Rooting Out Hunger in Malawi with Nutritious Orange-Fleshed Sweetpotato

Year 3 Midterm Report
(1 October 2011–30 June 2012)

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Submitted by:
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International Potato Center

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ABBREVIATIONS AND ACRONYMS

ASWAp	Agriculture Sector Wide Approach
BRS	Bvumbwe Research Station
CADECOM	Catholic Development Commission
CIP	International Potato Center
CU	Concern Universal
DADO	District Agriculture Development Office
DAES	Department of Agricultural Research Services of the Ministry of Agriculture and Food Security of Malawi
DARS	Department of Research Services
DVM	Decentralized vine multiplier
FUM	Farmers Union of Malawi
GoM	Government of Malawi
HH	Household
ICM	Integrated crop management
IP	Implementing partner
M&E	Monitoring and evaluation
MAP	Months after planting
MVP	Millennium Village Project
NGO	Nongovernmental organization
NSO	National Statistical Office
OFSP	Orange-fleshed sweetpotato
PQS	Public Quarantine Research
SUN	Scaling up Nutrition
TC	Tissue culture
TOT	Training of the trainers
UIL	Universal Industries Ltd
VAC	Vulnerability Assessment Committee
VAD	Vitamin A deficiency
WALA	Wellness and Agriculture for Life Advancement

EXECUTIVE SUMMARY

Malawi is one of the world's 20 poorest countries. Malnutrition of children remains one of the biggest challenges in developing countries such as Malawi. The Government of Malawi is committed to poverty reduction and, since 2005, has been monitoring poverty annually with its Welfare Monitoring Survey, conducted by the National Statistical Office.

In Malawi, maize is the most important food crop, followed by cassava, sweetpotato, Irish potato, and sorghum. According to the 2011/2012 second round national production estimate figures, sweetpotato production in Malawi was 3,582,428 metric tons. In terms of production, cassava was ranked 1 followed by maize and sweetpotato. On the other hand, sweetpotato is currently one of the most widely grown crops. Maize is much more vulnerable to dry spells than sweetpotato. Dry spells are becoming increasingly common due to climate change, so there is great interest on the part of government and other partners in mitigating these risks with nutritious orange-fleshed sweetpotato (OFSP). As a result, many partners have joined the Irish Aid-funded project "Rooting out Hunger in Malawi," and farmers throughout the country are benefitting. Sweetpotato is becoming a major food source and increasingly contributes to the food basket, especially in the months where maize is scarce or the price is too high for poor people. This crop is also becoming a source of cash and employment to many farmers.

The project, currently entering its third year of a 4.5-year program, seeks to improve vitamin A and energy intake for at least 70,000 rural households with young children (the group most vulnerable to vitamin A deficiency) using OFSP. The project uses a 1 ("primary"), 2 ("secondary"), 3 ("tertiary") vine multiplication system. Primary multiplication provides clean planting material and is managed by researchers at the research station; secondary and tertiary multiplications are decentralized on farms and managed by farmers under the supervision of government and extension personnel from nongovernmental organizations. This is also called as a DVM, or *decentralized vine multiplication*. The DVM is clearly defined by this year. A DVM is a group of farmers or individual farmers who are multiplying OFSP together within a radius of 9 km. We consider that the vine cuttings should not be wilting during the transportation. In Malawi, it fits into a Geographical Village Head (aka *Group Village Head*). The DVM should also be a place where trials can be demonstrated.

By January 2012, the project has covered 15 districts scattered along the three regions of Malawi: southern, central, and northern. These 15 districts are Mzimba, Kasungu, Dowa, Lilongwe, Salima, Dedza, Balaka, Machinga, Zomba, Chiradzulu, Phalombe, Mulanje, Thyolo, Chikhwawa, and Nsanje. A total of 169 DVMs (28.04 ha) are ready to disseminate clean OFSP planting material by this coming rain season of 2012/2013. Furthermore, 6.5 ha of land covered by six OFSP varieties at primary multiplication situated at Bvumbwe Research Station are backstopping the need for clean planting material by farmers.

All partners are committed to the success of OFSP program in Malawi. This could be explained by the results recorded from the dissemination of OFSP planting material. After two years, we reached 62,425 households (HH) who grew sweetpotato through subsidized voucher and non-subsidized voucher schemes. On the basis of the project proposal, our target is to reach 70,000 HH by April 2014.

The project has achieved 89.2% of the target meant for four and a half years; in fact, we have reached this target after just two years.

A total of 4,075 lead farmers, government, and NGO extension staff have been trained since the project was launched in October 2009. In 2012 alone (Jan.–27 June), 572 lead farmers and extension staff have been trained on OFSP production, multiplication, crop protection, postharvest handling, and OFSP processing. These were from the new expanded areas in Mzimba, Kasungu, Dowa, Lilongwe, Dedza, and Salima. After this training, a trainer has to train another 5–10 people. This method has worked well in Dedza, Phalombe, Mulanje, Zomba, and Chikhwawa that was previously done by Concern Universal, Millennium Village Project, and Catholic Development Commission, respectively.

A small-scale business was included in the OFSP processing training module, as generating incomes from OFSP activities is one of the objectives of the project. Participants were given simple bookkeeping by the end of the training. Testing of selling OFSP products was done by groups of farmers in Zomba, Phalombe, Mzimba, and Kasungu during the field day—which the farmers successfully did. Another small-scale business test was in Salima during the field day held on 5 July 2012. From a portion of OFSP chips and chicken, the club could earn Mk 150 (US 57 cents) with a profit of Mk 80 (30 cents). For *mandazi*, they sold for Mk 25 (10 cents) per *mandazi* and received a profit of Mk 10 (4 cents). Farmers were very excited to have this experience.

Gender is of essential importance in the Rooting out Hunger project activities. Both female and male farmers should be equally involved in the trainings, meetings, and implementing the program. Most female farmers are illiterate in the remote areas. Thus, men have played an important role. For training, we recorded more male participants than female participants. Fewer female farmers participated in training compared to male farmers from our data documented in the last two years. The data showed that 47% females and 53% males (out of a total of 4,075) participated. The data from DVMs in the 2010/2011 rain season, there were 48 female multipliers and 52 males. In 2011/2012, the number of female multipliers decreased (to 38) and males increased (to 62). It was a different story with the number of HH beneficiaries to have received the 300 OFSP vine cuttings. In the 2010/2011 rain season, the number of female beneficiaries was 5,562 HH and males 5,406—roughly equal. In the 2011/2012 rain season, the number of female beneficiaries increased tremendously, to 15,168 HH. In contrast, the male beneficiaries were only 8,767. The implementing partners have tried their best to make both genders participate equally in the project.

In the last two and half years of project implementation, achievement was extraordinary. Though some gaps have been found—and they need to be filled in the next two years—the project is moving into a second phase. These gaps are (1) strengthening the partnership with private sector on seed multiplication. The DVMs and mass-distribution in partnership with the private sector could be focused in the central and northern regions of Malawi. This can happen because the Department of Agricultural Research Services of the Ministry of Agriculture and Food Security of Malawi received some funds from Irish Aid to build up seven primary multiplications scattered from the south to the north of Malawi; (2) need to concentrate on the nutrition education and communication activities at household level; (3) small-scale business, market orientation, and value chains; and (4) some research on postharvest handling, intercropping sweetpotato with other crops (e.g., pigeon pea), and integrated pest and disease management.

1. INTRODUCTION

In Malawi, one of the world's 20 poorest countries, over 40% of the population lives on less than a US $1/day. The average Malawian can expect to live just 40 years due to high prevalence of HIV/AIDS, malaria, and malnutrition (USAID 2012). Malnutrition of children remains one of the biggest challenges in developing countries such as Malawi. Children aged 0–23 months are the most vulnerable group with a peak incidence of mortality and morbidity. The Government of Malawi (GoM) is committed to poverty reduction and, since 2005, has been monitoring poverty annually with its Welfare Monitoring Survey, conducted by the National Statistical Office (NSO). On the basis of a sample of over 18,000 households (HH), the national percentage of persons falling below the poverty line is 39%, a marked improvement from the 50% found in 2005.[1] However, rural poverty remains much higher (43%) than urban (14%) and poverty in the rural South (51%) significantly higher than in the center (41%) or the north (31%) of the country (NSO 2010). In spite of the gains made, levels of malnutrition remain high, with 47% of under-five children stunted, 59% having vitamin A deficiency (VAD), and 13% underweight. The infant mortality also remains high, with 112 deaths per 1,000 live births estimated for 2010 (DHS 2010). There is still a significant prevalence of HIV/AIDS, currently estimated at 12%.

In Malawi, maize is the most important food crop, followed by cassava, sweetpotato, Irish potato, and sorghum. According to the 2011/2012 second-round national production estimate figures, sweetpotato production in Malawi was 3,582,428 metric tons. In term of production, cassava was ranked 1 followed by maize and sweetpotato (*Daily Times Newspaper* 26 April, 2012). On the other hand, sweetpotato is currently one of the most widely grown crops. Maize is much more vulnerable to dry spells than sweetpotato. Dry spells are becoming increasingly common due to climate change, so there is great interest on the part of government and other partners in mitigating these risks with nutritious orange-fleshed sweetpotato (OFSP). As a result, many partners have joined the Irish Aid-funded project "Rooting out Hunger in Malawi," and farmers throughout the country are benefitting. Sweetpotato is becoming a major food source and increasingly contributes to the food basket, especially in the months where maize is scarce or the price is too high for poor people. This crop is also becoming a source of cash and employment to many farmers.

The project is currently entering its third year of a 4.5-year program. The project seeks to improve vitamin A and energy intake of at least 70,000 rural HH with young children—the group most vulnerable to VAD—using OFSP. The project uses a 1 ("primary"), 2 ("secondary"), 3 ("tertiary") vine multiplication system. Primary multiplication provides clean planting material and is managed by researchers at the research station; secondary and tertiary multiplications are decentralized on farms and managed by farmers under the supervision of government and extension staff of nongovernmental organizations (NGOs).

With the build-up of surplus root production, the project has started investing more in postharvest handling and nutrition education at the community level and product and market development. Malawi launched the "Scaling up Nutrition (SUN) 1000 Special Days" initiative in July 2011. The

[1] Note that the WMS is not without controversy as it does not actually measure expenditure at the household level but estimates poverty based on a set of indicators highly correlated with consumption expenditure. The model used was constructed from the full-fledged Integrated Household Survey conducted in 2005.

project attempts to align with the National Nutrition Education and Communication Strategy described in the SUN 1000 Special Days movement.

This report describes the project activities based on the achievement made after two years of implementing the project and the Year 3 project (1 November 2011–30 June 2012)). The project activities fit to the growing season in Malawi usually started in November. That some activities of Year 2 were not reported in the annual report of Year 2 is included in this report. This was particularly on the increased numbers of beneficiaries who received vine cuttings through the subsidized vouchers and the funds have been used for the subsidized vouchers.

2. OVERALL GOAL AND OBJECTIVES

The overall objective of this 4.5-year project is to improve vitamin A and energy intake for at least 70,000 rural HH with women and young children using OFSP-based approaches and to ensure that at least 20% of the HH growing OFSP earn at least $100/year from OFSP sales and increase their average sweetpotato yields by 50%.

