked to Robert to tune the training towards addressing the critical points. Methodological changes are expensive in terms of time and one needs to be patient, committed and foresighted. Should be able to take decisions based on the prevailing circumstances. Obviously the first lot of FF were not very good but at least had understood the concepts. I believe they would become better facilitators than MTs during successive phases. If the project life was at least 4 years and Tanya and Sam remained on the project the impact would be formidably sustainable.

I think it is important to include the role of Project Coordinator (PC) and PA
PC role in documentation, coordination, objective criticisms and follow ups including financial information, correspondences, seasonal field monitoring etc enhanced the implementation of the activities.

- Are people born facilitators or is it a skill you can improve on?
Yes and no.
A few individuals possess inherent qualities of being good facilitators. They are good planners and convincingly antilate messages, Others need training, exposure and continued practice to make good facilitators.
- Training of facilitators, risky investment?? What training should facilitators receive? We need to address the FFS approach training that FAO runs here, how much do you know about it Sam, please add in as much detail as you can think of. Need to invest in training, but what kind of training
Risky Investment (Facilitator training a necessary evil!!)
 - Cost- Is the cost justifiable?Running each school costs US\$ 500 plus the cost of TOT
 - Dependability- Can we rely on the facilitators to achieve the desired impact?

- Sustainability- Continuity of the training approach!! The training apparently causes insignificant technology dissemination methodological change. Farmer Field school involves planning and patience on the part of the facilitator. Extensionists are not used sparing a lot of time with farmers. And that is why they try to dodge facilitation. Actually in the traditional extension service most the agents get free payment at the end of the month because they hardly visit the farmers unless on special occasions.
- Commitment – Most facilitators identify themselves with the FFS because of the allowance which is an additional pay on top of their monthly salary.
- Availability – Trained but not available for facilitating the farmers due the various assignment by the employer. And the deliberate action to cheat the farmers because of inadequate monitoring and coning farmers in the pretext of having done them a favour to get the competitive training opportunity

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The cost of training each facilitator for a week is US\$ 200-250 (Tanya I have used the quotation that Robert sent to CIP when we were budgeting for the World vision participants and AfricaNow from Kenya during the last training at NAARI).

- Technical TOT – the researchers involved need to be familiar with and supportive of the concepts of farmer empowerment and discovery learning behind the FFS approach, how could this be better done so that researchers role is one of developing technically confident facilitators who support and help structure and direct farmers learning but aren't trying to be the person with all the answers always, and aren't trying to impose their ideas for experiments on farmers at the expense of farmers then not testing their own theories.
- Most the facilitators engaged in FFS training are Diploma holders trained in colleges e.g. Arapai Agric college located in Soroti. My quick suggestion is that the FFS concepts should be included in the curriculum. Secondly when most these graduates come out, it is not easy to get employed and even those in service like Mr. James Odieng are being laid off and replaced with University graduates to do the same extension service. My second opinion is that we could engage the services of these people on fulltime basis so that they are wholly answerable to the project. For the case of Sweetpotato processing in Soroti one of the facilitators, Mr Ochom was a graduate of Arapai who was engaged by me in the same description and upto now farmer e.g. Eugene refer to him as a committed servant. Also in Western Uganda on my previous FFS assignment facilitators were fulltime on the project and each could run 4 schools per week and Friday was strictly for compiling the weekly reports for submission. The schools operated on bi-weekly basis so that each facilitator could run 8 schools in a season. The TOT training could be revised so that participants are given the notes to read through on arrival or before reporting for the TOT. each subgroup will be asked to make a presentation to the rest and criticisms made. Assumption here is that the facilitators already possess the agronomic skills and topics for presentation will be technical but presented basing on FFS approach. Additional topics on post harvest handling and processing could be delivered as special topics and even the experimental ideas could come here. WHY I am raising this is

that often participants think that their time is wasted on revising obvious technical aspects.

- Although facilitators initially disliked the inclusion of experimentation it appears that most of them who have facilitated more than one season appreciate its inclusion. BUT I always do not understand why Godrick tries to discourage when the facilitators think it is very useful component? Even farmer who have gone through it appreciate it. Experimentation helps the participants to understand the findings of their trials.
- Lack of creativity – how come the same experiments are present in all the schools? This really is proof that the facilitators have completely missed the concept behind FFS or that they are not confident enough in their own facilitation or experimental design skills to let the participants design the experiments and so prefer to copy one that was done the previous year.
- This an area that needs serious address and the role of PA is paramount.
- Farmer facilitators, working in pairs, issues we came across how do we tactfully mention the corruption that we suspect in Bungoma with FF being chosen on condition that they pay a certain proportion of their allowance to the EF (Although I have used EF interchangeably with MT but I am realising that MT could also refer to a FF who has effectively facilitated FFS for a number of cycles and has gained a lot of confidence and derives a lot of pride and satisfaction. For example Mr Ekinyu and Jane Juma in Busia could fall under this category and I believe can perform better than some MTs. Also, during the Busia meeting one of the MT uncomfortably expressed that he is proud if his graduate FF performs better than him) .
- Working in pairs enhances Farmer Facilitator's confidence because they technically back up each other during the training, and the gap due to absence of one is not realised. The role of the MT in identification and of the FF and monitoring of one it also ensures that at confidence in. Occasionally, MT tends to regard the respective emerging as their own babies and tend to influence their running and management including remunerations to facilitators of the FF-led schools. Some MTs have often been disfranchised and sabotaged the subsequent participation of FFs by replacing them with those who can abide to their own interests. In such circumstances the project ends up missing the expertise of good performing FFs and even distorted the CV of affected FFs.
- How would we avoid this emerging vice? The strategy should increase the dependence of the FF or temporarily de-link his operations from EF. We need a discussion forum involving the aggrieved FFs and respective stakeholders to openly raise these emerging vices. I know the point would be tough but once exposed others will be cautious. (Similar cases that I exposed and have had subsequent impact are: operations of funds to the schools- MTs used to connive with the FFS signatories to the accounts to steal the money without the majority of participants who used to be kept ignorant about the amount of money the beneficiaries used to receive. The immediate consequence was coordinated hatred for Sam by the affected racket that was involving the outgoing PA, Facilitators FFS signatories to the bank and DAO's offices (in most cases the corruption is system networked and to tackle it one must be courageous and objective). But

impact was realised this on-going phase (2005/06) when the new PA attempted to be tricky and tending reactivate the same vice- Schools complained and appealed for intervention but I advised them to openly raise in their joint discussions before they can approach other people like the DAO. I guess it has been sorted out. The money corruption is widespread but needs exposure and very few servants try to be honest. Please do not treat these revelations as accusation but as archetypes. Other similar salient cases are during our first visit to Kenya in Busia, Udungu FFS funds were transferred and the coordinator had the following day signed for a good portion of it. The unexplained delay by in transferring funds by more than 2 months this season to schools despite the fact that funds had been requested and released timely I pressurised Regina to release money on time which she did but I was personally surprised that for more than 2 months the money had not reached the group accounts. Instead things were being done in a hurry because they were expecting us. All these are weaknesses surrounding money which are almost embedded in the system.

- Language issues, extn staff don't always speak the vernacular language while farmers do, particularly important when dealing with complex ecological issues to have someone familiar with local agro-ecology and cultural beliefs

Most local languages have limited vocabulary to express some scientific issues and/or not deployed in their areas of birth. Even within a particular language there are many dialects. On the other hand English language is associated with individuals who have gone to school, thus some individuals insist on using to distinguish themselves and derive self satisfaction. But those who have endeavoured to express key issues in local languages have ended up perfecting their local vocabulary especially insect and disease naming. Personally I have benefited a lot whenever especially from western Kenya, the Luhya language. A record of these could be used for future reference.

- Bicycles and other incentives and problems
I am personally proud of this initiative. And if we are thinking of future FF participation this will part and parcel of the strategic package. Transport is very critical component for wider scaling of the activities. It minimises endemism of the operations. Besides the facilitators consider it a personal tangible asset benefit from the project that enhances popularity of the activities. The only problem is that it reduces their allowance paid to them and feel they are poorly being remunerated. Also some are not able to meet the costs of possible repairs e.g. punctures which should not be very serious within a single cycle because new bicycles should not present a lot problems. Bicycles are key transport means in the rural areas, they are a source of income so there is a tendency of beneficiaries diverting to purposes other than FFS activities thereby depreciating it very fast and requiring frequent service. It is possible that some community leaders would misunderstand it as project bicycle and would want to borrow it.

Facilitators do not only regard the other incentives including facilitation allowances as support to them to travel to the school and conduct the training but also as an income to solve their other domestic obligations.

- Reference materials, written manuals etc need to highlight the absence of other materials and the demand for this sweetpotato one.

