Delivering and Disseminating Biofortified Crops in Uganda

Midterm Report
January–June 2012

Prepared for:
HarvestPlus

Submitted by:
International Potato Center (CIP)

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International Potato Center (CIP), National Crops Resources Research Institute (NaCRRI)/National Agricultural Research Organization (NARO), Makerere University (MAK) and BioCrops

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Prepared by
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1.0 BACKGROUND

This is the first year of the project, "Delivering and Disseminating Biofortified Crops in Uganda," which started in January 2012. The project is implemented by partners the International Potato Center (CIP), HarvestPlus, Makerere University, Department of Agricultural Production, College of Agricultural and Environmental Sciences (MAK), the National Crops Resources Research Institute (NaCRRI) of the National Agricultural Research Organization (NARO), and a private company, BioCrops Uganda Limited.

CIP and the HarvestPlus Reaching End Users orange-fleshed sweetpotato (OFSP) project introduced beta-carotene-rich OFSP and related messages concerning agronomy, nutrition, and marketing in order to induce broad OFSP adoption, increase vitamin A intake, and reduce vitamin A deficiency (VAD) for children and women in Uganda. Children with VAD are at increased risk of severe morbidity from common childhood infections such as diarrheal diseases and measles; in cases of extreme deficiency, they can go blind. The intervention worked through local farmer groups (FGs) to disseminate information about OFSP and improved nutrition and to distribute OFSP vines for planting. (Biofortified sweetpotato is an extremely rich source of pro-vitamin A that has been proven to improve vitamin A status of children.) In addition to the intervention, the project also included a rigorous evaluation component to test and document the most cost-effective method to disseminate OFSP and encourage its consumption.

Despite the successful dissemination of the OFSP varieties, most succumbed to the devastating sweetpotato virus disease. Following discussions with CIP and HarvestPlus, we realized that without a good supply of virus-free planting material, sustainable cultivation of the susceptible OFSP varieties was not possible. MAK was commissioned to start activities on the rapid multiplication of virus-tested sweetpotato planting using tissue culture (TC)—thus contributing to the CIP/HarvestPlus project.

BioCrops and CIP initiated collaborative work on developing and delivering biofortified crops in Uganda, specifically aimed at establishing a sustainable supply of virus-free cuttings of four OFSP clones. BioCrops has so far received 195 clean vine cuttings from CIP-Nairobi in two batches to establish a mother stock for use in the propagation work.

NaCRRI, in collaboration with CIP, has started conducting on-farm trials with extensive farmer participation in key target areas to identify superior, preferred, adapted OFSP clones. NaCRRI will establish a stock of virus-free plantlets of major OFSP varieties at Namulonge as a backup of the same varieties at MAK TC laboratory, in Kabanyolo.

The project's main objectives are to:

1. Establish sustained supply of virus-free plantlets of major OFSP varieties at MAK and NaCRRI.
2. Establish capacity of private sector operator (BioCrops) to produce cuttings of primary foundation material.
3. Facilitate the adoption of at least three new OFSP varieties to local conditions of northern and western Uganda.
4. Identify in every district, two commercially oriented, large-scale vine multipliers with excellent management skills.

5. Have at least 30% of target households in areas with prolonged dry seasons (>4 months) adopt the "Triple S" technology (i.e., Storage in Sand and Sprouting).
6. Test and refine recommended practices for curing sweetpotatoes by smallholder farmers to increase longevity in storage.

2.0 MAJOR ACCOMPLISHMENTS DURING THE REPORTING PERIOD

2.1 Recruitment of the Field Crops Agronomist

The project successfully recruited the Field Crops Agronomist, Mr. Gerald Kyalo, in February 2012. He is involved in all the research aspects of the project, including setting up on-farm trials to test the adaptability of new OFSP clones in northern and southwest Uganda. He will also conduct trials on curing and Triple S technology, which provides planting material from storage roots in areas with a long dry season. The roots are then stored in sand, planted out, and watered before the arrival of the rains, enabling production of large amounts of planting material in time for the rain.