3. TARGET GROUPS

The principal target groups are poor, rural women, and their young children (6 months–5 years of age) in sweetpotato-producing areas. Each NGO partner will include additional specific criteria such as income, health status, and access to water of their target group. Although children and their women caregivers are a primary target group of the project, men will not be excluded from nutrition education and variety dissemination activities. This will ensure that they understand the importance of investing in nutritionally rich foods and good care-giving practices as they influence what decisions are made and how well decisions are implemented at the HH level.

A secondary target group is urban consumers, many of whom rely on purchased foods. Slums in major Malawian cities and their associated peri-urban areas are expanding, and poor urban women and children would particularly benefit from a nutrient-rich root. Understanding the breadth of preferences among high- and low-income consumers concerning fresh roots will enable farmers to better target their variety selection and marketing strategies to specific areas and target groups, and by doing so obtain more revenue from sweetpotato sales.

For Year 3, we will target 15,000 HH to receive OFSP planting material through the subsidized voucher scheme. From the evidence of the last two years, multipliers were able to sell the OFSP planting material beyond the voucher scheme to various organizations. The money that they received almost equals what they got from selling them using vouchers. Hence, we expect to have more than the figure we will plan by the end of this year.

4. PROJECT ACHIEVEMENT TO-DATE

4.1 Increasing Numbers of Multiplication Sites and Partners Over Time

OFSP is now widely recognized in Malawi and it could contribute greatly to food and nutrition security. This can be seen from the indication of increasing numbers of multiplication sites and partners over time (Fig. 1). When the project began, four districts had the multiplication sites and

there were three implementing partners (IPs). There are now 19 multiplication sites scattered in 15 districts and seven IPs. For instance, in Balaka, Mulanje, and Chikhwawa districts, we have two multiplication sites managed by two different IPs: Wellness and Agriculture for Life Advancement (WALA) and Concern Universal (CU); and WALA and the Catholic Development Commission (CADECOM).

Figure 1 Increasing numbers of multiplication sites and partners over time.

4.2 Project Expansion and its Relevance

By January 2012, the project has covered 15 districts scattered along the three regions of Malawi (i.e., southern, central, and northern). These 15 districts are Mzimba, Kasungu, Dowa, Lilongwe, Salima, Dedza, Balaka, Machinga, Zomba, Chiradzulu, Phalombe, Mulanje, Thyolo, Chikhwawa, and Nsanje. By introducing the OFSP program in these new districts, one would contribute to the Millennium Development Goals and the Agriculture Sector Wide Approach (ASWAp), which focus on food and nutrition security in Malawi.

It is noticed that Mzimba, Dowa, Lilongwe, Salima and Dedza are the districts where the pilot program of the "SUN 1000 Special Days" initiative is taking place. The IPs who are managing these districts are involved in the SUN project activities as well. In this way, the Rooting out Hunger project activities strongly align with the program of SUN in Malawi.

Mulanje, Thyolo, and Lilongwe districts (Mitundu Trading Center) comprise the so-called "sweetpotato belt" in Malawi. White- and yellow-fleshed sweetpotato varieties are predominantly grown and commercialized in these areas. Thus, we have to introduce and disseminate the OFSP into these areas. At the last three trainings for postharvest handling and OFSP processing, the chief of this area declared and encouraged his people to grow OFSP and took good care of the planting materials.

The Malawi Vulnerability Assessment Committee (VAC) reported that in September 2011, 201,854 people in parts of Chikhwawa, Nsanje, Phalombe, Zomba, Chiradzulu, Blantyre, Balaka, Neno, and Mwanza districts in the south and Ntcheu District in the center would miss entitlements this consumption year (beginning in April 2012). An estimated 5,000 metric tons of maize equivalents would be required to meet the missing entitlements (FEWSNET 2011). In addition to the districts mentioned by Malawi VAC, Machinga and Mulanje districts were also among areas where people were affected by dry spells and flooding catastrophe in the 2011/2012 rain season. Sweetpotato and cassava are evidently promoted by the Ministry of Agriculture and Food Security of Malawi to mitigate the effect of this climate disaster. At present, the established 1-2-3 sweetpotato seed systems implemented by the Rooting out Hunger project have contributed to providing clean OFSP planting material to these affected areas through the GoM.

4.3 The 1-2-3 Sweetpotato Seed Systems

A well-defined 1-2-3 sweetpotato seed system is shown in Figure 2.

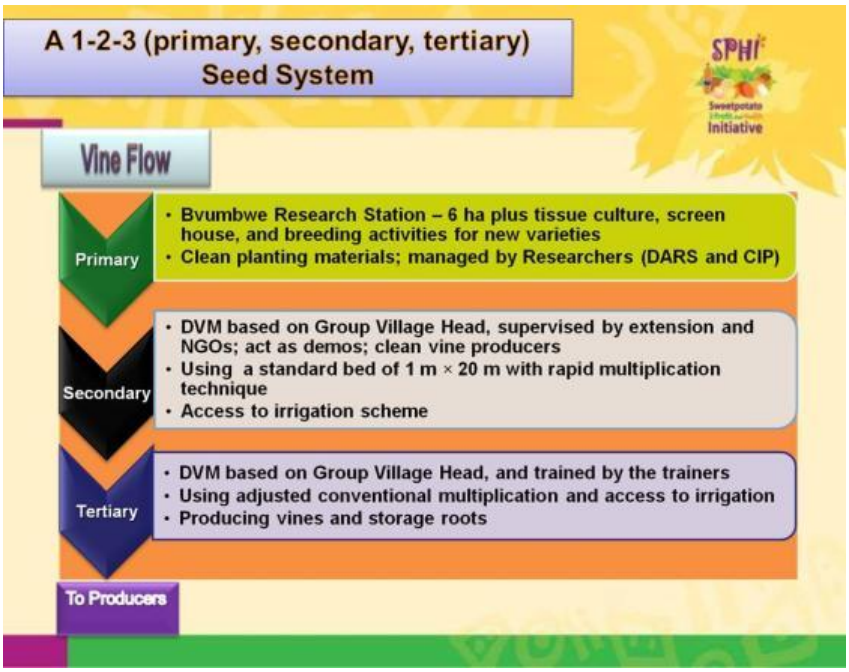

Figure 2 The 1-2-3 sweetpotato seed system model in Malawi.

4.3.1 The Primary Multiplication

At the primary multiplication (Figs. 1 and 2), we have six OFSP varieties. One OFSP variety, Zondeni, has been widely disseminated whereas the other five are yet to be distributed to all DVMs by this coming rain season. The new varieties were released by the Department of Research Services (DARS) on 8 September 2011. The names of varieties are Anaakwanire ("enough for children"; original name was BV07/028), Chipika ("big log"; original name was LU06/0527), Mathuthu ("big heap of roots"; original name was LU06/0146), Kadyaubwerere ("eat and come back to eat again"; original name was LU06/0252) and Kaphulira ("early maturity"; original name was LU06/0428) (Fig. 3).

Figure 3 Newly released OFSP varieties.

The primary multiplication has facilities of a screen house and a small tissue culture (TC) laboratory. This aims at maintaining the virus-free plantlets of sweetpotato varieties (Fig. 4).

Figure 4 Screen house during the open day on 17 May 2012 (left) and visit of Irish Aid team to TC lab at Primary Multiplication of Bvumbwe Research Station (right).

4.3.2 Decentralized vine multiplication (DVM) and its status in Year 3

Secondary ("2") and tertiary ("3") vine multiplications were established when the project was launched in Malawi (Year 1)—that is, 1 October 2009–30 September 2010. The DVMs could only provide the OFSP clean planting materials for the first in the 2010/2011 rain season, which started in November 2010. The total number of DVMs was 133 and covered 5.8 ha. During the second year of the project (1 Oct. 2010–31 Oct. 2011), we increased them to become 146 and covered the land of 26.5 ha for the distribution of the rain season of 2011/2012, exactly in December 2011. Year 3 of the project started by the 1 November 2011 and extends to 30 December 2012. The well-established DVMs in the older areas remain intact (Table 1), but we built up new DVMs in the new districts (Table 2). Figure 5 explains how the 1-2-3 seed system fits with the sweetpotato growing calendar in Malawi. Table 3 summarizes the principal differences between the secondary and tertiary DVM. Assuming this system goes well, we can expect to have the clean OFSP planting material and produce the sweetpotatoes throughout the year. Monitoring on pest and disease incidence at DVM level is strikingly important. Good teamwork amongst relevant government departments, researchers, extension staff, and farmers/private sectors is contributing to the success of the seed system. Currently, the attempt to achieve this success is still underway. The Rooting out Hunger in Malawi project has shown evidence of strong partnerships at all levels.

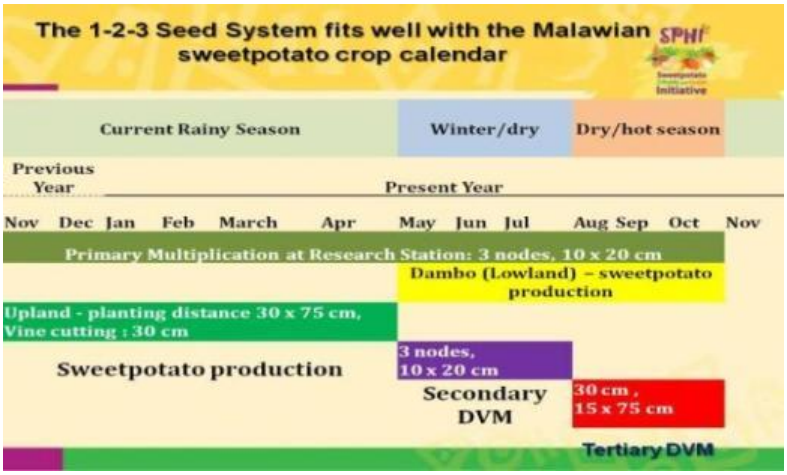

Figure 5 Sweetpotato crop calendar: the 1-2-3 seed system fits well with the Malawian sweetpotato growing season following the uni-modal rain season pattern.

Table 1 Status of DVMs up to Year 3

IP/District	2010/2011 Rain Season (Y1)				2011/2012 Rain Season (Y2)				DVM in Y2 Continued in 2012/2013 Rain Season (Y3)*
	% Female at DVM	% Male at DVM	DVM	Area (ha)	% Female at DVM	% Male at DVM	DVM	Area (ha)	DVM/Area (ha)
CU-Dedza	48	52	17	3.4	68	32	26	16	26/16
MVPs-Zomba	47	53	44	0.9	64	36	16	2.5	16/2.5
CU-Phalombe	53	47	39	0.8	66	34	60	4	60/4
CU-Mulanje	-	-	-	-	41	59	32	1	32/1
Cadecom-Chikwawa	0	100	33	0.7	8	92	12	3	12/3
TOTAL	**48**	**52**	**133**	**5.8**	**38**	**62**	**146**	**26.5**	**146/26.5**

*This figure may develop over time, since the DVMs may be affected by the number of households by Nov. 2012.