2. Experimentation

- Importance of including experimentation in the technical TOT and perhaps it should also be included in the FFS approach training that facilitators receive as well, manual and FFS, knowledge of how to calculate an average, idea of replication
- On-farm experimentation includes farmers' informal practices, for example, of sourcing and trialling varieties of their interest. That is why they can afford to give you the reasons for the drop outs and adoptions of their local preferences. However, the majority of the farmers and even field officer have a bias that experimentation is difficult or confusing, time wasting and consequently discouraging its inclusion in many farmer trainings. The majority of field extension agents tend to duplicate what they learnt during their training and advocating for use of researcher recommendations even to those farmers who are hearing it for the first time. Many multi-location trials involve selected farmers from the area and apart from being researcher managed; the deductions are often remain endemic. The college training for most extension agents (Diploma graduates) does not emphasise experimentation subject and that is why most extensionists avoid using it because they cannot confidently articulate its application under farmers' conditions. To prove this point in 2001 there was greater resistance by the facilitators to implement this component in the FFSs and during our review workshop it was one the issues that ended unresolved. But due to my persistent explanations during the M and E visits during which criticisms on field layouts and implications and possible suggestions were made to the facilitators independently with aim of deeper individual understanding and then to the entire group led to implementation of scientific trialling in most of the schools. Since most of the facilitators are not able to interpret the messages during the initial meetings with participants as a basis for composing and guiding towards group own-initiated trials and thus the reason for duplication. Indeed the first meetings are not only to form the group but also to collectively define and conceptualise the problem-solving roadmap to the identified farmer constraints. Although in most cases the farmer problems are similar, the prioritisation and approach to the solution are not necessarily the same because of various factors including environmental reasons. For example, farmers in commonly sandy soils like in Soroti tend to make smaller heaps/mounds than in Bungoma where the soils are heavy and the vine length may not be the same in both cases. Also the differences in soil fertility may affect performance the same variety in either location. Therefore it is advisable for the facilitator to guide the participants in the low fertility soils to suggest options of improving on their yields. This may include mitigating fertility component by application of fertiliser e.g. manure or inorganic source or even using one common source but varying the rates of application. Conversely, in the fertile soils the problem may be excessive vegetative growth which compels growers to practice wider spacing and even prepare very bigger mounds than the recommended. In the former scenario the investigation may centre on soil fertility and the later appropriate vine spacing.
- However during the special topic presentation on "Soil fertility and plant population" the facilitator should ensure that all issues in both cases are well

- understood by each participant in both groups and these could be concretised by the during the exchange field visits, when participants share the results of experiments emerging from the same topic on “Soil fertility and plant population”.
- In this way experimentation in FFS increases the understanding because farmers have diverse discovery opportunity to a similar problem. Often there is lack of sustainable uptake of recommended technologies including those validated through on-farm trialling because of researcher imposition of the treatments across locations.
 - The negative attitude portraying experimentation as a difficult practice is just a bias because many facilitators are selected from the existing extension agents who are used to dodging their responsibilities in the field. The intent is to depopularise the act of experimentation which will save on their time to conduct training sessions as it will be easy to plant using orthodox approach. Surprisingly, most farmers too prefer approaches that are easy and time saving so that they are able to fulfil other obligations. But work in SPFFS has shown that they are willing to change with time in a similar way the facilitators have changed their attitude towards experimentation. Many SPFFS graduate farmers in Soroti and western Kenya have become research contact persons for conducting research on-farm trials because of successful conceptualisation of practical experimentation skills. During many presentations Eugene has referred to himself as a researcher, Jane Juma in Busia is another graduate who recognises the technical contribution through SPFFS and Ruth Apodi open gratitude to towards increasing has field experimentation understanding. She has ever expressed her disappointment with Godrick’s discouragement of experimentation in FFS and contacted me guidance on the trials in her charge
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 - Actually the exclusion of experimentation in most FAO graduate schools and the M and E in SPFFS create the difference between FAO and SPFFS schools. For example, the Abuket group failed to adopt the planting skills taught in FFS because of report lack of comparison of the techniques during the training. Farmer resorted back to the orthodox approach after the training and there no evidence of farmers training on better groundnut recommended farm practices But with SPFFS at skills on vine management and conservation, planting on ridges (this was participants own initiatives during the training), pest management, processing etc are being practised.
 - Lack of creativity – how come the same experiments are present in all the schools?
 - Lack of confidence re experimental design, resulting in facilitators copying each others experiments – leads to the experiments not being about farmers issues at all, then doesn’t this lower the motivation and involvement of farmers in the FFS??
 - Replication – importance, is it complicated, what is the point of any experimentation without replication, can you actually have experimentation without replication? Comments by extension staff that farmers wouldn’t

- understand about replication so they decided to omit it from their experiments – do they really think that farmers don't understand about risk aversion? The explanation of having a photocopy of each treatment so you can see whether it performs in the same way or better than the other treatments each time, or whether it only performed well because it was placed in the best part of the field.
- As already indicated most facilitators have fallen short of guiding the participants to conceptualise the problem solving path during the initial meetings because most of them are descendants of bookish approach. The role of PA in reversing the trend is very important.
 - Controlling researchers desire to put their experiments everywhere, technical TOT need to be run by individuals with an understanding that FFS is about supporting farmers to develop the skills to design, layout, manage and evaluate their own experiments, not to copy a bland researchers designed experiment of little relevance to farmers
 - Worry about researchers just using on-farm trials to set up their own experiments on farms but still not handing over any of the management control to farmers, now have a worry that extension staff (oblivious of most basic research methods are attempting to set up their own trials on FFS learning plots!)

3. Groups

- How does group formation tend to have happened, voluntarily, then if there are drop outs interested volunteers can fill their places, what about in Soroti this year where some of the groups are originally groups who had been working with SOCADIDO, how was the decision for Eugene to work with them made. In Kenya also existing groups were chosen many who had been Women or Youth Groups previously and who the extension staff knew from before and decided would be a good group to work with. Voluntary groups tends to attract middle to higher wealth household members as opposed to the poorest households or those with less social capital. There isn't an issue here its just that we need to be honest about how is benefiting from FFS currently?
- There are exists many women, youth, and gender mixed groups in the rural communities formed with different objectives including soliciting assistance from charitable or humanitarian organisations, loans from rural micro-finance institutions, service benefiting groups such as NAADS. Some people belong to more than one group. To start a school members have to be enlisted from these groups. There is always a tendency of many facilitators co-opting any of these groups for FFS activities besides their original objective. This tendency has often resulted into participants' low commitment or poor understanding of FFS activities from the start because that this was just a pin off activity. For example, Abuket, Omodoi, Kasunire and the farmer-led school in Bungoma in 2002/03 were not borne and such arrangement and they are among the most stable groups after graduating. The formation of Abuket FFS is a clear manifestation of this case: Initially the facilitator had identified Kamurojo NAADS group for the sweetpotato FFS in Soroti. But when Sam and Prosy visited the group without the company of the facilitator (Mr. Emuria) they found the group having a session on poultry management under the NAADS programme. The two had to wait and met

a few members after their session. The visit was made after information from Mr. Emuria about the meeting day and time. The facilitator had arranged with the key group mates that after they would be shortly meeting after their NAADS sessions, sign attendance book to justify the presence of the FFS. Besides had convinced one of the participants to avail money to open up a separate group account on which funds would be deposited for FFS activities. Thereafter they would withdraw it and refund his money. Unfortunately when we met the group I was personally not convinced because the members present for even the NAADS session were less than 10, no formal group meetings had been held to establish a FFS. We requested them to convene a general meeting within a week with all interested persons during which we would discuss FFS activities. But further revelations during the short interaction indicated that they did not what to be many and had already discussed it with the facilitator. based on this I gave them a condition of raising the participants membership to at least 25 and accept that their meetings would be starting in the morning hour not afternoon as earlier arranged with the facilitator and the Local administrators should be encouraged to attend this meeting with them. These conditions seemed not to **auge** well with them and cast a lot of doubt about their success, looked disappointed but pledged to compromise.

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- A week later I was there and found a dozen of members who said others were coming but eventually never turned up. The local administrator was not available. The brief-case members present requested to meet me briefly so that they save time to meet the NAADS facilitator. I objected because I needed ample time for the initial discussion and they quickly suggested that they change the meeting date.
- However, during the impromptu visit with Prosy, Mr. Ekinyu who had inquisitively listened to my explanation picked interest and requested separately for a one minute audience with him. His request was whether another group besides this one would be acceptable. He too belonged to a community group but accepted to mobilise surrounding community to come up for a scheduled meeting to discuss the FFS group formation. Attendance came from 3 different existing community groups and Abuket evolved from different existing groups.
- In short most facilitator do not follow the protocols of FFS formation for their own convenience and greed to save time and engage in other community programmes that will earn them supplementary income. For sure Mr. Emuria would not even turn up the scheduled dates because he was facilitating in other NAADS groups that were more paying than FFS. He would only come to sign the visitors' book to justify his claim for the meagre payment without work. Incidentally it a common practice in FFS and that is why I dropped Michael, the farmer facilitator for Angole because of the same habit that he had copied from the master trainers.
- Otherwise under normal circumstances 2 meetings (general and interested community meetings) have to take place before a school is formed.