2.2 Monitoring and Selection of Vine Multipliers in Different Regions of the Country

Mr. Kyalo of CIP joined Mr. Charles Musoke of HarvestPlus on a trip in February to assess the status and availability of vines in the districts of Gulu, Lira, Soroti, Rakai, Masaka, Isingiro, Mukono, and Buyende. The trip provided insight into the readiness of existing vine multipliers to supply planting material during the first season of 2012. During the trip, it was discovered that there was a shortage of planting material in the northern districts of Lira, Gulu, Kole, and Oyam, whereas there were plenty of vines in Mukono, Buyende, Luweero, and Isingiro districts. It was therefore agreed that the northern region would get supplies of vines from Soroti, while Kibale and Kamwenge would be supplied by multipliers from Luweero district. Farmers from Kabale would get supplies from Isingiro district.

2.3 Planning for On-farm Trials

In February 2012 Dr. Robert Mwanga and Mr. Kyalo of CIP met Mr. Gorrettie Ssemakula, head of the Sweetpotato Program of NaCCRI, to draw up plans for OFSP activities under the project. The team discussed arrangements to be made in preparation for the planting of OFSP trials in the districts of Kabale, Isingiro, Buyende, Rakai, and Oyam. We also inspected multiplication sites where OFSP vines were being multiplied in preparation for 2012's first planting season. Criteria for selection of farmers to host OFSP were worked out.

2.4 Selecting Farmers to Host OFSP Trials

A trip was conducted in March in conjunction with the Sweetpotato Program of NaCCRI to select farmers to participate in the OFSP trials in the districts of Isingiro, Kabale, Buyende, Rakai, and Oyam. Farmers were selected based on the following criteria:

1. Willingness to host the trial and have visitors come to her/his farm on the evaluation day
2. Availability of sufficient labor and land to undertake the trial for the agreed management approach
3. Accessibility of location (not too far from a major road)
4. Experienced sweetpotato grower in good health
5. Soil for plot used in the trial should be homogeneous
6. Whether the farmer had problems in the past with animal destruction and theft.

On the basis of the above criteria, 10 farmers were selected per district to host OFSP trials (Appendix 1).

2.5 Training Farmers on Agronomy of OFSP

Mr. Kyalo joined the HarvestPlus team to conduct trainings on agronomy of OFSP in the districts of Lira, Kabale, Kamwenge, Kibaale, Rakai, Mukono, and Buyende in April. The beneficiaries of the trainings were extension personnel under the project.

2.6 Planting OFSP Trials

To accelerate the on-farm evaluation of promising OFSP clones, on-farm trials were planted in the districts of Buyende, Isingiro, Kabale, Rakai, and Oyam in April and May. The OFSP trials are currently hosted by 10 farmers per district with each farmer acting as a replicate. The trials have been established with OFSP varieties NASPOT 10 O (Kabode), NASPOT 7/2006/1185, SPK004 2006/1136, NASPOT 7/2006/292, and local checks selected by the farmers (see Appendix 1 for details). The clones were planted in plot sizes of 30 m^2 arranged in five rows 6 m long on ridges 40 cm high or on mounds depending on the farmers' agronomic practice. To satisfy farmers' curiosity, we planted 100 cuttings of SPK 004 (Kakamega) in an additional plot.

2.7 Tissue Culture Plantlet Multiplication-MAK

One-hundred in-vitro plantlets of four sweetpotato varieties were received at MAK on 24 Feb. 2012 from CIP-Nairobi: Ejumula, Kabode (NASPOT 10 O = SPK004/6/6), and Vita (NASPOT 9 O = SPK004/6). However, the in-vitro plantlets were batched up in a plastic container for each of the varieties. Upon sub-culturing onto multiplication media five days after arrival, most cultures became contaminated. This was probably due to improper packaging and handling during transit. To this effect, Ejumula (56 culture tubes), Vita (63 culture tubes), and Kabode (25 culture tubes) were rescued and have been sub-cultured onto multiplication media. Table 1 shows a breakdown of the status of the in-vitro cultures after one week of arrival. Owing to this setback, another batch of the same sweetpotato varieties was requested from CIP-Nairobi and were received on 28 May 2012. The varieties were Kabode, Vita, Kakamega (SPK 004), and Ejumula (Table 2). Table 3 shows the number of culture bottles—each containing two to four–plantlets—as of 15 June 2012.

A few in-vitro plantlets of each variety, after multiplication, are now being used to assess the suitability of the available potting mix. Since the cultures were in tubes, detection of contaminated cultures has been done more easily. In this regard, healthy cultures were sub-cultured onto multiplication medium and eight well-developed plantlets are due to be weaned.