Ours is a dynamic project (Fig. 1). A number of new DVMs with new IPs have grown since September 2011. We have recorded that there are 23 DVMs with 1.54 ha. Hence, a total of 169 DVMs (28.04 ha) are ready to disseminate clean OFSP planting material by this coming rain season of 2012/2013 (Table 2).

Table 2. Establishment of new DVM in Year 3

District	IP	2012/2013 Rain Season (Y3)[1]				When Established
		% Female at DVM	% Male at DVM	DVM	Area (m^2)	
Salima	Kachele Club	79	21	1	200	Sep. 2011
Dowa	FUM	27	73	1	2,400	Jan. 2012
Lilongwe	FUM	66	34	1	1,800	Jan. 2012
Dedza	FUM	43	57	1	1,800	Jan. 2012
Balaka	CU	49	51	12	8,268	Jan. 2012
Kasungu	FAO	50	50	1	60	Jan. 2012[2]
Mzimba	FAO	33	67	1	60	Jan. 2012[2]
Balaka	WALA	Not yet reported	Not yet reported	1	150	Feb. 2012
Machinga	WALA	60	40	1	150	Jan. 2012
Zomba	WALA	65	35	2	90	Jan. 2012
Chiradzulu	WALA	Not yet reported	Not yet reported	1	150	Mar. 2012
Thyolo	WALA	Not yet reported	Not yet reported	1	150	Feb. 2012
Mulanje	WALA	Not yet reported	Not yet reported	1	150	
Chikhwawa	WALA	-	-	1	90	Pending[3]
Nsanje	WALA	-	-	1	150	Pending[3]
TOTAL				**23**	**15,428**	

[1] This status is based on the time of vine being delivered except for Kachele Club by Nov. 2011.
[2] FAO bought the OFSP planting material from the DVM managed by Kachele Club in Salima District.
[3] Need approval from their umbrella organization CRS; thus total area for nurseries = 15,428 m^2 or 1.54 ha.

Table 3 The Principal Differences between Secondary and Tertiary DVM

Planting	DVM	
	Secondary Vine Multiplier ***Principal Goal: Vine Production***	**Tertiary Vine Multiplier** ***Principal Goal: Dual Purpose*** (roots + vines)
Period	Shortly after the main harvest for storage root production (last month of the rainy season)	Two months after the secondary multiplication, tertiary multipliers start (during the dry season)
Irrigation Method	Is needed **Rapid multiplication.** Multiplication rate of Zondeni. 1 cutting gives 30 cuttings/year after every 2 months	Is needed **Adjusted conventional multiplication.** Multiplication rate of Zondeni is 1:3/year and other varieties 1:2
Multiplication Technique	Two or three nodes are needed, and then plant them in a manageable-sized plot (i.e., 10 X 20 cm); planting distance of 10 X 20 cm. A plot size of 10 X 20 cm contains 10,000 plants. For Zondeni, 30,000 vine cuttings 30 cm long can be produced (50 bags of 50-kg volume—each 8 kg) for OFSP production.	Vine cuttings 30 cm long are planted in ridges. Planting distance within plants is 15 cm and between ridges is 75 or 90 cm, depending on the location.
Main Objective	Producing vine cuttings	Producing vine cuttings as well as storage roots for food and nutrition security when facing the hunger season

This year the DVM is clearly defined. A DVM is a group of farmers or individual farmers who are multiplying OFSP together within a radius of 9 km. We consider that the vine cuttings should not be wilting during the transportation. In Malawi, it fits into a Geographical Village Head, or "Group Village Head." The DVM should be also a place where we can demonstrate trials. This could be a center where people can learn more about sweetpotato. The clean sweetpotato planting material can be collected from here as well. At the DVM, an extension officer plays an important role to supervise multipliers. The DVM should work closely with the researchers from the primary seed multiplication. New techniques to farmers can be easily transferred through this type of network. The new and old multipliers were trained every year. This is aiming at updating knowledge and skills for farmers. Farmers will use the demo trials as their "live" library.

4.4 Status of Household Beneficiaries through Voucher Scheme up to Y3

A voucher scheme was introduced to speed up distribution of OFSP planting material so that it is reaching many Malawians in a short period of time. The objectives of using a voucher are (1) to easily monitor on the distribution of OFSP vines, (2) to assist vulnerable people and poor families getting benefit from the bio-fortified OFSP crop, and (3) to appreciate the work of multipliers. In Y1, because of the voucher scheme, 10,869 HH received OFSP planting materials and grew OFSP in the 2010/2011 rain season. In the 2011/2012 rain season, the numbers increased to 23,935 HH (Table 4). Additionally, the beneficiaries were trained on the OFSP crop production and multiplication, pests and diseases, and postharvest handling and processing (Table 5). Most of beneficiaries became a multiplier because they wanted to earn some money from selling the OFSP vines as their neighbor did. This beneficiary was carefully selected by the IPs. From 4 kg of vine cuttings, a beneficiary can grow the OFSP vines on a piece of land of 67.5 m^2. According to the baseline survey done in November–December 2010 (CIP 2011b), average land utilization by each HH was 1.20 ha; 97.1% were used for farming.

Table 4 Numbers of Beneficiaries Receiving OFSP Planting Materials through Vouchers during the 2010/2011 and 2011/2012 Rain Season and Being Budgeted in Project Y3

IP	District	2010/2011 Rain Season through Voucher Scheme (Y1)		2011/2012 Rain Season through Voucher Scheme (Y2)		Beneficiaries Planned in the 2012/2013 Rain Season through Voucher Scheme Budgeted from Y3 Project Budget
		No. of HH	Area of Production (ha)	No. of HH	Area of Production (ha)	
CU	Dedza	4,733	32.0	3,000	20.3	3,000
CU	Phalombe	859	5.8	3,235	21.8	3,000
CU	Mulanje	-	-	3,492	23.6	3,000
MVP	Zomba	3,250	21.9	8,000	54	3,000
CADECOM	Chikhwawa	2,126	13.7	6,208	41.9	3,000
Total	**5**	**10,968***	**73.4**	**23,935†**	**161.6**	**15,000**

*5,562 females (51%) and 5,406 male (49%) HH; †15,168 females (63%) and 8,767 (37%) male HH.

Table 5 Training Activities Recorded (Dec. 2009–mid-June 2012)

Year	Type of Training	Facilitator	Participants	Participants			Place of Training	When
				% Female	% Male	Total		
2009	OFSP processing	CIP-SSA based in Mozambique	DARS, MVP, and lead farmers from MVP	100	0	26	Mozambique	Dec.
2010	Vine multiplication	CIP-SSA based in Nairobi	CIP-Malawi, DARS, DAES, DADO, MVP, CADECOM, CU	24	76	17	Bvumbwe Research Station	Jan.
	Vine multiplication and sensitization	DAES, DADO, and NGO IPs	Multipliers, lead farmers	40	60	1,994	Dedza, Zomba, Phalombe and Chikhwawa	Jan.–Aug.
2011	Vine multiplication, sweetpotato production, and pests and diseases	DAES, DADO, and NGO IPs	Multipliers, lead farmers, and HH beneficiaries	49	51	601	Dedza, Zomba, Phalombe, Mulanje, and Chikhwawa	Jan.–Feb.
	Vine multiplication	CIP-SSA in Malawi based at Bvumbwe	Multipliers, lead farmers and village heads	79	21	47	Salima	Sep.
	Vine multiplication	DARS and CIP based at Bvumbwe	WALA-CATCH, World Vision, Concern International, Emmanuel International, Save the Children, Total Land Care, Africare, CAVA	11	99	36	Mulanje	Dec.
	OFSP processing	DAES, DADO, and NGO IPs	Lead farmers	89	11	749	Dedza, Zomba, and Phalombe	June–July
	Postharvest handling	CIP-SSA in Malawi based at Bvumbwe	DAES, CU, MVP, CADECOM	18	82	33	Dedza, Zomba, Phalombe, Mulanje, and Chikhwawa	May–June
2012	Vine multiplication	CIP-SSA in Malawi based at Bvumbwe	FUM, Emmanual, WALA	22	78	125	Dowa, Lilongwe, Dedza, Zomba and Machinga	Jan.
	Drip irrigation Kit installation	CIP-SSA in Malawi based at Bvumbwe	CU, CADECOM, FUM, Kachele Club, FAO	49	51	81	Phalombe, Mulanje, Chikhwawa, Dowa, Lilongwe, Dedza, Salima, Mzimba, and Kasungu	Feb.–Mar.
	Sweetpotato	CIP-SSA in	FUM, FAO,	37	63	161	Mzimba, Kasungu,	Mar.

Year	Type of Training	Facilitator	Participants	Participants			Place of Training	When
				% Female	% Male	Total		
	production, multiplication and crop protection	Malawi based at Bvumbwe	Kachele Club				Dowa, Lilongwe, Dedza and Salima	
	Postharvest handling, OFSP processing	DARS and CIP based at Bvumbwe	FUM, FAO, Kachele Club	50	50	205	Mzimba, Kasungu, Dowa, Lilongwe, Dedza, and Salima	May–June
Total				**47%**	**53%**	**4,075**	**14 districts**	

Source: CIP Reports, 2010 and 2011a, b, and current situation.

4.5 Income Generation from Vine Sales

4.5.1 At the primary seed multiplication

Primary multiplication is managed by researchers at Bvumbwe Research Station (BRS) under DARS. CIP backstops the activities through the Rooting out Hunger project. Table 6 illustrates the vine cuttings sold by the primary multiplier—that is BRS–DARS. The vines, in fact, were bought by the project. The objective was to set up new DVMs in various districts. Except for 5,625 bundles (out of 17,321), these were for helping the Ministry of Agriculture to bring to Mulanje in order to help people who were affected by the drought.

Table 6 Income Generated from the OFSP Zondeni Primary Multiplication Managed by DARS at BRS

Rain Season	District Where Vines Were Distributed	No. of Bundles Distributed (@ 4 kg)	No. of Vine Cuttings (30 cm long)	Total Received by DARS (US $)
2010/2011	Salima, Dedza, Liwonde, Mulanje, and Chikhwawa	7,643	2,292,900	6,991.20
2011/2012	Lilongwe, Dedza, Balaka, Machinga, Zomba, Chiradzulu, Mulanje, and Thyolo	9,678	2,903,400	8,718.88
Total	**11 districts**	**17,321**	**5,196,300**	**15,710.08**

4.5.2 At the secondary and tertiary DVM using voucher and non-voucher

Individual farmers or groups of farmers who participated as multipliers could sell their vines through vouchers and also on the free market (non-voucher scheme). Table 7 shows some incomes generated by the multipliers from vine sales using the two different approaches. Each multiplier sold one bundle of 300 cuttings (4 kg) (Fig. 6) to a beneficiary who received a voucher. The multiplication rate at secondary multiplication technique is 1:30. This means that 1 vine cutting (3 nodes) from Zondeni variety can produce 30 cuttings/year, but irrigation is needed. The price of vine cuttings through the voucher scheme was Mk 155 ($1) per 4 kg. The price was met after considering the production costs and the government's price. Table 8 is a rough

Figure 6 Bundle of 300 Zondeni vine cuttings (4 kg).

calculation of vine production and its profit.