- How do the drop-outs emerge?

Individuals who joined with a lot of expectations were disfranchised and opted to abandon the groups. In the Kamorojo case an individual followed me during the session at Abuket demanding that the facilitator had lured him into depositing his money for opening the account. He was asking me how he was going to recover his money now that I had not considered them for the school. I referred him to the facilitator? Other who thought there was money to share were disappointed after knowing that it was for paying the facilitator and establishing productive group activities. Also lack of compromise or mistrust of group officials may lead to some participants withdrawing from the group. It is important that the facilitator is sensitive to such issues cropping up and solves them amicably to maintain group cohesion.

Entrants were those who were convinced about the seriousness of the programme. Some compared it with the on-going NAADS programmes during which participants are given money whenever they met as not being sustainable.

- How could we target poorer farmers, or is the very time costly nature of FFS a factor that works against inclusion of the poorest members of the community?
- The poorer farmers are laggards who in most cases would not present themselves for group work participation because they admitably regard themselves as unfortunate people who have very little developmental ideas to offer. And because of their prior inferiority even when they join the groups their contribution is masked by the wealthier farmers because in most cases they are dependent on in-kind food provisions in exchange for the labour on the farms of innovator farmers to supplement own deficient harvests to sustain domestic food requirements. It is like they are sharing a class with their superiors. In regard to field production experiences, they are practically more knowledgeable about the problems affecting crop performance than the innovator category of farmers who lack limited hands-on field experience because of minimal exposure
- To enlist or attract their participation the initial meetings should be conducted at lower community levels because they rarely attend bigger meetings. Since the gathering is not too big to get each of the attendants to say something, after introduction of the objective of the meeting opportunity should be given to each of them to say something about own farm practices. This discussion could be led a grass root community leader who may entice each of them to say something. Preferably the local extension worker should be left out of this meeting because some are normally not free to say out their opinion because it may appear as if they are reporting on aspects not addressed. Occasionally during the session meetings, the poorer farmers could be sub-grouped alone to give them opportunity to contribute without the innovator shield effect.
- Women's involvement and the influence they exert on trial design and even what characteristics of varieties are evaluated, special topics that are asked for etc, silent participation or single sex groups

- Experiences encountered during the first pilot phase indicated that groups without an element of male participation were not sustainable because women when alone tend to despise each other and the resultant effect is disintegration and collapse of the groups (reference to Umoja FFS in Kakamega where they disagreed and later formed caucus sub-groups and even our facilitator Ruth was implicated in siding with particular sub-groups. But in sub-sequent season I insisted that sweetpotato FFS should have at least male participation and this has subsequently worked out well and even upheld by the groups themselves).
- Expectations and lessons on need to share expectations early on to reduce likelihood of farmers joining in case they can access the funds etc. Sam can you add in some of the detail that occurred in Soroti where you had farmers wanting to access funds and how you managed them?
- Commercial focus of groups, it was actually very clear from our August visit to Soroti and Kenya that the commercial plot is given a very high priority within the groups activities infact it appeared to be more important than the learning plots in many case, obviously it is a big incentive for groups to find a way to earn money together at the same time as they are learning my worry is whether the learning gets the same attention as the money earning does.
- The financial benefit is a key stimulant to up taking technology. Technology improvement leads to increased crop performance and therefore the added yield should not only be reflected in changes in food supplies but also income. Most rural are poorer than urban communities because of the limited or untapped opportunities that would lead to increased incomes and by FFS promoting better techniques of farm production farmer groups automatically equate it to expected change in incomes. think that promotion without the component of commercialisation is unlikely to succeed because many farmers would focus.
- Perhaps Sam you could list some of the examples of why groups didn't function well, and also some criteria of groups that did function well.

To continue with

- cost of running FFS,
- Donor attraction, visitors, photogenicity vs reality, use by other programmes
- Post FFS

Miscellaneous

- Processing and post harvest aspect of the sweetpotato FFS is unusual, and added a lot of interest and value
- Commercial planting material production, and the benefits the groups get, but for how long
- Special topics
- Impact of FFS on researchers, helping them learn about what farmers want to focus on, can we give some solid examples here???
- Number of FFS in some divisions in Kenya and previously in Soroti is so huge compared to the divisions population that it suggests the whole population must be involved in at least one FFS ??? Fictional FFS

- Developing and implementing policy e.g.3 co-management, issues of scale, stakeholder analysis etc
- The role of monitoring and evaluation at all implementation phases
- The potential benefit of knowledge sharing with particular consideration on AESA tool
- Developing data collection strategies
- Importance of review workshops, loan schemes, emergence of community based farmer facilitators from graduate schools and the expansion phase.

**Promotion of sweetpotato marketing and utilisation through improved chipping techniques:
Evidence from Abuket Sweetpotato Processors Association, Uganda**

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Abstract

Commercial processing of dried orange-fleshed sweetpotato (OFSP) chips was introduced to Abuket farmer field school (FFS) in Soroti by NARO's sweetpotato post harvest program in collaboration with International Potato Center (CIP), Vitamin A for Africa (VITAA) partnership, and Soroti Catholic Diocese Integrated Development Organisation (SOCADIDO).. In 2002 season, one ton of dried sweetpotato chips was sold to Maganjo Grain Millers Company in Kampala by the group. In 2003, the group scaled up production to 12 tons of dried chips but ended up lacking immediate market. Other potential markets such as UgaChick Poultry Breeders, still held reservations to integrate sweetpotato as an ingredient for poultry feeds because of un reliable supply of adequate amounts required in the feed production. The quality of the chips produced in reference to their beta-carotene retention was also questionable. Experience over the two years has shown that increased processing has positive bi-directional impact on both root production and processing. CIP and Kawanda post-harvest programme have continued to search and link farmers to possible markets. Desperate for market, the group attempted to integrate sweetpotato into the traditional dishes by mixing dried chips with roasted maize and cassava sorghum to obtain composites for porridge and local bread called *Atap*. *Atap* is traditional bread made of millet or sorghum. Through knowledge acquired from the FFS the group tried developed different composite flour recipes by fortifying roasted maize, sorghum and cassava with varying proportions of dried sweetpotato chips. The developed composite was later sold for distribution to the people displaced by the war and living in camps around Soroti municipality. Up to 5 tones of this flour was distributed to these people. The composite's baking, texture and palatability characteristics have since been improved through incorporation of tamarind and soya flour. These innovations by the farmers are likely to lead into a bigger market of local consumers hence resulting into wider scale processing by the group. This case highlights both the importance of the need to promote production and corresponding marketing skills and the horizontal impact of all the stages in production to processing. It also demonstrates the crucial role of farmer understanding and participation, and the benefits of incorporating existing practices.

1. Introduction

Processing of orange-fleshed sweetpotato (OFSP) has been approached from both an economic and nutritional perspective, with the aim of eradicating or at least the reducing poverty and Vitamin A deficiency. Piloting of sweetpotato processing was initiated during a brainstorming workshop by organizations promoting sweetpotato production and processing namely, International Potato Center (CIP); National Agricultural Organisation (NARO); Soroti Catholic Diocese Development Organisation (SOCADIDO) and Soroti District Agricultural Office (DAO) in 2000. They agreed that a processing route was needed to help diversify the existing monopolistic mode of marketing fresh sweetpotato roots through the bottlenecked open market which was subject to significant exploitation by middlemen. Processing would widen the options of consuming sweetpotato roots and products and act as a springboard for opportunities geared towards value addition. The approach would stimulate increased consumption of pro-

vitamin A orange-fleshed sweetpotato varieties to all classes of consumers. Beta-carotene, the precursor of Vitamin A is present in high quantities in OFSP. The majority of people in the east African region especially young children in rural areas suffer from Vitamin A deficiency. Severe Vitamin A deficiency leads to night blindness, increasing susceptibility to various illnesses and child mortality in east Africa (Woolfe, 1988). The traditionally grown white or cream-fleshed varieties supply little or no pro vitamin A.

The collaborating institutions spearheaded by Soroti Local Government and CIP launched a promotion strategy to disseminate two OFSP varieties (Ejumula and Kakamega) that had already been bred by the National Agricultural Research Organisation (NARO) at Namulonge Agricultural and Animal Production Research Institute (NAARI). The VITAA partnership together with the DFID funded Sweetpotato Farmer Field Schools project, organised training in sustainable production and post harvest management, value addition technologies, and promoted the consumption of OFSP varieties as an agricultural-based strategy to combat the Vitamin A deficiency as well as enhance food security by supplementing the white-fleshed varieties.