Table 1. Status of the In-vitro Cultures after 1 Week of Arrival at MAK of Batch 1

Variety	No. Delivered by CIP (culture tubes)	No. of Contaminated Culture Tubes	No. of Healthy Culture Tubes
Ejumula	44	4	40
Kabode (SPK 004/6/6)	55	25	30
Kakamega (SPK 004)	17	8	9
Vita (SPK 004/6)	55	4	51

Table 2. In-vitro Status Sweetpotato Plantlets of Batch 1 and Batch 2

Variety	Batch 1 (sub-cultured to multiplication media)	Batch 2 (sub-cultured to multiplication media)	Total Culture Bottles
Ejumula	160	40	200
Kabode (SPK 004/6/6)	196	30	216
Kakamega (SPK 004)	42	9	51
Vita (SPK 004/6)	123	51	174
Total	321	130	641

Table 3. Culture Bottles Each Containing 2–4 Plantlets in Culture Room (as of 15 June 2012)

Variety	Total Culture Bottles	Total of Individual Plantlets	Projected No. of Plantlets by 15 August 2015
Ejumula	200	640	1,800
Kabode (SPK 004/6/6)	216	834	2,000
Kakamega (SPK004)	51	200	600
Vita(SPK 004/6)	174	520	1,500
Total	641	2,194	5,900

2.8 Vine Multiplication

The first batch of vines for the four OFSP varieties was received on 28 March 2012, from KEPHIS, Nairobi. Because MAK had not yet delivered plantlets for use as mother stock, CIP provided more vines for us to be able to meet the deadline. As such, 121 vine cuttings were received on 23 May 2012 from which mini-cuttings were made immediately and potted. Currently, so far two cuttings have been obtained from the initial material (Table 4). The total number of potted cuttings is shown in Table 5. From establishment, two months are required before mini-cuttings are harvested from the newly established vine cuttings. Subsequent mini-cuttings can be obtained from established plants after a month. Table 6 reports on the completed milestones by MAK, and Table 7 summarizes the progress made by BioCrops. Summaries of travel, and activities and milestones are presented in Tables 8 and 9, respectively. Appendix 1 lists the names of farmers or FGs hosting on-farm trials in the first season of 2012.

In the meantime, CIP ordered and received on 28 March 2012, pathogen-tested mini-stem cuttings of the four cultivars (Vita, Kabode, Kakamega, and Ejumula) earlier imported as in-vitro plants (Table 4). The stem cuttings were sent on the same day to Dr. David Talengera, of BioCrops, for multiplication under screen house conditions (Table 5).

Table 4. Indexed Vines Received on 28 March 12 and the Status of Multiplication, BioCrops

Variety	Vines Received	Mini-cuttings Generated at First Cutting	Mini-cuttings Generated at Second Cutting
Ejumula	24	231	500
Kakamega	14	250	352
Vita	20	200	270
Kabode	16	150	270

Table 5. Indexed Mini-vine Cuttings Received on 23 May 2012 and Status of Multiplication, BioCrops

Variety	Vines Received	Derived Mini-cuttings
Ejumula	20	51
Kakamega	63	123
Vita	30	105
Kabode	8	14

Table 6. Milestones Completed: Technical Reporting Summary, MAK

Planned Activities	Targets	Actual Achievements	Remarks
In-vitro multiplication	4,000 in-vitro plantlets	55% (Table 3)	400* in-vitro plantlets received; 100 of each of the varieties Ejumula, SPK 004 (Kakamega), SPK 004/6 (Vita), and SPK 004/6/6 (Kabode)
Training	2 persons	100%	Two BioCrops technicians (Ms. Faridah Mugisha and Mr. Geoffrey Atubuni) successfully trained 9–11 May 2012 in sterilization of sweetpotato explants, initiation, and serial cultural of auxiliary buds
Hardening	4,000 potted plantlets	0%	Planning to start the weaning of the in-vitro plantlets July 2012

*The consignment of the in-vitro plantlets was **not** received in good condition. Many of them got mashed up during transit since they were transported on semi-solid medium. This, together with the combination of limited number of plantlets, led to a slow start of multiplication.