Table 7 Incomes Generated by the DVMs from Vine Cutting Sales Using Voucher and Non-voucher Schemes after Two Years

IPs	District	EPAs	No. of DVM	Area of DVM (ha)	Total No. of Multipliers	Total HH through Voucher Scheme	Income from Voucher Scheme (US $)	Income from Non-voucher Scheme (US $)	Total Income (US $)
CU	Dedza	Kanyama, Bembeke, & Chafumbwa	26[1]	16	823	7,733	7,198.9	366.37	7,565.3
	Phalombe	Waruma, Naminjiwa, & Nkhulambe	60[2]	4	60	4,094	3,811.2	3,778.67	7,589.9
	Mulanje	Thuchila, Mulanje Boma, & Milonde	32[2]	1	32	3,492	3,250.8	-	3,250.8
MVP	Zomba	Thondwe	16[1]	2.5	310	11,250	10,472.97	19,475.68	29,948.7
CADECOM	Chikhwawa	Mbewe, Mitole, & Livunzu	12[2]	3	12	8,334	7,780.62	2,102.10	9,853
Total	**5**	**14**	**146**	**26.5**	**2,132**	**34,903**	**32,514.49**	**25,722.82[3]**	**58,237.31**

[1]Group of farmers; [2]individual farmers; [3]Equal to 27,522 HH, in total = 62,425 HH have grown OFSP after 2 years of project implementation (note: price of each bundle was 93.36 cents).

Table 8 Calculation of Costs of Vine Cuttings per 200 m², Vine Sales and Profit

Items	Total (US$)		
	River Diversion	Treadle Pumps	Motorized Pumps
Agricultural inputs per 200 m²*			
1st vine harvest	128.3	165.8	224.7
2nd vine harvest	62.7	102.1	159.2
3rd vine harvest	62.7	102.1	159.2
Vine Sales per 50 kg bag volume (8kg vine cuttings)*			
1st vine harvest	90.1	90.1	90.1
2nd vine harvest	180.2	180.2	180.2
3rd vine harvest	270.3	270.3	270.3
Profit			
1st vine harvest	87.53	86.75	85.61
2nd vine harvest	178.29	177.5	176.36
3rd vine harvest	268.61	267.82	266.68

*Based on the averaged market price in Dec 2011/Jan 2012.

4.6 Capacity Building

4.6.1 Establishment of primary vine multiplication at BRS

CIP backstopped the primary vine multiplication based at BRS. This includes the maintenance of 6 ha of land covered by OFSP Zondeni (Fig. 7) and 0.5 ha of irrigated land covered by five newly released varieties (Fig. 3). BRS has the potential to generate income from vine sales (Table 6). Primary multiplication is a source of clean planting material to provide multipliers and sweetpotato growers. Out of 1 ha of land covered by Zondeni variety, one can harvest 1.5 million vine cuttings 30 cm long. Thus, 9 million vine cuttings per year can be produced. We can calculate how much money they can earn from selling vines. This indicates that BRS is able to develop to become the commercial vine producer for its sustainability.

Figure 7 Primary multiplication covered by 6 ha of Zondeni variety.

The Rooting out Hunger project has built one screen house (Fig. 4) and equipped the TC laboratory with two air-conditioners and some chemicals for maintaining the clean plantlets (Fig. 4). The screen house enables the clean plantlets from the TC laboratory to multiply before growing them in the field. At this moment, a manageable number of clean Zondeni plantlets are maintained in this laboratory. We expect to receive a number of virus-free plantlets of five new OFSP varieties from Public Quarantine Research (PQS) in Nairobi by this year. Other varieties for the breeding program led by DARS are also kept in the laboratory.

4.6.2 Trainings and producing IEC materials

Training, sensitization, field day/open day, awareness creation campaign, radio programs, demo trials, and visits were significantly effective in building up the capacity of farmers and extension staff. A total of 4,095 lead farmers, government, and NGO extension staff have been trained since the project was launched in October 2009. Table 5 (above) shows the training activities up to 27 June 2012. After the training, an action plan was made. It was agreed that each trainer had to train another 5–10 people. We have already implemented this strategy in the five districts of Dedza, Zomba, Phalombe, Mulanje, and Chikhwawa with success.

In 2011, the project produced one training manual for trainers that contained some procedures on how to estimate sweetpotato yield in a plot (CIP 2011b). This included the Triple S (storage in

sands and sprouting) translated into Chichewa, and storage of the OFSP roots in a pit. This year, three modules for training of the trainers (TOTs) have been written. The first module is for crop production, multiplication, and crop pests and diseases. The second one is for postharvest handling, and the third for OFSP processing. The content was associated with the IEC materials of the "SUN 1000 Special Days" movement. The three modules have been tested in the districts of Mzimba and Kasungu under FAO; of Dowa, Lilongwe, and Dedza under Farmers Union of Malawi (FUM); and of Salima District under the farmers' club of Kachele Club. The three organizations found the modules to be useful and a good source of knowledge for trainers. Currently, CIP is working on the English language edition. As soon as this editing is done, hard copies will be disseminated to Irish Aid, all partners, and anybody who is interested in farming of sweetpotato crop.

Some impacts from the training were noticed

Every year, training, sensitization, field day/open day, awareness creation campaign, radio programs, and demo trials were conducted by the IPs. Training is expensive for rural poor farmers in a poor country like Malawi. The impact of the training is clearly met; farmers are motivated. They have confidence to participate in any field days to show their capability on what they gained from the training. For instance, on 15 and 26 June, the newly trained farmers in Kasungu and Mzimba participated in the agricultural show to sell the OFSP products. Kachele Club has participated in a show on 5 July and plans to sell the OFSP products, just shortly after finalizing their training on OFSP products. Salima District is one of the districts in Malawi that has an erratic rain pattern. Thus, the theme of this agriculture show was "small-scale irrigation for hunger reduction." Kachele Club received two treadle pumps from the Rooting out Hunger project in September 2011 (Fig. 8) and 20 drip irrigation kits in May 2012 (Fig. 9). These farmers were trained on how to install a drip irrigation kit. The treadle pumps and drip irrigation have turned their garden into "green" during the dry season (Fig. 10). They were also trained on the OFSP multiplication. The Club would show the OFSP secondary and tertiary OFSP multiplications, treadle pumps, drip irrigation kit, and other crops (Fig. 10). Kachele Club is practicing the tertiary multiplication technique side-by-side with the secondary multiplication. This implies that using both techniques at the same time is possible. In the end, it depends on the objective of farmers: are they growing the OFSP for food and nutrition security or for vine commercialization?

Figure 8 Two treadle pumps for Kachele Club given by Erna Abidin (project leader) in Sep. 2011 (left), treadle pump in use (middle), and treadle pumps having turned their gardens "green" (right). (Photo taken 25 June 2012).

Figure 9 Drip irrigation installation training at Kachele Club in Salima District (left) and at CADECOM in Chikhwawa District (right) in May 2012.

Figure 10 Plants at tertiary (left) came from the secondary (right). It is seen some less populated plots were just harvested from this secondary multiplication technique. All farming and multiplication at Kachele Club irrigated using the treadle pump from the Rooting out Hunger project. (Photo taken on 25 June 2012 during the dry season.)

5. RESEARCH ON INTERCROPPING SWEETPOTATO AND MAIZE

In Y2 project activities, through the 2010/2011 rain season, we investigated a trial of intercropping between maize and sweetpotato. This trial is under the integrated crop management (ICM) milestone in the project proposal and was conducted on station at BRS. Lead farmers, government, and IP extension staff came and judged the performance of maize and sweetpotato aboveground. The result was presented at the DARS scientific forum, "Horticulture In-House Meeting," in September 2011, and was reported in the CIP annual report to Irish Aid (CIP 2011). In Y3, during the 2011/2012 rain season, the same investigation is repeated (Fig. 11). We added two supplementary treatments on each sole cropping of maize and sweetpotato. We could not have these two treatments last year. The station site was experienced with the unreliable rainfalls when we set up the trial. Hybrid maize significantly needs a good rainfall. As was shown in the previous report, maize crop could be used as a border crop for the OFSP Zondeni plots. Maize was harvested at four months after planting (MAP) and sweetpotato at seven MAP. When harvesting the sweetpotato at seven MAP, it was when the incidence of sweetpotato weevil was high. However, the roots and vines from our intercropping trial with maize were found clean and free from weevil damage (CIP 2011b; Nampeera et al. 2011). Farmers have shown their interest in intercropping maize and sweetpotato in their garden as well. Because of this preliminary finding, we are repeating this trial in the second season and it falls under Y3 budget.

Figure 11 Intercropping maize and sweetpotato: the green sweetpotato is attracting the farmers!

The second season of observation was aimed at having accurate data to be analyzed, so we can draw a satisfactory conclusion. Two open days have been planned for this year. The first was organized on 17 May 2012 and the second one is planned for the third week of July. In the first open day, we invited a number of lead farmers and relevant government and NGO extension staff from various organizations to BRS. The participants were from FUM, CU, MVP, CADECOM, WALA, Kachele Club, District Agriculture Development (DADO), and DAES. A total of 75 participants (50 males, 25 females) attended. Most participants were the same people who came to BRS last year. Besides judging the intercropping trial, the participants were brought to the primary multiplication field, screen house, and the field for breeding program (Fig. 12). We also promoted the OFSP chips along with "chicken *muchomo*" (pieces of fried chicken) and salad. The menu was copied from the vendors who sell the Irish potato chips in the trading centers along the road and slightly modified. A complete result from the intercropping trial will be presented in the 2012 annual report. General opinions based on the aboveground observation (Table 9) were collected from the participants. Both maize and sweetpotato plants were still in the field. Our challenge is that only 36 (out of 75) participants filled in the questionnaire form. It seems that some female farmers were illiterate.

If we carefully observe each ranking given by respondents and then comparing them, we could conclude that maize was more important than sweetpotato in the first season's assessment. However, in the second season's assessment the respondents ranked sweetpotato in a different fashion. The OFSP was then becoming more important than maize (Table 9).

Figure 12 Diffusion of knowledge occurred during the open day on 17 May 2012.

Table 9 Opinions of Respondents Collected during the Two Open Days Conducted in 2010/2011 and 2011/2012 Rain Season

Treatment	First Season		Second Season	
	No. of Respondents	Rank	No. of Respondents	Rank
T1: 2 ridges Zondeni and 1 ridge maize	13	2	19	1
T2: 1 ridge Zondeni and 1 ridge maize	12	3	6	2
T3: 1 ridge Zondeni and 2 ridges maize	24	1	4	4
T4: Planting in the same ridge 1 maize plant and 3 Zondeni plants	3	4	0	6
T5: Sole cropping of sweetpotato	-	-	5	3
T6: Sole cropping of maize	-	-	2	5
Total	**52**		**36**	

Maize was not doing well this year. Moreover, in certain plots, some sweetpotatoes also had problems. We observed that 40% of sweetpotato plants have shown the symptom of *Altenaria* spp., which was not surprising. We have noted in the neighborhood of the trial that the *Altenaria* symptom was found everywhere.

Where do the sweetpotato vines go after harvest?