To avoid the subsistence bound, inviability of individual farmer processing, two specific processing groups were identified and the remaining groups and individuals were encouraged to produce and supply roots to the processors. CIP and NARO through Kawanda post-harvest programme provided a chipper machine to each of the processing groups and the period of the initial financial support that would be recovered from the sale of the chips was extended to enable them to buy roots from producers. Abuket sweetpotato processors supplied a pilot batch of 1 ton of chips to Maganjo in 2002 that was readily paid for. Consequently, in 2003 the producers supplied about 40 tons of roots that resulted into 12 tons of chips that could not be sold in 2003 within the first 2 months of harvesting. The delay or uncertainty in disposing of it immediately, coupled with the resulting lack of funds to pay for excess roots and limited storage capacity led to the processors halting the chipping activity. The root producers, however, were desperate to harvest and even supply in credit to processors so as to avoid increased weevil damage in the field and to ensure guaranteed sale of the roots. Although, the development workers involved had noted positive indicators that they thought would lead to increased future root production and processing, the market bottleneck resulted in an instant change of heart by both the root producing and processing farmers groups who started to question the future of sweetpotato production and processing. Maganjo declined to buy the additional chips and their annual purchase of 2 tons did little to match the quantity of chips produced by the farmers. Other potential food and feed processors like Kirinyaga in Nairobi and UgaChick in Kampala doubted the quality, quantity and supply sustainability of the chips.

The technical challenge was to uphold the initial enthusiasm felt by the farmer producers and processors as a pre-requisite to sustained adoption of sweetpotato production and processing. CIP and NARO continued to search and link primary processors to alternative market outlets such Kamego Herbal Research Center and Tanzania Food and Nutrition Center for possible markets in Dar es Salaam. NARO in collaboration with other partners such as Kasawo and other food processors in Kampala continued to develop sweetpotato flour recipes. Also, the desperate primary processors (farmers) using the knowledge they had gained through participation in the sweetpotato farmer field schools on value addition of sweetpotato combined with traditional knowledge of local food mixtures embarked on developing flour recipes for porridge and bread (Atap) for local demand. The primary processors with logistics support from Soroti Local Government made a composite of chips with roasted maize and cassava before it was distributed to the internally displaced peoples (IDPs) camps. CIP through the VITAA partnership purchased 5 tons of Vitamin A sweetpotato chips from the farmers to be provided to the IDPs for disaster mitigation for vulnerable groups in displaced camps especially children, expectant and breast feeding mothers. During the course, Kasawo that had developed sweetpotato recipes with guidance of Kawanda Post harvest programme bought about one ton of chips to pilot mixing of a commercial porridge flour using sweetpotato as an ingredient. Their first product on the market was stocked in their contact shop in Natete and within 3 weeks the composite had all been sold. Since then Kasawo buys one ton of chips every month from the farmers. At the same time Kirinyaga, a factory based in Nairobi has indicated that it can take one ton of chips every month from Abuket farmers since their other supplier the Gamelega farmer processors group cannot meet their monthly requirement of two tons. These emerging market trends for orange-fleshed sweetpotato chips have re-ignited the demand for commercial production of roots for chipping. This paper highlights the sensitivity of market stimuli on technology promotion and dissemination at farmer level. It

also demonstrates the importance of farmer understanding and participation, the role of inter-institutional linkage and observance of ethical technical objectivity in promoting development technologies.

Experiences from farmer groups

Vines of two orange-fleshed sweetpotato varieties, namely Kakamega and Ejumula, were distributed to different Farmer Field Schools Vine (planting material multiplication and conservation) and Root Production (FFSV and RP) groups which had formed in order to supply vines to other sweetpotato farmers in the area and roots to the Farmer Field School Sweetpotato Primary Processing (FFSPP) groups. CIP in liaison with the sweetpotato programme at Namulonge continued to enrich the choice of orange-fleshed varieties through the participatory breeding programme with the same farmer groups.

CIP and Kawanda Post harvest programme provided two chippers to FFSPP groups for commercial processing of dried sweetpotato chips and subsequently, sale to secondary/ tertiary food processors engaged in production and packing of flour composites for instant nutri food preparations. The technical promoters also facilitated linkages between primary and secondary processors. The activities of the FFSPP included washing the roots, chipping and open sun drying them for about 8 hours on black polythene sheets laid on raised platforms. The thick-skinned chips, not properly dried were then removed for further drying while the rest was bagged in white-coloured polythene bags for storage and transportation to secondary processing points.

The FFSPP group also combined techniques learnt in the Sweetpotato Farmer Field Schools (SPFFS) with their traditional knowledge of sweetpotato chipping and food preparations, piloted the production of farmer-formulated instant composites flours by mixing orange-fleshed sweetpotato chips and roasted maize and soya flour. Trials of different mixtures of sweetpotato chips, roasted maize, cassava chips, sorghum and later soya bean were made and distributed to primary tasters or different groups (individuals in and out of offices, families and internally displaced persons [IDPs]) around the Soroti municipality. Adjustments were made based on various comments made by tasters that led to the development of two generally acceptable farmer-formulations (one for porridge and the other for bread (local Atap). Supplementations of additives such as tamarind or lemon or young mango fruits and sugar were recommended by some of the tasters. Porridge and Atap prepared from the sweetpotato composite flours were tasted during the Parliamentary-Consultative for International Agricultural Research (CGIAR) meeting in Jinja in April 2004.

The secondary processors (Maganjo and Kasawo millers) using the formulations developed jointly with Kawanda Post-harvest programme prepared instant composite flours which were supplied to supermarkets and their contact shops for sale. Product promotions were also conducted by these millers through packaging, promotional materials and exhibits during field days, workshops and meetings in 2003 and 2004.

Results

Initially the acreage for orange-fleshed sweetpotato in Soroti district increased from four acres during 2002/03 to 72 acres in 2003/04 long-season crops. Yield per acre at farmer level increased from 7 to 8 ton/ha attributed to improved management and importance attention to the crop. One and more than 12 tons (Table 1) of orange-fleshed sweetpotato chips were processed in 2002 and 2003, respectively. In 2002, the maiden ton of chips supplied to Maganjo resulted in normal profit and the monopolistic Maganjo millers remained reluctant to adjust the price so that the farmer could realize some positive profit margins. The 120% increase in chip production to 12 tons in 2003 was a result of the immediate sales the previous season. Apart from initial lack of market in 2003, concerns over the quality of the chips were highlighted when the farmers had already produced more than 10 tons, at this stage a lot of roots were still in the field awaiting processing. This resulted in an immediate re-orientation of market strategies to try and dispose of the chip stocks and to avert tremendous loss. Further chipping was halted and more than 15 tons of roots were not be chipped. At this juncture both the producers and processors were regretting the venture. The farmer processors on their part had to quickly resort to venturing in trialling production of sweetpotato mixtures to suit the local consumption preferences and the root producers consoled themselves by chipping

using local methods for enhancement of their traditional food security stocks. Initially four and three (Table 2) farmer formulated composites for porridge and Atap respectively, were prepared. The favourite composite flour mix for each was selected along with recommendations for the use of optional supplements such as tamarind, sugar, lemon or fresh and boiled young mango fruits. Based on the two favourite farmer formulations, seven tons of composite flour was mixed containing more than 60% orange-fleshed sweetpotato chips. The mixture was donated to the internally displaced people for disaster mitigation and used to supply local demand (Plate 1).

Later, Kasawo grain millers in Kampala asked if a consignment of 1.5 tons of good quality OFSP chips could be delivered to the factory at a purchase price of equivalent US\$ 0.2 per kg within a two month period. Kasawo grain millers now use one ton of OFSP chips per month. Three other millers in the region including Kirinyaga in Kenya (who have estimated their requirements at 2 tons per month with a purchase price of US\$1 per kg on delivery), and Ugachick in Kampala (Table 2). Ugachick are already obtaining half their required chips from Gamalega, counterpart farmer processors in Kenya. Farmer to farmer linkages has also been forged between Abuket and Gamalega groups to liaise in supplying chips to Kirinyaga and other potential buyers.

Nevertheless, the initial lack of market led to farmers losing interest in continued production of orange-fleshed sweetpotato varieties and many abandoned their OFSP planting material areas, allowing livestock to graze on them. This has resulted in a critical shortage of vines during the third season.

Fortunately, the processing Farmer Field Schools maintained sweetpotato vine and root banks in the wetlands in preparation for their training on quality production of chips for industrial processing that required a source of orange-fleshed sweetpotato learning plots during the off-season period. This followed the successful approval by NARO (SAARI)/ Client Oriented Agricultural Research and Development (COARD) of their proposal to train farmer processors. A lot of irregularity including bleaching and therefore loss of Vitamin A due to open sun drying was observed. This FFS planting material plot is the only local source of OFSP planting materials for the third season.

Although the production levels of OFSP have continued to fluctuate due to the uncertainty in market, the latest attitude towards production of dried chips and roots is positive and projections suggest an area of 100 acres (1000 tons of roots) of OFSP will be planted this year, 75% of which will be processed into chips.