Table 7. Summary of Progress, BioCrops

Planned Activities	Targets	Actual Achievements	Remarks
Establishing screen house space for multiplication of OFSP	Establish at least 280-m^2 floor space of insect-proof screen house for multiplication of OFSP	A retaining wall has been erected in preparation for construction of the 200-m^2 screen house. Work has been started on the foundation and the metal frames	Construction awaits the finalization of the contract from the second quote and has been delayed by the lack of electricity at the site. However, the power line to the site has been erected and electricity connection is being worked on.
Equipping the screen house for sweetpotato propagation	Acquire seedling boxes and accessories to propagate at least 10,000 cuttings	Plastic containers have been purchased	Plastic containers, as opposed to wooden structures, are more convenient in terms of portability
Nursery multiplication	Receive at least 20 virus-free vines by end of March as an alternative to hardened TC plantlets	Two batches of vines have been received from KEPHIS adding up to: 44 Ejumula, 77 Kakamega, 50 Vita, and 24 Kabode. Cuttings were made from these, which, together with the first batch of vines, brings the total number of potted cuttings, including the initial material, in the screen house to Ejumula, 810; Kakamega, 730; Vita, 590; and Kabode, 450.	A survival rate of 100% has been registered
Staff training	Four staff equipped with sweetpotato micro-propagation skills by MAK	Two technicians trained in sweetpotato TC and nursery management at MAK	

Planned Activities	Targets	Actual Achievements	Remarks
Establishing sweetpotato in-vitro cultures	Have at least 100 in-vitro cultures of each of the four OFSP varieties to established by June 2012	Basic chemicals for TC work have been purchased	The order for the special media components was made. The TC lab space is almost completed to provide space for in-vitro micro-propagation.

2.9 Tissue Culture Space

BioCrops is in the last stages of completing the new laboratory facilities with a 110-m^2 growth room capacity. With this space, the company plans to up-scale sweetpotato micro-propagation among other activities.

2.10 BioCrops' Screen House

The site prepared for the screen house was not suitable for raising sweetpotatoes and a new site was proposed. In preparation for the construction, it was necessary to first build a retaining wall to hold the soil. Metal frames have been fixed and work on the foundation is in progress. Two contractors have presented quotes, which have been reviewed. Because prices of building materials are rising more than BioCrops had budgeted for, it would prefer to deal directly with wholesale outlets of building materials (e.g., cement, steel products, and netting material) where they can buy directly at relatively lower prices. This will enable the construction costs to fit within the budget.

Photos

Figure 1. Some of the in-vitro plantlets that were rescued after delivery at Kabanyolo.

Figure 2. Foundation stage of the 200-m^2 screen house at BioCrops.

Figure 3. OFSP cuttings established in a screen house at BioCrops.

Figure 4. New BioCrops laboratory building at Kabaga.

2.11 NaCRRI/NARO, MAK, BioCrops, and CIP Subcontracts

Letters of understanding between CIP and the three partners were completed by March. However, funds were disbursed to their accounts in April 2012; MAK was the latest to receive funds for the project, in early June 2012.

2.12 Visit of Dr. Wolfgang H. Pfeiffer, Deputy Director, Operations, HarvestPlus

The Deputy Director, Operations, HarvestPlus, Dr. Wolfgang H. Pfeiffer, visited the project 9–12 June 2012. He visited our trials at Buyende, where we discussed many issues with the farmers. He also visited our office at CIP and our partners BioCrops, Makerere University (TC laboratory, Kabanyolo), and NaCRRI.

3.0 SUMMARY OF PERSONNEL COMMITMENTS

Dr. Mwanga and Mr. Kyalo serve as principal investigator and field crops agronomist for the project, respectively. Our partners NaCRRI, MAK, and BioCrops also continued with their activities as stipulated in their contracts. At NaCRRI, one scientist (10% time), one technician (50%), and one driver (30%) are involved in the project. At Makerere, Dr. Ssetumba Mukasa has engaged two technicians who are committed to the project.

4.0 MAJOR EQUIPMENT ACQUIRED

The project has procured a Dell Laptop computer (Dell Latitude E5420) for Mr. Kyalo.

5.0 DESCRIPTION OF SIGNIFICANT TRAVEL

During the reporting period, CIP staff travelled often to accomplish objectives (Table 8).