A total 1,853 kg of OFSP vines from the intercropping trial after being harvested were given to four dairy farmers in Bvumbwe, Thyolo District. There will be a significant impact for the cattle after consuming the sweetpotato vines. CIP in Nairobi has done much research on the use of sweetpotato vines for silage (www.sweetpotatoknowledge.org).

6. INVESTIGATION ON CLEAN ZONDENI FROM PQS VERSUS POSITIVE SELECTION DONE BY NATIONAL RESEARCH SERVICES

The lack of virus-free, or "clean," planting material is regarded a major constraint. Most of the local landraces and introduced materials are degenerated because of the sweetpotato virus disease. A number of references indicated that a yield gain of 30–50% could be obtained through healthy planting material (Fuglie et al. 1999). In the 2011/2012 rain season, research was conducted to compare between clean OFSP Zondeni planting material from PQS in Nairobi and the OFSP Zondeni planting material from the positive selection done in Malawi by the DARS scientists. Since the project was launched in October 2009, we only multiplied and disseminated the planting materials to farmers from this positive selection. We conducted this trial at BRS (on station) and on farm in Phalombe and Mulanje. CIP and DARS scientists of BRS are at present managing this research. The results will be reported in the 2012 annual report.

7. PRELIMINARY STORAGE TRIALS AT BRS

The trials were conducted based on the project budgeted in Ys 2 and 3. The objective of the trials was to find the life-span of OFSP Zondeni roots. We tried to test three methods written below. All methods were from farmers' practices with a slightly modified technique. This was a preliminary observation but it needs to be repeated with two replicates at least. We had to test the method on station before we bring this technique to farmers. In the meantime, in the training module for

postharvest handling, we also included the pit storage method. Recently, we have trained a number of extension staff and lead farmers in six districts in central and northern regions of Malawi. They are going to train others after this training as an obligation.

Clean roots of OFSP Zondeni were used for the storage trials. The roots were from the intercropping maize and sweetpotato trial at which were harvested seven MAP (CIP 2011b).

Four types of storage trials were conducted at BRS:

1. Marketable sized roots were stored in a basin with sand with two replicates (at CIP office and horticulture laboratory).
2. Marketable sized roots were stored in a pit with sand and ash. We used two types of sand, wet and dry. Then we treated the pit with roof cover against no cover for both sand and ash.
3. Control: marketable sized roots were put on the floor of CIP office and on a shell from wood at the horticulture laboratory.
4. Triple S was mainly for vine production. We used the non-marketable roots and stored them in a basin with dry sand. We replicated twice, one was kept at CIP office and another one at horticulture lab.

Observations for recording the data were done twice after two and six months. In the observation after two months we focused on root quality and its appearance. After six months, the taste test and β-carotene analysis were done. The trials started on 24 August and ended on 16 February 2012. However, the trial with basin and dry sand for marketable size and Triple S was continued up to seven months. Tables 10 and 11 show both results after two and six months, respectively.

Table 10 Results from the Observation after Two Months

Treatment	Results	Remarks
Pit storage using dry sand under shed	10% of the roots started sprouting	The pit was protected from rain drops, sprouting started at the edge that was attached to the vine.
Pit storage using wet sand under shed	50% of the roots started sprouting	Moisture from the wet sand might have facilitated fast sprouting of roots.
Pit storage using ash under shed	5% of the roots started sprouting	The ash could be the best material for storing sweetpotato roots. However, the appearance of the skin surface of a root was not clean unlike keeping it in the sand.
Pit storage using dry sand on open ground	20% of the roots started sprouting	There was rapid sprouting of roots because of the early rains that might have accidently provided moisture.
Pit storage using wet sand on open ground	50% of the roots started sprouting	Moisture from the wet sand and rains might have rapidly facilitated sprouting of roots.
Pit storage using ash on open ground	20% of the roots started sprouting	Rains could be the cause of facilitating sprouting since the pits were not covered.
Dry sand storage using a plastic basin	0% of the roots was sprouting	The observation continued up to seven months with the same result, 0% sprouting.
Triple S for vine production	40% of the roots were sprouting	By the seventh month of observation

By three months, more than 90% of roots kept in all pit treatments were sprouting. We could not continue observing them, hence, we discarded them all. We learned that we might be making a mistake by selecting areas for pit trials near the Sweetpotato Crossing Block of Dr. Felistus Chipungu. We suspected when watering the crossing block some water might have penetrated the pits. This facilitated the roots sprouting.

The roots kept on the floor of CIP Office as for a control were getting shriveled starting in the three months of observation and then getting rotten and smelling bad. So, we discarded them after four months. Meanwhile, those on the shelf at Horticulture Lab were getting smaller but still performing well up to six months.

Nevertheless, the roots which were kept in the basin filled in by the dry sand were continued without sprouting at the time we terminated the observation by seven months (Fig. 13). The small roots from the Triple S treatment were sprouting (40%) at the observation of seven months (Fig. 14).

Figure 13 Fresh Zondeni after beiing stored being stored in sand for seven months.

Figure 14 Small roots from Triple S after being stored in sand for six months.

The taste test was conducted and β-carotene was analyzed after six months. The roots from the sand storage, including those from the Triple S observation, were steamed for 35 min following the procedures given by DARS. Eleven technicians from BRS and two farmers (6 males, 7 females) tasted and then assessed them. The assessments included appearance, sweetness, texture, the presence of fibers, and general taste (Table 11). Scores were given from 1 to 5, where 1 was bad, 3 fair, and 5 good. There is a difference between males and females when drawing their conclusion, particularly on giving the good score (score 5).

Simonne et al. (1993) noted that sweetpotato varieties can be grouped into four general categories based on their ß-carotene content on a dry weight basis non-detectable (<1 µg/g); low ß-carotene (1–39 µg/g)—pale orange; moderate ß-carotene (40–129 µg/g)—orange; and high ß-carotene (>130 µg/g)—dark orange. Hence, the results from this trial showed that β-carotene was still moderate (Fig. 13 and Table 11). In addition, the β-carotene was found slightly higher in the sprouting roots than non-sprouting roots. In contrast, the sprouting roots taste bad compared to the non-sprouting roots according to the taste test result.

Table 11 Results from Taste Test and β-carotene Analysis of OFSP Zondeni Roots Stored in Sand from Two places (n = 13)

Treatment	Gender	Appearance			Sweetness			Texture			Presence of Fibers			Flavor			General Taste			B-carotene (µg/g)
		B	F	G	B	F	G	B	F	G	B	F	G	B	F	G	B	F	G	
Triple S-CIP Office - Sprouting	Male	0	3	3	0	1	5	0	5	1	0	4	2	1	3	2	1	4	1	
	Female	2	3	2	2	3	2	4	3	0	3	4	0	3	3	1	4	3	0	82.00
Marketable roots-CIP Office-Not Sprouting	Male	2	2	2	1	0	5	1	2	3	1	3	2	2	0	4	2	2	2	
	Female	2	3	2	1	4	2	3	3	0	3	3	1	2	4	1	4	2	1	75.33
Triple S-Horticulture Lab-Sprouting	Male	3	2	1	3	3	0	3	2	1	3	3	0	3	1	2	2	4	0	
	Female	3	0	4	5	2	0	5	2	0	5	2	0	5	2	0	4	2	1	88.18
Marketable roots-Horticulture Lab-Not Sprouting	Male	3	3	0	3	1	2	3	3	0	3	3	0	2	4	0	1	5	0	
	Female	3	3	1	4	3	0	5	2	0	6	0	1	4	3	0	5	2	0	86.81
Control-Horticulture Lab on the shelf-Sprouting	Male	3	2	1	2	2	2	4	1	1	4	1	1	3	2	1	3	2	1	
	Female	5	2	0	7	0	0	6	1	0	6	0	1	4	2	1	6	1	0	95.5

Note: B = bad; F = fair; G = good

8. PROJECT ACTIVITIES ALIGN WITH ASWAp

The Rooting out Hunger in Malawi project activities are corresponding well to the Malawi's ASWAp strategic objectives. Table 12 shows this detailed correspondence and project achievements up to 30 June 2012. The achievements strongly align with the ASWAp strategic objectives.

Table 12 Project Objectives Corresponding to Malawi's ASWAp Strategic Objectives

Project Objectives	Corresponding ASWAp Strategic Objectives	Project Achievement (1 October 2009–30 June 2012)
1. To improve vitamin A intake for rural vulnerable groups in central and southern Malawi through effective establishment of DVMs and a media-based demand creation campaign.	**1.2.1.c:** Increase productivity of cassava, sweetpotato, yellow-fleshed sweetpotato, and Irish potato in relevant areas **1.2.2.a:** Promote dietary adequacy **1.2.2.b:** Improve quality of diets for the most vulnerable groups **1.2.2.c:** Intensify nutrition education	**1.2.1.c:** Number of farmers who cultivated the OFSP in Dedza, Zomba, Phalombe, Mulanje, and Chikhwawa districts in the 2011/2012 rainy season was 23,935 HH with the area of production 161.5 ha. There was an increase of 4,397 beneficiaries. In mid-November 2011, the registered HH to have received subsidized vouchers were 19,538 (CIP 2011c). Together with the beneficiaries who have already had the OFSP plants in the 2010/2011 rain season and through non-voucher scheme, it makes all together 62,425 farmers who have had OFSP planting materials this year (Fig. 12; Tables 4 and 7). Implementing partners are on track for Y3 project implementation. The training and selection of multipliers and beneficiaries are still going on. Expansion of project areas to 10 districts under new implementing partners, FAO, FUM, and Kachele Club has reached Northern Region of Malawi. Twenty-three new DVMs were established (Table 2). **1.2.2.a:** An awareness campaign was conducted in October 2010 in 22 villages of the four districts mentioned above. In Y2, the awareness campaign conducted in each district and focused on the areas of having few beneficiaries during the Y1 project implementation. Radio programs and agriculture shows through field days and invited the mass-media were one of the initiative of project's partners in the respective areas (Annex 3). CIP, through Rooting out Hunger in Malawi, has backstopped all of the awareness campaign, radio programs, and field days. Each radio program is aired every Wednesday afternoon from 16:15 to 16:30 from 14 Sep. to 9 Nov. 2011, that was organized by Irish Aid (Laura Lalor) and NASFAM. The current radio program is aired on every Saturday organized by FUM and Zodiac Radio Broadcasting of Malawi. The diffusion of the message about production, where to get the planting material, nutritious value of OFSP, as well as various recipes has reached the wide audience in Malawi. A high demand for OFSP planting material was met. A number of multipliers have already generated income out of OFSP vine sales. **1.2.2.b and 1.2.2.c:** Nutrition awareness through the sensitization, training, and field days on the utilization of storage roots and leaves is taking place at the district and extension planning area (EPA) levels. Three newly prepared modules for TOTs have been tested in Mzimba, Kasungu, Dowa, Lilongwe, Dedza, and Salima districts from mid-February up to end of June 2012. They found the modules had rich information to backup the knowledge of trainers during conducting training. The module includes the nutrition education and information materials (Annex 2).