Table 1: Profile of annual chips production and interested secondary food processors

Year	Tons of chips	Interested food processors
2002/03	1	1
2003/04	12	4
Cumulative total	13	4

Table 2: Taste preference of different farmer-formulated porridge and Atap (local bread) composite flour samples (results based on pairwise ranking)

Category	Porridge				Atap (Bread)			
	Urban dwellers	IDPs ¹	FFS PPTs	Non FFS PPTS	Urban dwellers	IDPs	FFS PPTs	Non FFS PPTS
Taste population	30	100	60	35	20	100	60	20
Percent (%) preference taste for sample composites (C1-4)								
C1	00	03	10	02	00	05	05	02
C2	10	20	10	10	15	40	37	38
C3	40	41	20	44	80	55	58	60
C4	50	36	50	44	-	-	-	-

¹IDPs = Internally Displaced Persons, FFS = Farmer Field School and PPTs = Participants



Distribution of farmer processed OFSP flour to IDPs in Soroti

Discussion

The Abuket processing group model has confirmed several key hypotheses including the assumptions that:

- without marketing outlets for roots, farmers response to production and acceptance of the introduced varieties would be slow;
- participatory learning through farmer field school develops farmers decision making skills providing them with a basis from which to decide whether to reject or accept various practices;
- availability of a new nutritionally enhanced raw materials (pro-Vitamin A sweetpotato chips) would result in the development of Vitamin A rich food mixtures.

More recently sweetpotato processing in Uganda has been the subject of wide organizational, research, political and community interest. When coupled with each other, the sweetpotato processing perspective has attained an important social dimension, and implied transformation of a crop previously considered important only as a rural food security but marginal economic crop into an important role in a high potential livelihood strategy. The successful venture into processing by the entrepreneurial Abuket FFS group, exemplifies the positive essence of development intervention such that farmers are able to take control of their own (demand driven) activities and exert responsibility and purpose with respect to their economic future. While the development worker can bring specialist knowledge and skills to an intervention, the client determines the final outcome of the intervention.

Conclusion

Commercial chipping of orange-fleshed sweetpotato (OFSP) varieties was collaboratively piloted by the International Potato Center (CIP), Kawanda post-harvest programme (KPHP) and the NGO, SOCADIDO in Uganda in 2001 through sweetpotato Farmer Field Schools (FFS) in partnership with the Vitamin A for Africa (VITAA) initiative. In 2002 Abuket FFS processed one ton of sweetpotato dry chips was processed and sold it to Maganjo food processors in Kampala but could not take larger quantities of the chips. In 2003, farmers produced 12 tons of dry sweetpotato chips, however, there was no clear or immediate market for this quantity of chips. Many prospective buyers, such as UgaChick, are skeptical about committing themselves to substituting sweetpotato chips for other ingredients. They fear that the supply of sweetpotato chips is not reliable, because the production and chipping of OFSP varieties is still in its infancy and farmers have limited experience in quality processing. CIP and Kawanda post-harvest programme intervened to search and help to link farmers to possible markets. Abuket processors group combined their traditional knowledge of local food mixtures with knowledge they gained through the sweetpotato FFS on value addition of sweetpotato through processing, and in 2003 developed their own composite formulations for porridge and bread (the popular Atap).

Abuket processors who are graduates of a FFS used a participatory approach that is likely to result in wider scale processing since it captures a large proportion of potential consumers who rarely buy necessities from modern super markets. This case highlights both the importance of the need to promote production and corresponding marketing skills and the horizontal impact of all the stages in production to processing and marketing. It also demonstrates the crucial role of farmer understanding and participation, and the benefits of incorporating existing practices.

Slides presented

The development scenario

The monopolistic Maganjo offered unattractive prices and later withdrew from use of SP chips after the first trial

- The immediate disposal of roots in 02/03 stimulated production the subsequent season but market remained uncertain
- Lack of market for more than 10 tons chips in 03/04 resulted in both the producers and processors were regretting the venture and led to:
 - a) Halting of further processing leading to loss of more than 15 tons of roots in the field,
 - b) Desperate venturing in trialling production of sweetpotato mixtures to suit the local consumption preferences
 - c) The root producers consoled themselves by chipping using local methods for enhancement of their traditional food security stocks.
 - d) Kasawo millers come with a monthly demand quota of 1 ton OFSP chips and posed a challenge on how to sustain supply and re-ignited the need to produce roots.
 - e) The vines were again scarce and the only source was the Farmer Field School that had conserved vines in the wetlands
 - f) Farmers needed specialised skills for production of quality chips

Discussion

- Without marketing outlets for roots, farmers response to production and acceptance of the introduced varieties would be slow;
- Participatory learning through farmer field school develops farmers decision making skills providing them with a basis from which to decide whether to reject or accept various practices;
- Availability of a new nutritionally enhanced raw materials (pro-Vitamin A sweetpotato chips) would result in the development of Vitamin A rich food mixtures.
- Sweetpotato processing perspective has attained an important social dimension and has led to transformation of a mere food security crop into a potential livelihood strategy
- The successful venture into processing by the entrepreneurial Abuket FFS group, exemplifies the positive essence of demand driven development intervention
- While the development worker can bring specialist knowledge and skills to an intervention, the final outcome of the intervention is determined by the client.

Challenges

- Meeting the demand of sweetpotato chips for large industrial processing especially feed mixing
- Expanding the secondary processing through wide use of sweetpotato incorporated mixtures
- Development of high dry matter, less sweet, drought and weevil tolerant varieties to compete with the popular white varieties
- Conservation and multiplication of vines especially during the prolonged dry spell
- Establishment of operating funds
- Enhancement of the farmers value addition incentives, understanding and participation; and the benefits of incorporating existing practices
- Promoting wide consumption of OFSP and products
- Scaling up the success story and winning stakeholder advocacy

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Dissemination and commercialization of orange-fleshed sweetpotato varieties through FFS and VITAA partnership: Experiences from Eastern Uganda **presented in Arusha**

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Abstract

Integrated Sweetpotato Management through farmer field schools was incorporated into the already established IPPM FFS (Integrated Pest and Production Management Farmer Field Schools) programme in East Africa from May 2002 to promote sustainable sweetpotato production and post harvest management. After four months field implementation of this technology-based and farmer education project, partnership was forged with the VITAA (Vitamin A Africa) initiative during its launching at Gweri sub county, Soroti district to disseminate and promote commercial production of orange-fleshed sweetpotato (OFSP) varieties high in beta carotene (the precursor to vitamin A) content as a crop-based approach focusing at alleviating micro-nutrient deficiencies and household poverty in the rural communities. Since then a cumulative total of 1622 bags of vines each containing 1800-2400 cuttings ready for planting worth Uganda Shs 9,732,000 (US\$ 4866) have been distributed to farmers through farmer-oriented organizations within Soroti district. 334 bags of vines, 36 and 297 for first and second seasons respectively have been channeled through FFS while the rest have gone via other VITAA promoting partner organizations including NAADS and SOCADIDO. Whereas the other partners reported complete crop failure due to the adverse weather conditions during the first crop cycle, 2 FFS managed to produce orange-fleshed roots for processing and delivered about 1 metric ton of chips to Maganjo processing factory in Kampala. Of an estimated total of 72 acres of OFSP planted during the second cycle, 20% of the planting material was supplied by the first season sweetpotato FFS from their vine bank plots and 31% of the acreage has been planted by the on-going 8 (6 new and 2 graduate) sweetpotato FFS. Two sub-counties have prioritised sweetpotato as a

commercial crop through the NAADS programme. CIP provided two chipper machines to FFS and other sweetpotato producer groups in a bid to transform sweetpotato into an industrial crop and is spearheading the search for and linkage to alternative markets for chips. However, the pilot venture into commercialization through processing did not appear to be profitable to the groups however the idea of selling OFSP to boarding schools and other institutions is thought to be a more promising alternative market.

Key words: Dissemination, Farmer Field Schools, Orange-fleshed, Vitamin A

1. Introduction

Sweetpotato is grown as a food crop in many Sub-Saharan Africa countries and covers an estimated 2.1 million hectares with annual estimated production of 9.9 million tones of roots. It is the third most important food crop in east Africa and ranked seventh among the food crops produced in the world and has an annual production of 138 million metric tons (Edison, 2000). Uganda is the world's second largest producer of sweetpotato and first in Africa. Sweetpotato plays a primary role in food security in Uganda especially in the eastern region where two crops per year are grown for both home consumption and to supplement household income by sale to local markets and urban centres. Although crop utilization in urban centers was previously limited and often kept secret as it was considered to reflect the low income status of the consumer, it is becoming increasingly important in urban food systems and there has been tremendous positive change in attitude towards the crop.