Table 8. Summary of Significant Travel

Date	Name	Institution	Locations	Travel Objective	Output
15.02–1.03 2012	Gerald Kyalo Charles Musoke	CIP HarvestPlus	Gulu, Lira, Kole, Oyam, Masaka, Isingiro, Buyende, Soroti	Monitoring and assessment of vine multiplication	Status and presence of vines assessed. Suitable suppliers for first season planting identified
6–28.03 2012	Gerald Kyalo Jowelia Namakula	CIP NaCRRI	Buyende, Rakai, Isingiro, Kabale, Oyam	Selecting farmers to host trials	Ten farmers identified per district
2–19. 04.2012	Gerald Kyalo Charles Musoke Lillian Adeke	CIP HarvestPlus	Lira, Kabale, Kibale, Kamwenge	Training extension personnel on agronomy of OSP	Extension personnel trained on agronomy of OSP, arrangements for distributing planting material made
23.04–16. 05 2012	Gerald Kyalo Jowelia Namakula	CIP NaCRRI	Buyende, Rakai, Isingiro, Kabale, Oyam	Planting trials	Fifty (10 per district) trials planted
09.06. 12	Gerald Kyalo HarvestPlus Team Wolfgang H. Pfeiffer	CIP HarvestPlus	Buyende	Field visit	Trial sites, commercial sweetpotato farmers visited
11.06. 12	Robert Mwanga Wolfgang H. Pfeiffer HarvestPlus team	CIP HarvestPlus	BioCrops, Makerere University		Project progress discussed, status of sweetpotato clones under multiplication discussed

6.0 DELAYS, PROBLEMS, SUGGESTIONS

The planned project activities are on course (Table 9). However, the first rains were late, thereby delaying the planting of on-farm trials in the respective districts. The trials were planted in the third week of April and the first week of May 2012. Funds to our partners were disbursed late so activities started later than planned.

Table 9. Summary of Milestone/Activities and Progress

Activity/Milestone	Targeted Outputs	Target Date	Baseline	Status	Comments
CIP: Task 1 Ensure disease-free supply of primary foundation seed					
Obtain disease-free plantlets from KEPHIS in Kenya for MAK to multiply 4,000 plantlets	4 OFSP clean TC starter stock available at MAK	Dec. 2012	Required pathogen-tested in-vitro OFSP varieties not available at MAK	Plantlets received in March	MAK received two batches of OFSP TC plantlets from KEPHIS; details given under MAK BioCrops
Assess the cost of the TC multiplication in Uganda	Information on cost of production of sweetpotato TC clones	Dec. 2012	Information on sweetpotato TC production is not available in Uganda	Information collection is in progress	For later reporting
Have advanced yield trial OFSP clones "cleaned-up" at KEPHIS where thermotherapy chambers are available	Clean OFSP available for seed system	Dec. 2014	Promising OFSP clones not clean	On schedule	Three new OFSP clones have been sent to Muguga for cleaning: NASPOT 7/2006/1185, SPK 004 2006/1136, and NASPOT 7/2006/292
Task 2 Transfer the Triple S technology at scale and build a cadre of trained extension personnel to monitor its adoption					
Select key dry areas for testing Triple S technology at scale	Triple S technology validated and scaled up with farmers in key dry areas, 30% of target households in areas with prolonged dry seasons adopt the technology	Dec. 2012	Triple S technology not yet tested in HarvestPlus project areas	On schedule	Dry areas selected include Oyam, Gulu, and Rakai. Discussions with stakeholders are ongoing. First meeting with farmers held third week of June.
Train extension personnel to effectively implement Triple S technology	At least one lead farmer from each county hosting OFSP trials trained in OFSP production	Dec. 2012	Number of extension personnel trained in OFSP production	Planned for July 2012	Farmers to host Triple S technology trials to be selected in July
Monitor adoption of Triple S technology and make any needed changes in approach based on addressing any emergent constraints to adoption	At least 30% of communities in project areas adopt Triple S technology	Dec. 2014	OFSP is not grown in the project areas	Planned for later years	Adoption will be monitored during in year 2014
Evaluate characteristics of adopters and non-adopters of Triple S technology	Percent adoption and characteristics of adopters	Dec. 2015	Technology absent in project area	Planned for later years	