Project Objectives	Corresponding ASWAp Strategic Objectives	Project Achievement (1 October 2009–30 June 2012)
2. Increase effective demand by changing the perception of sweetpotato and develop fresh root marketing chains for OFSP in the Blantyre market and reduce fluctuations in overall sweetpotato supply to the fresh market.	**Key support service 1.a:** Institutional strengthening and development **Key support service 1.b:** Capacity building **Key support service 2.a:** Conducting results and market-oriented research on priority technology needs and provision of technical and regulatory services **Focus area 2.3.a:** Improve the PPP for broader growth of the agriculture sector **Focus area 3.1:** Sustainable agricultural land management	• CIP has required 2 Malawians to be a specialist on each respected area of marketing and M&E. The two specialists will work for the Irish Potato project and Rooting out Hunger project (50-50) to help develop a marketing model, including the OFSP value chains and evaluating the impacts of the CIP projects in Malawi. • Universal Industries, a private business, has committed to support the value chain and market strategy. They are testing different varieties provided by DARS. However, due to previous economic situation in Malawi, this private sector has postponed of purchasing machineries for OFSP crisps and vitamin A rich-biscuits from OFSP until the Malawian economy becomes stable. • The 1-2-3 Seed Systems fit with the sweetpotato farming in Malawi (Fig. 5). This finding will help decision makers put up a strategy on sweetpotato land management in a nationwide approach. • Trial on maize intercropping with sweetpotato is ongoing for the second season's observation at BRS. The effort aims at finding opportunities on using land efficiently, increasing the food and nutrition security, as well as generating incomes for poor rural farmers.
3. Increase the productivity and quality of sweetpotato in intensifying farming systems to ensure surplus production for sale and decrease the length of the hunger season. **4.** Increase the capacity of DARS to produce clean, TC sweetpotato plantlets, maintain primary multiplication sites, and design and conduct seed systems and ICM research.	**1.2.1.c:** Increase productivity of cassava, sweetpotato, and yellow-fleshed/OFSP, and Irish potato in relevant areas **Key support service 1.a:** Institutional strengthening and development **Key support service 1.b:** Capacity building **Focus area 2.3.a:** Improve the PPP for broader growth of the agriculture sector **Focus area 3.1:** Sustainable agricultural land management	• The 1-2-3 vine multiplication strategy aims at ensuring surplus production for sale and decrease the length of the hunger season. • The primary multiplication is based at BRS. This multiplication is managed by DARS and backstopped by CIP. The capacity of DARS is strengthened by renovating a TC laboratory and a screen house and maintenance of the 6 ha of land covered by Zondeni OFSP variety and 0.5 ha covered by the five recently released OFSP varieties. The primary multiplication fully backstopped by CIP can keep producing clean planting materials when needed any time in various agro-ecological zones in Malawi. • Secondary and tertiary multiplication are decentralized on farms and managed by farmers under the supervision of NGO and government extension staff. Tertiary multiplication sites serve for both storage root and planting material production, contributing to food and nutrition security during the hunger season. • Support will give to part of a PhD thesis work of Ms. Pilirani Pankomera, a DARS scientist who is doing a PhD sandwich program at a university in New Zealand. She intends to work on postharvest handling particularly on pit and sand storage for sweetpotato. The previous support for an M.Sc. thesis work would be cancelled due to the prolongation of unclear decision from the University in Zomba.

9. SPECIFIC ACTIVITIES IN Y3 AND PROGRESS

In Table 13, we describe particularly on the progress met on the specific activities in Y3 (i.e., 1 November 2011–30 June 2012).

Table 13 Specific Activities in Y3 and its Progress up to 30 June 2012

Planned Activity	Progress up to 30 June 2012
4.1. The 1-2-3 vine multiplication system will be maintained as source of clean planting materials. This year, 15,000 HH from seven districts (Salima, Dedza, Zomba, Phalombe, Mulanje, Chikwawa, and Thyolo) will receive clean planting materials from the established DVMs (266 DVMs) and the primary multiplication at BRS. Subsidized vouchers will be given to these HH. At the end of the year, the voucher system will be evaluated and a decision will be made whether to continue full voucher subsidization or move to a system where farmers must pay for at least part of the value of the vines.	The target of 15,000 HH beneficiaries will be receiving vouchers in October 2012 to grow sweetpotato by November 2012 where the 2012/2013 rain season is expected to come. The identification of DVM and selection of beneficiaries just started. We plan to have the same number of DVMs for the districts under the voucher scheme. A complete report will be written in the 2012 annual report. In the round table management meeting held on 10 April 2012, participants in the meeting concluded that it was too early to decide on changing the current voucher system into part or non-subsidized vouchers. It was suggested to implement this in the second phase. In the meantime, a case study should be done in the last phase of the 4.5- year project (Annex 1).
4.2 Further multiplication efforts of OFSP varieties for specific end uses will be initiated to serve the needs of the IPs. Integration of agriculture-nutrition OFSP-based intervention and the promotion of the successful processed products will take place. DVMs will be targeted to scale up multiplication depending on where commercial opportunities and demand arise. For example, the peri-urban area surround Salima District can produce sweetpotato and growers are likely to respond to commercial opportunities. In Thyolo and Chikwawa, access to irrigation presents farmers with significant opportunities for expansion of planting material production for surrounding farmers for fresh roots and dried chips in April/May 2012 and to meet the demands of UI in the next two years from now.	Establishing new DVMs in the districts of Mzimba and Kasungu under FAO, Dowa, Lilongwe, and Dedza under FUM; Salima under Kachele Club; and Balaka, Machinga, Chiradzulu, Mulanje, and Thyolo under WALA. Chikhwawa and Nsanje under WALA is on the way. In the older project areas like Phalombe, Zomba, and Mulanje, farmers have already started doing some small-scale business on OFSP products (Annex 1). They have expanded their land growing OFSP to generate income from both OFSP vines and products. In Chikhwawa, farmers also have their marketing orientation by selling the vine cuttings and OFSP leaf for veggies. UI has informed us in the management meeting held on 10 April 2012 that they could not purchase the machinery for making chips and biscuits due to previous political situation. However, they might purchase it this year. It means their plan of buying roots from farmers would be postponed. Another 3 chipping machines, the manual ones were purchased. One has been delivered to Salima, those for Chikhwawa and Dedza districts have not been delivered.
4.3 Within the framework of the Y3 project implementation, a demand creation campaign will be launched nationally that includes radio programs and other communication and education strategies.	• Radio program is ongoing. FUM and Rooting out Hunger project are working together on this radio program since FUM has a good collaboration with Zodiac Broadcasting Program. The Zodiac Radio Program can be heard by almost Malawians

Planned Activity	Progress up to 30 June 2012
Promotion materials and approaches developed during Ys 1 and 2 will be shared with implementing NGO and public sector partners. The demand creation campaign will focus on the "minus 9 months to 24 months" period and will focus on the key "essential nutrition actions" (ENA) which are relevant for OFSP. Work will continue with locally based nutritionists to incorporate OFSP as a "doable action" into the relevant essential nutrition actions and messages. This will include continued testing and developing complementary multimix feeding recipes which use at least three food groups. These recipes will be developed to reflect the seasonal availability of different foods including sweetpotato roots and leaves, specific age-group needs and incorporate relevant care practices (e.g., meal and snack frequency, feeding style). The ENA messages will be drafted as a basis for use through different potential channels, for example: • Use for radio programs on seasonal basis – how to plant sweetpotato and where to get them—has already aired on 16 November 2011. The next radio programs will be discussed deeply with Irish Aid in Lilongwe. • Theatre, songs, children's games in school—this will be agreed with IPs when we supposed to do it. • Training/workshop for the trainers to develop recipes for the infants and young children feeding—this will be planned when we harvest the storage roots in April/May 2012 • Preparing the training materials for IEC—this will be in April after being discussed with IPs. Close links will be established with the National Nutrition Education and Communication Strategy and its focus on SUN 1000 special days.	even in the villages situated in the remote areas. • Training module for OFSP processing was produced (Annex 2). Multimix feeding recipes including porridge for the infants are emphasis during the practical work. The content of the module is aligned with the SUN 1000 Special Days. This module has been tested in Mzimba and Kasungu under FAO; Dowa, Lilongwe and Dedza under FUM; and Salima under Kachele Club. FAO and FUM have invited the journalists from local newspaper, Zodiac Radio Program, and UN Information Officer to document this training. Farmers from Mzimba and Kasungu participated in the agriculture show held on 15 June and 26 June 2012, respectively. They sold the OFSP products during the events. In Salima, the agriculture show is organized by the local government held on 5 July 2012 at Kachele Club. This club has sold the OFSP products. This was their first learning on small-scale business to generate incomes from OFSP products.
4.4 Efforts on OFSP value chain development with farmer organizations and traders will be intensified for both OFSP products and fresh root in the markets. We will test consumer acceptance of different products in the Blantyre market. The economist/marketing specialist, who will be based at BRS, will help the project leader design the efforts mentioned above in order to reach the project achievement.	CIP has recruited 2 specialists: marketing and M&E. They are Malawian and will share with the Irish Potato project (also funded by Irish Aid). The marketing specialist just started working in June and is based at CIP-Lilongwe. The M&E specialist will start by 9 July 2012 and be based at CIP-Blantyre.

Planned Activity	Progress up to 30 June 2012
4.5 Early in Y3, key sweetpotato crop management and postharvest handling research will be undertaken so that preliminary findings can be used in the formulation of key extension messages. Extension advice will draw on research findings to work with farmers on new techniques of vine and root conservation.	The preliminary results conducted on station is reported elsewhere in this mid-year report. At the farmers level, the training of trainers is still ongoing in various newly expanded districts.
4.6 We will implement ICM research (particularly related to inter- and relay-cropping, agriculture conservation, fertility and water management) at the on-farm trial/demonstration sites in each district. Also, at these sites, implement research as demonstration activities on appropriate storage and processing techniques aimed at providing a more consistent supply of fresh roots to be used for fresh market sales over an extended marketing season, or as a source of raw material for a somewhat extended period of processing/drying to produce chips/flour for markets such as biscuit manufacture. We will also explore the use of puree (boiled and mashed) OFSP as an ingredient in bakery products.	• Part of the results from intercropping maize and sweetpotato conducted in this current rain season has been reported in this mid-year report elsewhere. • Planning on supporting an M.Sc. research on agriculture conservation, fertility, and water management has been canceled due to an academic calendar problem at the Chancellor University in Zomba (budget reserved: US $5,663). However, the project management will request Irish Aid to allow supporting part of the PhD thesis work on postharvest handling. This will be done by one of DARS scientists, Pilirani Pankomera, who is doing a sandwich program at New Zealand University. We are still waiting for her project proposal.
4.7 Flyers/leaflets about sweetpotato pests and diseases will be translated into local language Chichewa.	Sweetpotato pests and diseases translated into Chichewa is yet to be done. Three modules for sweetpotato production and multiplication, pests and diseases, and OFSP postharvest handling and processing have been written but still in English version.
4.8 Maintain the capacity of DARS to produce clean TC of OFSP plantlets at the primary multiplication site, including evaluation of the yield benefits of in-vitro–derived planting material.	6 ha of land covered by Zondeni (Fig. 7) and 0.5 ha covered by 5 newly released varieties (Fig. 3) are well maintained. The screen house and TC lab are functioning well (Fig. 4).