In spite, of the increasing popularity of sweetpotato in both rural and urban food systems, most local varieties grown throughout the region have white or cream-coloured flesh, and supply little or no pro vitamin A in the body (Draft Sweetpotato Technical manual, 2003). Vitamin A deficiency is one of the major health problems which most developing countries currently face. This micronutrient is critically deficient in the diets of the majority of people in the east African region especially in rural areas, particularly young children. Severe deficiency leads to night blindness, while less severe forms reduce a person's general health and capacity to fight off malaria, measles, diarrhea, AIDS associated illnesses, pneumonia and other diseases. Vitamin A deficiency has been identified as the leading cause of early childhood death and a major risk factor for pregnant and lactating mothers in East Africa (FAO/WHO, 1992).

Whereas Food and Agriculture Organisation's (FAO) food balance sheet indicates an improving trend of Vitamin A in the diets for most developing countries in the last 20 years, in East Africa the overall vitamin A supply is actually decreasing (United Nations, 1992). According to International Food Policy Research Institute (IFPRI) projections 2000, the number of the malnourished children will continue to increase from 33 million in 1997 to somewhere between 39 and 49 million in 2020.

According to FAO/WHO report 1992, vitamin A intake is often inadequate because of the seasonality of food sources, the early abandonment of exclusive breast feeding, high morbidity levels, and practice of not giving vitamin A-rich food to young children. Dependence on capsules donations from UNICEF and use of fortified foods is quite costly and not implemented widely. The best sources of beta-carotene are liver and fish-liver oils, which are very expensive for the rural poor. The best plant sources of beta-carotene, which the body turns into vitamin A as needed, are carrots, green vegetables and orange-fleshed sweetpotato (OFSP). Whereas most rural people especially in eastern Uganda associate carrots with rich families and greens are regarded as inferior vegetables to be used during periods of scarcity, sweetpotato is traditionally thought of as a famine crop that can substitute for cassava and fits in many food mixtures (blends) and forms.

To date countries tackling the Vitamin A deficiency problem are focusing actions largely on a combined approach of supplementation as a curative measure, promoting the increased production and consumption of Vitamin A-rich foods, and use of fortified products. Beta-carotene (precursor of vitamin A) reported as units of vitamin A activity in many studies is the most prevalent source of vitamin A in our foods (Colgan, 1995), and thus, the introduction of Vitamin A-rich sweetpotato in farmer-oriented programmes can play an important role in improving their nutrition and is amenable to agriculturally-based interventions (FAO and WHO, 1992). The OFSP varieties, which have previously been relatively uncommon in Africa, are providing their worth as a low-cost, easily available, natural, dietary source of pro-vitamin A. The total

carotenoid content of sweetpotato has been found to range from 0 to > 20 mg/100g of fresh weight depending on the variety, which would be equivalent to 0 to 60 mg/100g of dry weight basis (Akoroda and Teri, 1998). Sweetpotato has a comparative advantage over other common staple foods especially cereals and legumes which provide zero to minor traces of beta carotene equivalents. Children below 5 years, 7-10 and adults need to eat about 30, 40 and 80g of OFSP respectively, to meet the daily requirements of pro-vitamin A therefore even if OFSP is not a preferred diet for an individual consumer, one needs to add only a small portion on top of his choice and farmers with small plots can adopt it as a back garden crop to supply roots and leaves for daily household dietary supplementations (Third Draft Technical Manual, 2003).

International Potato Center (CIP) is providing support towards modern technological dissemination to improve on production, post-harvest handling and processing to add value (Tara, 2003). This would improve on the current fragile food security, low per capita income, and very low availability of Vitamin A in the diets, which according to the United Nations report 1992, Vitamin A supply in the East African region is actually decreasing due to seasonality of food sources, early abandonment of exclusive breast feeding and high morbidity levels. In recent years, technology dissemination through Farmer Field Schools (FFS) has been introduced to East Africa and is seen as a promising approach for sustainable technology adoption. Participatory systems approach is well suited to increasing rural incomes because they are tailored to the requirements of the villagers and build on the strengths and knowledge of the smallholder community (Chandra, 2000). Therefore, piloting promotion of OFSP activities through the recently started sweetpotato integrated pest and production management farmer field schools (SP IPPM FFS) groups set up as part of the UK Department for International Developments (DFID) Crop Protection Programme funded project 'Promotion of sustainable sweetpotato production and post-harvest management through farmer field schools in East Africa' would strengthen dissemination and technology uptake among farmers and other end users.

World Health Organisation (WHO) estimates that in many of the under developed and developed countries, several nutritional disorders are prevalent, and could easily be alleviated by consuming root and tuber crops like sweetpotato (Edison, 2000). According to VITAA Newsletter (2001), the Vitamin A for Africa (VITAA) partnership is promoting consumption, production and marketing of OFSP varieties which have been lacking in the traditional farming systems. The partnership is extending the impact of OFSP varieties through community awareness of nutritional benefits. International Potato Center in collaboration with Soroti district agricultural extension agencies/National Agricultural Advisory Services (NAADS), research institutions, community-based organization such as Soroti Catholic Diocese Development Organisation (SOCADIDO), World Vision launched as an immediate action plan for establishment of OFSP varieties by facilitating distribution of planting material and awareness raising about vitamin A deficiency to potential sweetpotato farming communities. Since the launching of OFSP in Gweri sub-county in September 2002, CIP has continued to support sensitization seminars, workshops, radio talk shows and press articles involving a cross section of stakeholders. International Potato Center (CIP) facilitates the provision and delivery of planting material for commercialisation and evaluation, and is spearheading the promotion of OFSP as an industrial crop by encouraging processing and searching for viable market options.

Farmer Field Schools (FFS) are an effective and popular method of farmer education, learning is through discovery and adoption follows farmer assessment of technologies and varieties. Farmer Field Schools have been found to be a successful technology dissemination approach in a number of countries including Indonesia, Sudan, Benin, Ethiopia and East Africa Federation (M'Boob, 2002) they facilitate increased farmer understanding of crop ecology and farmer experimentation combining and comparing indigenous and researcher developed technologies that allow farmers to evaluate and develop appropriate pre and post harvest crop management strategies for their specific farm conditions and needs. Farmer Field Schools have become popular entry point for most agriculturally -oriented programmes in Uganda including NAADS and Acquired Immunity Disease Syndrome (AIDS) Awareness activities. Technical staff in the traditional extension service or graduates of previous FFS are contracted to facilitate the FFS throughout the cultivation season.

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Participants are led through the growth and development stages of both the above and underground plant parts by using a hands on approach, or inciting leading to discovery and action. The language of guidance or instruction is preferably indigenous. Group dynamic exercises enhance togetherness and their sub-group session rotation as hosts, computation and result presentation leads to expression of their value of togetherness, mission understanding and leadership challenges. This has been manifested in a number of FFS graduates from previous Integrated Pest and Production Management (IPPM) FFS being elected to responsible positions within the community leadership councils, and the evolving of farmer facilitators' association with the aim of competing for provision of selected community services.

Inclusion of OFSP variety growth and performance assessment in FFS learning and commercial plots enhanced their dissemination and highlighted their nutritional importance. Participants sensitized on the use of OFSP, multiply varieties that have already passed consumer acceptance tests, evaluate agronomic performance of candidate accessions, produce OFSP roots for commercialisation, process OFSP for commercialization and grow them side by side in their own fields. Achievement days during which the community and influential people are invited are held to display the activities done during the season. Therefore the objectives of the partnership were: 1) promotion of sweetpotato integrated field crop and post harvest management; 2) make orange-fleshed sweetpotato available on large-scale, demonstrating the potential of crop-based approaches in alleviating micro-nutrient deficiencies; 3) promote commercialisation through processing and utilization.

2. Strategies used for promoting OFSP varieties

a) Linking farmers to market

A meeting on linking sweetpotato farmers to markets was held on 5th Sept 2002 at SOCADIDO, Soroti chaired by Father Martin Aeho and attended by the marketing manager of Maganjo Grain Millers; sweetpotato farmers from potential sweetpotato growing areas in Soroti district, community development organizations (SOCADIDO and World Vision), researchers involved in sweetpotato improvement and post-harvest programmes, agricultural field extension workers, the CIP regional breeder, the SP IPPM FFS project assistant, and nutritionists. The goal of the meeting was to promote the socio-economic development of OFSP farmers and processors through integration of production, processing and marketing thereby linking a wide range of public and private sector institutions. During the meeting community-based organisations and farmers emphasised the lack of market as the most important limiting factor to large scale production because farmers tend to avoid excess root harvest for fear that they would not be able to dispose of them while in contrast processors represented by Maganjo Grain Millers singled out lack of chips from sweetpotato producers as a factor delaying effective inclusion of sweetpotato in their composite flour mixtures. Therefore strategies developed to promote both production and processing included: a) acquisition of vine stocks from central region, establishment of rapid multiplication plots and swamp nurseries to buffer up supply especially for immediate planting after prolonged dry seasons were components sighted for sustaining the seed systems in Soroti and Kumi; b) establishment of a sustainable

rural-based sweet potato processing enterprise to supply quality dried chips to identified market opportunities. CIP/PRAPACE pledged to provide two processing machines for the two groups that would be identified as potential processors; c) identification of contract farmers to multiply seed vine of Ejumula, Kakamega and Naspot 5 orange-fleshed varieties for distribution to other farmers; d) a field day was planned to be held at Gweri sub-county as a central and potential sweetpotato growing area to sensitize the community on combating vitamin A deficiency and promote on-farm production of sweet potato for home consumption and market.