Activity/Milestone	Targeted Outputs	Target Date	Baseline	Status	Comments
Task 3 Accelerate evaluation on-farm of promising OFSP clones					
Conduct on-farm trials for OFSP clones with extensive farmer participation in key target areas	New OFSP clones evaluated with farmers and at least two clones selected for further evaluation	Dec. 2012	New OFSP clones from NaCRRI have not been tested in HarvestPlus project areas	On schedule	Trials have been planted in Kabale, Isingiro, Rakai, Buyende, and Oyam, 23 April–16 May. 50 trials planted (10 per district) with OFSP clones NASPOT 10 O, NASPOT 7/2006/ 1185, SPK 004 2006/1136, and NASPOT 7/2006/292
Task 4 Improve curing techniques and investigate other ways to improve postharvest quality and extend postharvest shelf life of traded OFSP					
Design and conduct trials and curing demonstrations	Conditions for curing established	Dec. 2012	There is no curing of OSP in E. Africa	On schedule	Protocols on curing have been sent to partners for review
Provide at least two new clones for cleanup for the seed system by year 4	Promising OFSP clones identified for clean up	Dec. 2015	No promising OFSP clones identified at start of project	Planned for later years	
Evaluation of improved curing methods vs. current practice	Improved curing and storage techniques tested with farmers	Dec. 2012	No curing method for sweetpotato used by farmers in Uganda	Experiments scheduled for July	
Work with implementation team to improve training on handling of roots during harvest and postharvest	Training on handling and postharvest of at least one key contact person from each target district conducted	Dec. 2012	Training on handling of roots during harvest and postharvest not done in project areas	Training planned to coincide with harvest time	CIP is working with HarvestPlus team to improve postharvest handling
Task 5 Backstop implementation team and broader dissemination objectives					
Respond to emergent problems about sweetpotato multiplication and production as requested by the implementation team	Backstop sweetpotato research and development work by partners	Contin-uous	CIP not involved in farmer partner activities in project area	Continuous	CIP has backstopped all the partners since start of project
Ensure that experience is documented and any relevant materials and finding are loaded on the Sweetpotato Knowledge Portal (SPKP)	Relevant documents from the project uploaded on SPKP	Contin-uous	No documents on the biofortification project on SPKP	Continuous	Compilation of reports for uploading on SPKP is in progress.

Activity/Milestone	Targeted Outputs	Target Date	Baseline	Status	Comments
NaCRRI					
Conduct on-farm trials for OFSP with extensive farmer participation in key target areas	New OFSP clones evaluated with farmers and at least two clones passed on to the farmers	Dec. 2012	New OFSP clones from NaCRRI have not been tested on-farm.	On schedule	First-season OFSP trials have been planted in Kabale, Isingiro, Rakai, Buyende, and Oyam, 23 April–16 May. 50 trials planted (10 per district) with OFSP clones NASPOT 10 O, NASPOT 7/2006/1185, SPK 004 2006/ 1136, NASPOT 7/2006/292
Evaluating OFSP clones on station	OFSP clones from breeding tested on station	Dec. 2012	Breeding program at NaCRRI has new OFSP clones not yet tested on station	On schedule	One OFSP with 4 test clones trial planted, 2 other promising OFSP clones were selected from an observation and have been planted in a PYT at Namulonge, Serere, Ngetta, and Kabale
Multiplication and maintenance of planting materials for trials	At least 2 OFSP clones multiplied on station	Dec. 2012	There is shortage of planting materials for on-farm trials	On schedule	Four clones (NASPOT 10 O (Kabode), NASPOT 7/2006/1185, SPK 004 2006/1136 and NASPOT 7/2006/292) planted for seed conservation and multiplication in plots 15 X 5 m
Respond to emergent problems about sweetpotato multiplication and production as requested by the implementation team	Backstop sweetpotato research work by partners	Contin-uous	NaCRRI not involved in OFSP research and development work in project areas	Continuous	NaCRRI has started on-farm trials and associated activities in project areas
Ensure that experience is documented and any relevant materials and finding are loaded on the SPKP	Relevant documents from the project loaded on SPKP	Contin-uous	No documents on the biofortification project on SPKP	Continuous	Compilation of progress made by partners has started
		MAK & BioCrops			
MAK. Obtain disease-free OFSP plantlets of 4 varieties from KEPHIS in Kenya and multiply	40,000 cuttings of primary material produced	Dec. 2012	Required pathogen-tested in-vitro OFSP varieties not available at	Plantlets received in March	Mini-cuttings received on 28/3/2012 from CIP, Nairobi (Ejumula), 24, SPK 004