10. RESEARCH EQUIPMENT, VEHICLE, AND PROMOTION MATERIAL

The research equipment, vehicles, and promotion material listed in Table 14 have helped the project manage the OFSP program with extraordinary achievement.

Table 14 Clarification of Items Purchased by the Rooting out Hunger in Malawi Project since October 2009 up to 30 June 2012

Item	Quantity	Benefit Organization	Budget from
Air-conditioners for TC lab	2	BRS (DARS)	Ys 1 and 2
Treadle pumps for Chikhwawa and Salima	9	Farmers' communities under CADECOM (7 treadle pumps) and Kachele Club (2 treadle pumps)	Ys 1 and 2
Building a small-scale irrigation scheme for communities in 6 irrigation sites (Mk 800,000) (Annex 6 of CIP 2011b)	6	Farmers' communities under CU in Dedza	Y1
Watering cans	60	Farmers' communities under CU in Dedza	Ys 1 and 2
Drip irrigation kits	330*	• CADECOM-Chikhwawa: 100 • CU-Phalombe/Mulanje: 40 • CU-Dedza: 20 • MVP-Zomba: 10 • FUM-Dowa, Lilongwe, Dedza: 30 • FAO-Mzimba, Kasungu: 20 • WALA-Balaka, Machinga, Zomba, Chiradzulu, Mulanje, Thyolo, Chikhwawa and Nsanje: 70 • Kachele Club: 20 • BRS (DARS): 10 • CIP office (for training material): 10	Ys 1 and 2
Vehicle	2	• Nissan Petrol and Toyota Land Cruiser at CIP office in Bvumbwe, Blantyre for project activities	Ys 1 and 2
Vehicle	1	Motor bike for CIP office	Y1
Chipping machines with petrol engine	3	CU-Mulanje, MVP-Zomba, BRS (DARS)	Y2
Manual Chipping machines	3	Kachele Club-Salima, CADECOM-Chikhwawa, and CU-Dedza to be delivered	Y3
Traditional frying stove for OFSP chips	3	CU-Dedza, MVP-Zomba, and Kachele Club-Salima	Ys 1–3

Item	Quantity	Benefit Organization	Budget from
Slicing kitchen equipment for making OFSP chips	10	Each receiving 2 pieces of equipment: CU-Dedza, CU-Phalombe/ Mulanje, MVP-Zomba, CADECOM-Chikhwawa and CIP office at BRS	Y2
***Chitenje*-OFSP wrapping cloth as a promotion material:**  	3000 pieces of each 2 m	Parts have been given as promotion material for: • Minister for Agriculture and Food Security (Fig. 20) • Minister for Local Government • Permanent Secretary for Ministry of Agriculture and Food Security • Former Permanent Secretary for Ministry of Agriculture and Food Security (current: Team Leader for MVP) • Permanent Secretary for Department of Nutrition, HIV and AIDS at the Office of President and Cabinet • All relevant directors at DARS and Dept of Crop Production and Depart of Nutrition • Irish Embassy – through Irish Aid • Female multipliers under MVP in Zomba who pioneering the OFSP activities in the beginning • Participants at the Annual Meeting in October 2011 where this material was just ready from the manufacturer • Parts of these *chitenje* were sold at the basic price to farmers and various organizations' communities in Malawi, Zambia, Ghana and Kenya. Also a number of *chitenje* have been sold during field days, open days, etc. Farmers and people in general like it. This will be for revolving funds	Y1
Building screen house and equipped with agriculture tools	1	BRS–DARS	Y1
Pesticide Sprayer	1	Kachele Club-Salima	Y2
Office equipments: Computer, tables and chairs, video camera, projector, printers, etc	1 desktop and 3 laptops, 1 video camera, 1 projector, 2 printers	CIP office at Bvumbwe	Ys 1–3

* 20 drip irrigation kits were missing in Malawi (between Kamuzu airport and clearance agency) when receiving the boxes from USA this year.

11. LESSONS LEARNED AND DISCUSSION

11.1 Establishment of the 1-2-3 Seed Systems through Partnership

Some challenges were noted before the Rooting out Hunger project was launched:

- Malawians preferred white- or yellow-fleshed sweetpotato, not OFSP
- White- and yellow-fleshed sweetpotato varieties were predominantly grown in the country
- 59% of children under 5 years were deficient in vitamin A
- Planting materials in the onset of rain season were scarce
- The quality of planting materials was poor
- The average yield was low— 6 t/ha
- There was no proper seed system.

To overcome these challenges, a number of priorities were set. TOTs on seed multiplication (Table 5), building up the 1-2-3 seed systems, building the capacity on the national research program—in this case, BRS–DARS—meetings with IPs, and sensitization and awareness creation campaigns on the importance of the OFSP were carried out in Y1 of project implementation (1 Oct. 2009–30 Sep. 2010). It took one year to establish a 1-2-3 seed system because of the uni-modal rain pattern in Malawi. Primary multiplication was built up at BRS; meanwhile, the secondary and tertiary multiplications were set up in four districts: Dedza, Zomba, Phalombe, and Chikhwawa (Fig. 1).

Good communications among the IPs was one of the important tools in managing the project. Working in partnership has proved a success in managing the project. All the IPs (e.g., DARS, DAES, CU, MVP, and CADECOM) have actively monitored the OFSP vine situation at the multiplication sites. In the midyear report of Y1 in April 2010, the number of beneficiaries could be reached was 3,819 HH. This was five months after the project was launched. By comparing with the initial target written in the project proposal of October 2009, there was an increase of 2,819 HH. This progress indicated a strong commitment of project management. In the annual report submitted in September 2010, 7,097 HH were reported to have registered as beneficiaries for 2010/2011 rain season. The assurance of this figure was due to having an adequate supply of OFSP planting materials being established at multiplication sites of primary ("1"), secondary ("2"), and tertiary ("3") seed multiplication (Fig. 2). Furthermore, results from a number of meetings and sensitizations about the importance of OFSP for the health with local leaders, farmers, and DAES staff contributed to the increase in numbers of people who became interested in growing OFSP. Again, the good partnership significantly played a role in the success of conducting the awareness creation campaign in October 2010, a month before the first showers came. This campaign was strategized in a correct time for the correct target audiences. By November 2010, there was an increase of 3,772 HH beneficiaries to make a total of 10,869 beneficiaries who received subsidized vouchers from Y1 budget and grew the OFSP for the first time. These HH beneficiaries were the first mass distribution of OFSP through a partnership (see Fig. 7).

11.2 Evidence of Adoption of OFSP in Malawi and Its Impacts

Y1 of the project focused on setting up strategies and building capacity. We could not make use of the rain season of 2009/2010. There were 1,000 beneficiaries targeted in the project proposal. No OFSP planting materials were available. The seed systems were unclear. A number of priorities

were set up, including building up the 1-2-3 seed systems, capacity building on trainings, strengthening the capacity of BRS, sensitization, selection of multipliers, conducting awareness campaign on the importance of OFSP, and selection of beneficiaries to receive the OFSP planting material. By September 2010, 7,097 HH beneficiaries were interested in and registered to grow OFSP in the rain season of 2010/2011. In truth, the number became 10,968 beneficiaries to have received subsidized vouchers and all of them planted the OFSP (i.e., an increase of 3,871 HH). The increasing numbers were due to awareness creation campaign conducted in October 2010. In the rain season of 2011/2012, this number was tremendously enlarged and doubled. Furthermore, multipliers were able to sell the OFSP planting materials to various organizations (non-voucher scheme) and this increased the number of households growing OFSP in the 2011/2012 rain season. The increasing number of beneficiaries could be evidence of high adoption rate on OFSP in Malawi. Figure 15 shows evidence clearly.

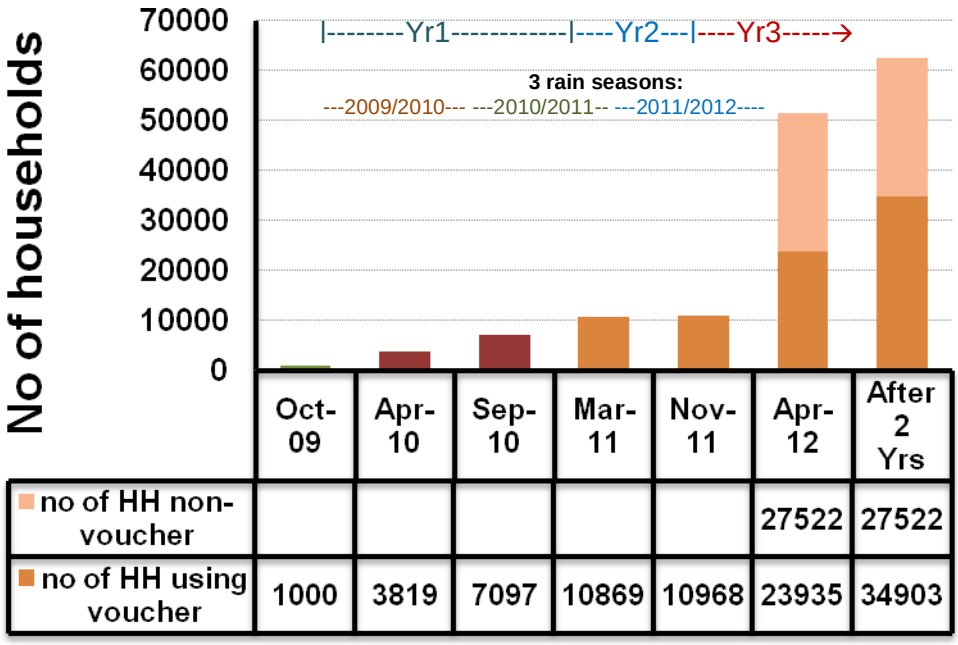

Figure 15 Number of HH beneficiaries projected in the proposal (green graph; ref: project proposal, Oct. 2009). Estimate of HH-based availability of OFSP planting material during the process of establishment of the 1-2-3 seed system (dark red graphs; ref: CIP reports in 2010—i.e., Apr. and Oct. 2010); achievement during the 2010/2011 and 2011/2012 rain seasons (dark orange graphs) (ref: CIP reports in 2011—i.e., Apr. and Nov. 2011); and the total beneficiaries after 2 years of project being implemented, including the numbers from the non-voucher scheme (light orange graphs; to date).

The evidence of high adoption would significantly give some impacts on numbers and types of training. In the beginning, we focused only on seed multiplication. Later, we included postharvest handling and OFSP processing. The diffusion of information has been broadened. This could be through radio programs, farmer-to-farmer talk, awareness campaign, and brouchures. It resulted in more organizations wanting to join the project and implementing the OFSP program in Malawi. An increase in the numbers of DVMs and districts also occurred. For instance, the number of districts was 4 and it is now 15. The impact of larger numbers of DVMs and IPs could be significantly accelerating the achievement of reaching the project's target. After the 4.5-year program, the project aims to reach 70,000 HH beneficiaries to have grown OFSP and generating income from

OFSP sales. There is an indication that farmers could generate incomes through non-subsidized vouchers of selling their OFSP vines.