The viability of commercializing production of OFSP varieties was estimated by assessing the expected production costs and compared with the processors' price offers. It was observed that during slack seasons leading to limited root supply, processing was not profitable because the open markets would offer better prices for roots. However, participants noted the viability of piloting orange-fleshed processing as a first step towards promoting industrialisation of sweetpotato and stimulating increased production. Costs and profits at different levels of sweetpotato production and processing were estimated and indicated that commercial processing was not economical as in the table below.

Table 1: Costs for processing 100 kg of dried sweetpotato chips using a powered chipper and raised tray dryers

Item/Activity	Details	Quantity	Unit price (US\$.)	Sub total (US\$.)
Fresh tubers	Farm gate price	3 bags (320kg)	4.00	9.00
	Peeling 3 bags	6 pers @ 4.5 hrs	0.13/pers/hr	3.38
	Washing	3 pers. @ 6 hrs	0.13/pers./hr	2.25
	Water	6 jerry cans (120 lts)	0.03/jerry	0.15
Slicing	Labour	2 pers.	0.13/hr/pers.	0.13
	Fuel	0.5 litres	0.70	0.35
	Oil	0.5 litres	0.50	0.25
Drying	Labour	2 pers./1.5 days	0.40/pers./day	1.20
Packing	Gunny bags	1	0.25	0.25
	Inner polythene	1	0.25	0.25
Transport	To Maganjo	100 kgs	0.01/kg	1.00
Total processing cost	Slicing, drying and delivery of chips to factory	3 bags of fresh roots (320 kgs)	6.07/bag	18.21
Production Cost of dried chips	3.2 kgs fresh roots = 1 kg dry chips	100 kg	0.18	18.00
Factory price/ kg chips	1 kg of dry chips delivered at factory	1 kg	0.18	0.18
Gross income	Sale of chips	100	0.18	18.00
Net profit	3 bags of fresh tubers or 100 kgs chips			0

b) Field day to launch OFSP varieties

Promotion of OFSP varieties organized by Soroti District Agricultural Office and SOCADIDO in collaboration with CIP, Namulonge Agricultural and Animal Research Institute (NAARI)-Sweet potato Research Program and the SP IPPM FFS project was launched at Gweri sub-county in Soroti, eastern Uganda on 27.09.2002 during which various stakeholders including politicians, community-based organizations, Agricultural departments and institutions, Research institutions, schools farmers and Farmer Field Schools, SOCADIDO, World vision, Buganda Cultural and Development Foundation (Bucandef) and (James Arwata Foundation (JAF) participated. The CIP regional breeder highlighted the efforts being taken by different partners and the importance of OFSP program for combating Vitamin A deficiency in agricultural-based communities especially eastern Uganda where sweetpotato is an important traditional

food eaten in many different forms. She explained that the field day was intended to promote the production and consumption of orange-fleshed sweet potato for both home consumption and marketing by the rural community. During the function the VITAA Coordinator reported that the occasion was part of a series of planned promotional activities to be held in the country and other parts of Africa through the VITAA initiative led by CIP and chaired by Dr. Fina Opiyo, NARO Director. The district leadership pledged total moral support in implementing the program. Success stories associated with OFSP cultivation and use in the central region of Uganda were shared with other participants. Demonstrations conducted included production, processing using the chipper and drier, and sweetpotato products such porridge, and processed flour from Maganjo processing factory were displayed. Distribution of planting material and handing over of the sweetpotato processing machine to the community. A play entitled “The Sweet Missing Vitamin” was acted by pupils of Anjopet Primary school and a poem, “Food and Life” was presented by Echeru Alex, a pupil of the same school.

c) Public and farmer - awareness seminars, talks, workshops

The district policy making body during their council meetings urged councilors to advocate for consumption of OFSP varieties as a cost-effective method of minimizing disease infections, especially loss of vision, they organized seminars in educational boarding institutions to promote inclusion of OFSP in their weekly menus. Radio talk shows involving policy stakeholders were organized to promote production, consumption and marketing of OFSP varieties. During technical review workshops OFSP was highlighted as a cost-effective nutritional strategy for the majority of rural people. One commonly highlighted issue during the meetings was the comparison of vitamin A levels in common staple foods and the vitamin A requirements (see tables 4 & 5) which served as evidence to help justify the adoption of OFSP into the production systems and dietary habits.

Table 2: Vitamin A levels (average per 100g edible portion) in common foods in East Africa

Source	Form [Beta carotene equivalent (g)]						
	Fresh	Boil	Skin boil	Dried	Porridge	Bread	Leaves
Sweetpotato	0-20,000		0-20,000	7,820			2,700
Cassava		0-20					8,280
Fresh maize		240					
Maize flour					0	0	
Rice		0					
Beans		Trace					
Carrots	12,000						
Tomato	600						
Cabbage		Trace					Trace

Table 3: Root flesh colour of sweetpotato related to dietary supply of vitamin A

Age/sex	Vitamin A requirement (µg RE)	Amount (g) of fresh sweetpotato roots required to supply the daily requirements of pro-vitamin A			
		Araka (white)	Osukut (yellow)	Kakamega (orange)	Enjumula (deep orange)
1 day-3 years	400	3636	265	78	35
4 to 6 years	500	4545	331	97	43
7 to 10 years	700	6364	463	136	61
Females over 10 years	500- 850	7273	530	156	69
Males over 10 years	500- 600	9091	662	194	87

Source: (Technical Manual, 2003)

d) Provision of the most limiting inputs

International Potato Center (CIP) in liaison with National Agricultural Organisation (NARO) and district farmer-oriented organizations namely NAADS and SOCADIDO facilitated availability of orange-fleshed sweetpotato planting material and two chipper machines on credit for pilot processing. The table below shows supply of planting material during the two seasons.

Table 4: Distribution of OFSP planting material during pilot cycles I and II

Season	Beneficiary	Source	Bags	Vines/bag	Cost/bag (US\$)	Total cost (US\$.)	Paid by
2002	SOCADIDO	JAF	256	600X3	3	768	SOCADIDO
	NAADS	JAF	600	600X3	2.5	1,500	NAADS
	Launching	CIP	27	800x3	4	108	CIP
	FFS groups	CIP	20	600x3	3	60	CIP
	FFS groups	Gweri	16	600x3	2.5	40	FFS
2003	FFS groups	CIP	196	600x2	2.5	490	CIP
	FFS groups	Gweri	45	600x3	5,000	113	FFS
	FFS groups	FFSs	85	600x3	5,000	213	FFS
	Spill offs	Gweri	630	600x3	5,000	1,575	*LCV& Inds.
Total			1875	600x3		4,866	

* Local Council V (Highest district policy making body)

e) Promotion of production and post-harvesting technologies

Two pilots SP IPPM FFS with a total of 60 participants successfully completed the first field season and held an enthusiastic field day on 07.03.03. The rapid sale of the OFSP products (doughnuts, pancakes, chapattis, cakes, crisps and chips) produced by the SP IPPM FFS and exhibited during the function stimulated the demand for vines of these varieties (which were still in very limited supply) and the immediate task to disseminate the sweetpotato integrated crop management technologies to a wider section of the community coverage. Therefore, 4 sweetpotato farmer field graduates who excelled during the first pilot cycle were selected for a week-long induction skills empowerment training at Namuloge Research Station so that they could boost the 2 extension-led facilitators and the number of could then be tripled during the second pilot cycle.

f) Production profile of OFSP

In spite of the poor weather conditions (drought) during the first pilot season the SP IPPM FFS participants managed to produce and supply OFSP roots for processing and conserved vines for subsequent season otherwise the non-FFS growers lost all their crop. Total acreage increased from 10 acres during first season to over 70 acres in the second cycle. About 1 was delivered to Maganjo food processing factory and 10 tons of OFSP chips were produced by FFS in the first and second cycles respectively.

g) Promotion processing and marketing

To kick-start the processing and marketing of chips, the NARO post-harvest programme extended a revolving fund to enable processors pay for the roots and meet the costs involved in processing and transportation of dried chips to Maganjo flour milling factory. Continued efforts have been directed towards attracting alternative market avenues for dried chips such as Kirinyanga millers in Nairobi, Kenya and Ugachick poultry feed producers in Uganda. Maganjo flour products are available in most supper markets in Uganda. Preparation and utilization of various recipes is being encouraged through FFS.