Activity/Milestone	Targeted Outputs	Target Date	Baseline	Status	Comments
4,000 plantlets at MAK			MAK		(Kakamega), 14 SPK 004/6 (Vita), 20 SPK 004/6/6 (Kabode), 16
BioCrops. Improve infrastructure (construct a screen house), provide training, and ensure that the private sector partner can produce quality primary material utilizing plantlets from MAK	Capacity of BioCrops to multiply clean foundation planting material established, two vine multipliers identified per district and trained on vine multiplication techniques	Dec. 2012	No experience of multiplying pathogen-tested OFSP vines	On schedule	A 75-m^2 floor space insect-proof screen house is now fully operational. Construction of another 200-m^2 screen house is underway. MAK trained two BioCrops technicians (Geoffrey Atibuni and Farida Mugisha) in tissue culture of sweetpotato
Milestone 1: Obtain disease-free plants or vine cuttings from CIP-Nairobi or MAK	10, 000 vine cuttings of each of 4 OFSP varieties (from clean vines) available by December 2012	Dec. 2012	Pathogen-tested source of OFSP varieties not available at BioCrops	4 OFSP pathogen-tested clean stock received	Clean OFSP varieties received as mini-cuttings
Receive initial 4 OFSP varieties		March–May		On schedule	Two batches of vines were received to cover up the in-vitro material from MAK. Total of 195 mini-cuttings of vines received from CIP 100% survival obtained
Establish received material under insect-proof screen house conditions		March–May		Potted vines Established	100% establishment attained
Milestone 2: Train and ensure that BioCrops can produce quality primary utilizing plants from CIP-Nairobi or MAK					
Construct a 20- x 10-m insect-proof screen house	At least one screen house constructed and devoted to sweetpotato	June–July	No screen house for sweetpotato present	Retaining wall, foundation constructed and metal poles erected	Prices have changed in the construction material and likely will affect the cost of the structure
Training staff in sweetpotato TC	Two technicians trained in TC	11 May	No work on TC of	Accomplished	2 staff (Geoffrey Atibuni and

Activity/Milestone	Targeted Outputs	Target Date	Baseline	Status	Comments
and nursery management	of sweetpotato		sweetpotato at BioCrops		Farida Mugishs) trained at MAK. More training needed to be done at BioCrops.
Multiplying initial varieties of OFSP vines (1st cutting) in seed boxes	Differences between OFSP varieties in multiplication established	June–July	No previous work on multiplication of OFSP in screen at BioCrops	Accomplished	Difference in vigour among the 4 varieties observed. 831 potted plants derived from first batch of vines, and 293 from the second delivery.

APPENDIX 1: FARMER/ FARMER GROUPS PARTICIPATING IN OFSP TRIALS

No.	Name	Status	Composition	District	Sub-county	Parish	Check Clone	Collaborating Partner	Date Planted	Trial Status
1.	St. Everest	Farmer group (FG)	13 (5 females, 8 males)	Isingiro	Mwizi	Ngoma Mwizi		Millennium Villages	2/5/12	weeded
2.	Kigalama widows	FG	120 (119 females, 1 male)		Kabuyanda	Iryango			30/4/12	weeded
3.	Kabugutukore	FG	11 (6 females, 5 males)		Kabuyanda	Kabugu			1/5/12	weeded
4.	Abamule Fish group	FG	25 (15 females, 10 males)		Kikagati	Ntundu			30/4/12	weeded
5.	Nyampikye Primary school	FG			Kabuyanda	Kabuyanda			1/5/12	weeded
6.	Kabatagare	FG	48 (44 females, 4 males)		Nyakitunda	Nyakarambi			2/5/12	weeded
7.	Bugongi women	FG	16 (all female)		Nyakitunda	Bugongi			2/5/12	weeded
8.	Kanywammaizi Environment	FG	8 (5 females, 3 males)		Kabuyanda	Kanywamaizi			1/5/12	weeded
9.	Karutonga Savings	FG	12 (2 females, 10 males)		Nyamuyanja	Nyamuyanja			1/5/12	weeded
10.	Kabirizi Tweyambe group	FG	Gb 16 (11 females, 5 males)		Kaberebere	Kaberebere			30/4/12	weeded
11.	Muyanbi William	Individual		Kabale	Kamuganguzi	Katenga	Mukono	Africa 2000	03/5/12	weeded
12.	Beatrice Ngabirano	Individual			Bubare	Nyemiyaga	Rwafafuruki		04/5/12	weeded
13.	Byarugaba Charles	Individual			Kamuganguzi	Katenga	Rwafafuruki		03/5/12	weeded
14.	Rukanshungirwa Fred	Individual			Kamuganguzi	Katenga	Mokono		03/5/12	weeded
15.	Tumwekwase Elizabeth	Individual			Hamulwa	Shebeya	Murungi		05/5/12	weeded
16.	Twinomugisha Dinar	Individual			Hamulwa	Shebeya	Murungi		05/5/12	
17.	Karugaba Fidelis	Individual			Hamulwa	Karukala	Murungi		04/5/12	
18.	Kuhasire Annet	Individual			Hamulwa	Mpungu	Rwabafuruki		04/5/12	weeded
19.	Rubereti Edith	Individual			Bubaale	Bubaale	Burundi		05/5/12	