Commercial root and chip production



Table 5: Institution responsibilities and significance of linkage to promotion process

Institution(s)	Responsibilities	Importance of promotion process
NARO	Provision of basic seed and training in production techniques and post harvest handling	Availability of improved clean seed, product utilization /acceptability & technology empowerment
SOCADIDO/ World Vision	Seed distribution to communities and farmer group formation	Household food security, wide dissemination and adoption in every household in the communities, wide seed distribution
CIP	Provision of advanced clones and technical support	Variety dissemination, adoption and utilization/ acceptability & sustainability
SP IPPM FFS project (Global IPM Facility, CIP, NRI, NARO, KARI)	Project development for SP IPPM FFS, sourcing funds for FFS activities, project implementation, reporting, M&E, dissemination, mirror activities in W. Kenya & W. Tanzania	Implementation (Set up, fund, support and monitor all SP IPPM FFS activities and plan scaling up)
PRAPACE	Technical support	Market orientation and technology adoption
NAADS/DAO	Enhanced variety and technology dissemination and adoption	Modernisation of agriculture (Food and poverty alleviation)

Farmer groups	Field and post harvest evaluation, proper management and commercial production	Enhanced production, processing and marketing skills
COARD	Training farmers in seed multiplication, conservation and quality chip production	Enhanced production, processing and marketing techniques at farmer level. Training farmers in clean seed production and conservation, and quality chip production
Flour millers	Flour processing	Value addition and creating vertical sweetpotato marketing
Policy makers	Sensitisation and project activities backing	Increased adoption, acceptability and approval of scaling up
Educational institutions	Provision of market and in-depth sensitization	Sustainable wide utilization multiple dissemination and adoption

i) Field achievement day

A joint field day organized by SP IPPM FFS project and Abuket Oyuunai sweetpotato processors to appraise the activities of farmer field school activities on the promotion of integrated sweetpotato field and post-harvest management in Soroti was held at Okunguro Farmer Field Schools (FFS) and attended by a cross section of stakeholders. The event was officiated by the Local Council V (LCV) Chairman, the highest policy making organisation in the district. Field guided tours and demonstrations were conducted to explain the improved field production technologies, commercial sweetpotato chipping and preparation of various products recipes were demonstrated and exhibited for sale. Local songs and a poem were sang and recited to express the usefulness of the SP IPPM FFS project.

3. Achievements

- a) Rapid dissemination of OFSP varieties, increased production and consumption
- b) Farmers appreciation of the commercial potential of sweetpotato and the successful linkage of primary processors to flour millers is a promising step towards industrialising the crop
- c) Intra-institutional participation in promotion of OFSP varieties is a positive trend towards scaling up
- d) Inclusion of sweetpotato on the list of priority in Gweri and Kyere subcounties, and subsequent approval of funding by NAADS is a positive indicator of project success and attitude change towards sweetpotato crop

4. Lessons learnt by promoters and farmers

- Commercialisation through processing did not seem to be profitable meanwhile the sale of OFSP roots to boarding schools appears more promising. Further promotional strategies are being geared towards increased food processing and local fresh root consumption. It is important for food processors to focus at flour mixtures for both the medium class and traditional rural market whose stocks often run out during prolonged post-harvest seasons
- During FFS discussions participants expressed that technologies tailored and promoted as strategies for alleviating poverty were viewed as more appropriate to the farmers involved learning to address the problem of food security, although the two issues are interconnected, the farmers believed that food security was easier to address They explained that this was the reason for the initially high group membership which later dropped because expectations were not met. They also attributed the failure of the earlier efforts of promoting cotton production through FFS to poor marketability. Whereas farmers recognize that their production approaches result in low yields, they avoid opportunities that will result in excess harvests that may not be disposed off. The marketing opportunities being created for OFSP have enhanced technology up-take because farmers want to take advantage of presumed profitable opportunities.
- Orange-fleshed sweetpotato chips have poor mashing characteristics during local dish preparations (Atap).

- Embracing Extension officers from the existing traditional service is a disincentive to technology dissemination and adoption unless they are closely supervised. Farmer facilitators, with a good grasp of the technologies and approach were found to lead to better learning by the FFS.
- Rallying local stakeholder support speeds up the process of promotion and dissemination
- Machine-sliced chips are not easily affected by storage weevils as compared to traditional manual slicing method
- Commodity market potential is a crucial sustaining ingredient of technology reception and adoption
- There is need to harmonise the expected impact of project partnership to avoid possible overshadowing of either activities. In some instances both facilitators and participants tended to highlight dissemination and commercialization of OFSP varieties rather than emphasizing sweetpotato improved production technology promotion

5. Discussion

Although significant progress has been made towards promoting production, processing and consumption of OFSP varieties, there is a general need to search for more competitive markets for both roots and chips. Existing opportunities such as exportation of organic fresh roots to European Union countries need to be exploited and more avenues to feed local boarding educational institutions, restaurants and ventures to supply orange-fleshed sweetpotato roots to super markets should be sought. Farmers could also stagger their planting periods to avoid over supply during peak harvest seasons leading to poor offers.

Research should among other tasks develop varieties that fit the traditional cooking and eating qualities of white-fleshed roots. Farmers/consumers have already reported problems with the poor fragmentation of boiled orange-fleshed chips during mingling into “Atap” (a popular sweetpotato bread form during periods of food shortage) as compared to white-fleshed varieties. But the orange-fleshed flour has been found to blend well with cassava flour in ratios 1:1, 3:1 and 1:3 sweetpotato flour: cassava flour for another form of Atap, and 2:1 for local porridge preparation that has also been supplied to internally displaced people (IDPs) . Processors could investigate the potential for packing sweetpotato-cassava composite flours to increase their shelf-life so that it can be supplied to super markets and local shops. This would increase the level of use of OFSP flour as most potential consumers (middle class) prefer to avoid the laborious traditional processes involved in the composite preparation. Also farmers stocks normally get depleted before the next harvest sets in. Notably, OFSP varieties especially the most popular Ejumula is highly susceptible to viral infections meaning they cannot be recycled more than three generations thus arrangements should be made to replenish them with clean vines otherwise farmers will be compelled to plant whatever is within their reach irrespective of its health status. This will not only negatively affect the yields but compromise the achievements gained in promoting these varieties due to long term disease build-ups. It is also important to understand more about the reasons why even the pioneer adopters of the OFSP are still growing their local varieties side by side.

Collective appraisal of the of approaches used by different stakeholders would probably lead to wider appreciation and advocacy for institutionalization of the FFS approach among different stakeholders as both a technology and input-based approach for agricultural-oriented communities. Acceptance to officiate during sweetpotato farmer field schools functions and close association with sweetpotato activities by influential personalities in the district has always provided the desired and impressive backing among the community. Also requests for introduction of the sweetpotato farmer field school activities by stakeholders from non project target subcounties such as Olio and Bugondo is a notable indicator of project successful impact.

The traditional culture of slicing sweetpotato was a pre-requisite to adoption of the improved processing for large-scale chipping. Soroti farmers normally slice or crush small root rejects (Inyinyo) that cannot be sold or easily peeled for cooking. The slices or breakages are then sun-dried, milled into flour that is normally utilized during times of food shortages. Slicing substantially influenced the processing technology uptake

and stimulated interest by individuals and other groups for further production of orange-fleshed varieties, and to date nine SP IPPM FFS groups, 20 SOCADIDO community-based groups in Kumi and Soroti districts, several individual spill-over within and beyond the project areas such as Bugondo subcounty. Soroti local government has internalized sweetpotato as a commercial crop (Soroti status report 2003) and Ministry of Agriculture through the NAADS programme has identified sweetpotato as a priority crop in selected sub-counties (Kyere and Gweri) in Soroti district.

6. Conclusions and Recommendations

- Orange-fleshed sweetpotato promotion through SP IPPM FFS has resulted in fast and effective dissemination and adoption of IPPM sweetpotato technologies. The prospects of FFS being institutionalized are bright.
- More initiatives are needed to widen the market opportunities and improve on prices.
- Research should focus at improving on disease resistance, virus screening and dry matter content of OFSP varieties. Opportunities to conserve vines during dry season should be encouraged to avoid continuous purchases of vines from the central region where the virus pressure is much higher than in Soroti.
- Follow-ups on FFS graduates and increased support to backstopping the farmer-facilitators through the farmer facilitators association to establish a sustainable technology dissemination system
- Policy makers should spearhead the institutionalization of the FFS approach
- Farmer processors chipping roots should explore opportunities of acquiring soft loans from community-based credit institutions.
- Millers should aim at composite formulations for both local and foreign markets
- Further sensitization on quality maintenance especially of grated products
- Scaling up dissemination of OFSP varieties within and outside Soroti district should be encouraged

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