No.	Name	Status	Composition	District	Sub-county	Parish	Check Clone	Collaborating Partner	Date Planted	Trial Status
20.	Karimunda Paul	Individual			Hamulwa	Hataba	Murungi		04/5/12	
21.	Tagabira atyaime	FG	23 (21 females, 1 male)	Buyende	Bugaya	Namusikizi	Muwulu aduduma		24/4/12	Weeded
22.	Tagabira atyaime	FG	23 (21 females, 1 male)		Bugaya	Namusikizi	Muwulu aduduma		24/4/12	Weeded
23.	Basoka kwavula	FG	25 (22 females, 3 males)		Buyende	Ikanda	Muwulu aduduma		25/4/12	Weeded
24.	Kyebajja tobona	FG	30 women		Bugaya	Butaswa	Muwulu aduduma		24/4/12	Weeded
25.	Byakatonda	FG	25 (21 females, 4 males)		Buyende	Ikanda	Muwulu aduduma		25/4/12	Weeded
26.	Kyowelela Harriet	Individual			Buyende	Ikanda	Muwulu aduduma		25/4/12	Weeded
27.	Ajja tobona	FG	25 (21 females, 4 males)		Bugaya	Butaswa	Muwulu aduduma		26/4/12	Weeded
28.	Namusobya Fazillar	Individual			Bugaya	Namusikizi	Muwulu aduduma		24/4/12	Weeded
29.	Kantono Irene	Individual			Bugaya	Namusikizi	Muwulu aduduma		26/4/12	Weeded
30.	Basoka kwavula	FG	25 (22 females, 3 males)		Buyende	Ikanda	Muwulu aduduma		26/4/12	Weeded
31.	Mary Opio	Individual		Oyam	Aboke	Opeta	Lira lira		14/5/12	Weeded
32.	Opio Francis	Individual			Aboke	Opeta	Raha raha		14/5/12	Weeded
33.	Anna Ojok	Individual			Aboke	Apach	Araka raka		16/5/12	
34.	Aripa Jacob	Individual			Aboke	Apach	Lira lira		14/5/12	
35.	Rose Akoi	Individual			Aboke	Apach	Raha raha		14/5/12	
36.	Obong Milton	Individual			Aboke	Apach	Lira lira		15/5/12	
37.	Awino Sophia	Individual			Aboke	OPeta	Okonyinero		15/5/12	
38.	Ajuka Patrick	Individual			Aboke	Opeta	Okonyinero		15/5/12	
39.	Oyeli Peter	Individual			Aboke	Opeta	Araka raka		16/5/12	
40.	Okidi Charles	Individual			Aboke	Apul	Araka raka		15/5/12	
41.	Mutesasira Daniel	Individual		Rakai	Kabonera	Kakunyu	Mwola nfuzi		9/5/12	Weeded
42.	Twosi women	FG			Nabigasa		Kasaniya		10/5/12	
43.	Baale Aids	FG			Wankone	Baale	Mbala		08/5/12	Weeded

No.	Name	Status	Composition	District	Sub-county	Parish	Check Clone	Collaborating Partner	Date Planted	Trial Status
44.	Basoka Kwavula women	FG			Kalisizo Rural				10/5/12	
45.	Basoka kwavula	FG			Lwankoni	Kibutamu	Kyambogo		09/5/12	Weeded
46.	Duka Obwavu	FG			Lwankoni	Lwankoni B			08/5/12	
47.	Kewelimidde	FG							09/5/12	Weeded
48.	Tebandeke John	Individual			Kirumba	Buyisa	Kibundukira		9/5/12	
49.	Bena Sentamu	Individual			Kabonera	Kitanga	Dimbuka		10/5/12	Weeded

Note: 1. Test clones include NASPOT 10 O (Kabode), NASPOT 7/2006/1185, SPK 004 2006/1136, and NASPOT 7/2006/292
2. Some farmers did not know the name of the local variety. We agreed to have it later after they have consulted their friends.