Figure 16 explains the increased numbers and types of training, organizations and farmers, and DVMs as evidence of adoption of OFSP. Many farmers want to be OFSP multipliers as we can see from the graph. In Y1 (2009–2010), the graph is increasingly sharp. This was due to the effort of IPs to speed up vine production to reach the target by the 2010/2011 rain season that was accidently fallen under Y2 project implementation. In Y2, the slope is slighter but shows the interest of many farmers to be multipliers. In Y3, the slope rises again. This was due to having more partners who wanted to join the Rooting out Hunger OFSP project. Consequently, a number of trainings should be conducted. It means more funds were used to get the training done.

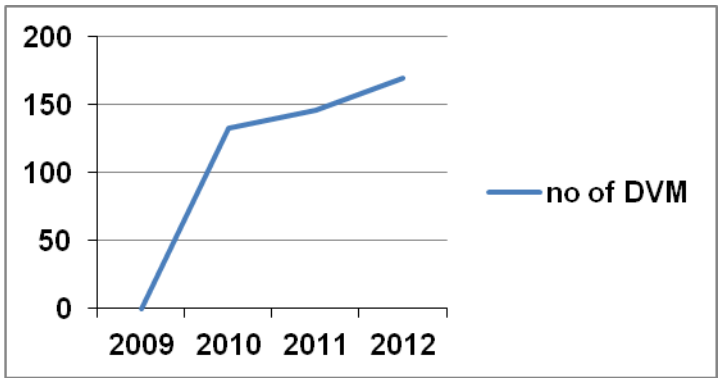

Figure 16 Increased numbers and types of training, organization, and lead farmers and DVMs over time.

More impacts were noted along with some stories:

- A high demand of OFSP planting materials has created additional incomes for multipliers who could sell the vine cuttings. On 2 July 2012, we received wonderful news from Dr. Felistus Chipungu, a coordinator for Horticulture, Ministry of Agriculture, who is leading the team on sweetpotato vine distribution for affected beneficiaries from dry-spells catastrophe: Chikhwawa OFSP multipliers have sold out all their vines. So, the team had to seek sweetpotato vines from Mulanje and Zomba to be distributed to Chikhwawa and Nsanje districts. It was reported previously that the incomes from selling the vines were used for paying the school fees, changing the roof from grass to iron sheets, changing the walls of a house from muddy walls to bricked walls, purchase of water pumps, etc. (CIP 2011a, b; IFPRI 2012).
- Project activities are now in the 15 districts and is reaching more than 50% of 28 districts in Malawi. The project area has scattered in the 22 Extension Planning Areas. The 15 districts are situated in the three regions of Malawi (northern, central, and southern). Through a good partnership and proper project management, there is evidence in accelaration of the OFSP dissemination throughout the country. It means we can reach many Malawians to have grown OFSP. In the long run, it helps reduce the number of children under 5 struggling with VAD.
- In the districts of Dedza, Zomba, Phalombe, Mulanje, and Chikhwawa, people have already realized the importance of eating OFSP and to include it in their daily diets. The same is reported from the lead farmers and local leaders came from Mzimba, Kasungu, Dowa, Salima, Lilongwe, and Dedza. Some started selling the products in the market, tea room, offices, and so on. The change of behavior from eating nsima trice to eating OFSP in the daily diet might slowly occur. Hence, a case study through conducting M&E is now about to begin. CIP has just recruited two Malawians to work on marketing/value chains and M&E.

12. PARTNERSHIP MODEL BEING EXPERIENCED BY THE ROOTING OUT HUNGER PROJECT MANAGEMENT

In a partnership, parties agree to cooperate to advance their mutual interests. In the Rooting out Hunger project management, CIP is in partnership with relevant government departments, NGOs, and farmer groups and farmers' union in order to manage this project.

All partners are committed to the success of OFSP program in Malawi. This could be explained from the results recorded from the dissemination of OFSP planting material. After two years, we reached 62,425 HH who grew sweetpotato through subsidized voucher and non-subsidized voucher scheme. As stated in the project proposal, our target is to reach 70,000 HH by April 2014. Thus, in just two years, the project has achieved 89.2% of the target meant for 4.5 years. The IPs like MVP and CU-Mulanje were actively finding the markets to help their multipliers generate incomes from the vine sales. Another explanation was on TOT. The first training was organized by the Rooting out Hunger project. This TOT was at first mostly attended by NGOs, government extension staff, and the lead farmers. Next, the IPs took the responsibility to conduct TOT at the community level. With this strategy, one trained trainer should train another 5–10 people. This could be an effective tool to reach many Malawians to have trained in a relatively short period of time. As seen in Table 5, 4,075 people were trained for sweetpotato production and multiplication, pests and diseases, and postharvest handling and OFSP processing. Two or three days of training, including practical training, were needed. With a good partnership, this training could be done smoothly and the objectives of the training could be achieved according to the plans. Furthermore, all partners were involved in the planning, evaluation, and other meeting relevant to the project's activities to have been implemented. Visits and telephone and email communications were included in the routine work done. Good communication *always* plays an important role in this teamwork. Updates about the progress on each other is met.

The first annual planning and evaluation meeting was held in Mangochi in December 2010 (Fig. 17 left) and the second one in October 2011 (Fig. 17 middle). In this meeting, Dr. Mary Shawa (pink suit and wrapped by the OFSP promotion material) was the guest of honor since the project aligned with the "SUN 1000 Special Days" program. Mr. Blessings Botha of Irish Aid was on the right side of Dr. Shawa. The latest meeting, on 10 April 2012, discussed marketing and value chains. Irish Aid representative, Mr. Botha, was also present. In the picture, we can see him holding a microphone with white shirt. This was a round table management meeting (Annex 1).

Figure 17 Partnership meetings.

We have applied three models of partnership involved in the project with mutual interest in the dissemination of OFSP in Malawi. These are:

- Model 1: Partnership with a contract agreement and receiving subgrants: CU (Dedza, Phalombe, and Mulanje projects) and CADECOM, MVP, and WALA-CRS (the letter of agreement is still in process; the delay is at the CRS office).
- Model 2: Partnership without a contract agreement and with no subgrants: FAO, FUM, and Kachele Club.
- Model 3: Private-sector partnership: Universal Industries Ltd (UIL) and individuals who are interested in a business.

In Model 1, all IPs were also using the subsidized voucher to disseminate the OFSP planting material, except WALA-CRS who just joined us this year. In Model 2, the partnership happens to be without a contract agreement. They have their own way of disseminating the OFSP but share the same objectives of using the OFSP for food and nutrition security and generating incomes from OFSP sales. Because they just started this year, they have not had experience with the dissemination of OFSP. The Rooting out Hunger project is giving a guidance to work on it. However, the project will not provide funds for redeeming the subsidized vouchers to the multipliers if they are following a voucher strategy that was used in Model 1. Kachele Club is a "grass-roots level" of farmers' club. The Rooting out Hunger project gave this club some supports when it inquired (Table 14). The club has developed well (Fig. 10) and has wonderful plans (Annex 4). FUM focuses on the nutrition awareness of the OFSP products. FAO is interested in food and nutrition security contributed by the OFSP crop. In Model 3, the partnership is at the level of commercialization. This includes UIL and individual farmers who are interested in investment based on a commercialized orientation. UIL is experienced with working on Irish potato. A number of private sectors have approached us and wanted to join the OFSP programmed for Malawi. All of the three models will be investigated. At least after two years we might draw a conclusion to answer the question: Which one can be the best for a seed system strategy in Malawi and more sustainable?

13. SMALL-SCALE BUSINESS

The OFSP processing training module includes the promotion of a small-scale business, and generating incomes from OFSP activities is one of the project's objectives. Participants were given simple bookkeeping by the end of the training. Testing of selling the OFSP products was done by groups of farmers in Zomba, Phalombe, Mzimba, and Kasungu during the field day. The farmers were successful in selling their products.

In Zomba and Phalombe, a number of people have started doing business by selling doughnuts, buns, OFSP juice, and others in the markets. Also, the female farmers' group from Zomba sold some OFSP products to various offices. Further investigation should be done in this area. A student from Ireland has shown her interest in coming to Zomba and Phalombe by 11 July to start a case study for her thesis work. Furthermore, we have two newly recruited staff from Malawi who are working on marketing and value chains and M&E. The Rooting out Hunger project will share the costs of hiring these staff with the Irish Potato project.

14. PARTICIPATION IN FORA

14.1 Participation in the meetings and conferences

Promoting OFSP is one of our tasks. The Rooting out Hunger project management is actively participating in a number of fora either at the national or international level. Oral presentation using PPT, posters, abstracts, flyers, brochures, and OFSP products were always prepared and displayed. All was about OFSP activities in Malawi through our project. For example, in September 2011, project management has participated in giving the "keynote presentation" during the conference organized by IFPRI in Lilongwe. The theme of the conference was "Unleashing agriculture's potential for improved nutrition and health in Malawi" (Annex 5). Also, we participated in the National Export Strategy Workshop organized by Irish Aid (Annex 6). Every year, one IP was financially supported to attend conferences or meetings. This year, it was Mr. Gracious Mjengezulu from CU based in Mulanje who participated in the Sweetpotato Support Platform (SSP), organized by CIP in Nairobi. Figure 18 shows the stand of Rooting out Hunger project during the meeting. In September 2012, project management will participate in the International Society for Tubers and Roots conference in Nigeria. An abstract was submitted and accepted by the conference committee.

Figure 18 The Rooting out Hunger stand at SSP meeting in Nairobi: 7–8 June 2012 (left) and IFPRI, Lilongwe, on 26 September 2011 (right).

14.2 The right time to the right people in the right place

A number of field days were organized by IPS CU in both Dedza (Fig. 19) and Mulanje (Fig. 20) projects, BRS–DARS (Fig. 21), and MVP (Fig. 22). CIP, through the Rooting out Hunger project, participated and backstopped the necessary components related to the events. Furthermore, we were actively participated in expositions in Malawi to promote the OFSP and the importance of this crop for us. Figure 23 shows the visit of Irish Aid team to the Chitedze Research Station in Lilongwe.


Figure 19 Ireland's Minister of Trade and Development visited OFSP farmers' fields on 14 June 2011 in Dedza District (left). Mr. Jo Costello, Ireland's State Minister for Overseas Development and Trade, tastes the OFSP chips promoted by Rooting out Hunger project at the field day organized by CU in Dedza, Feb. 2012 (right).


Figure 20. During the open day organized by CU-Mulanje, the District Commissioner of Mulanje (with green head and jacket in the center) was the guest of honor, in April 2012.

Figure 21 Value chains from OFSP promoted by the Rooting out Hunger project at the visit of Deputy Minister of Agriculture of Malawi at BRS. In the photo, Dr. Felistus Chipungu, the CIP counterpart, explains one of the products to the minister.



Figure 22 During field days in Zomba, organized by MVP, Minister of Agriculture visited in November 2011 (left and middle) and Minister of Local Government of Malawi in March 2012 (right).

Figure 23 An Irish Aid team from Ireland visits Chitedze Research Station. The Rooting out Hunger project management participated in exposing all of project activities to the visitors, in the beginning of this year.

On July 2012, the local government of Salima District organized a field day at the Kachele Club's community garden. The Deputy Minister of Agriculture was the guest of honor. The Rooting out Hunger project participated. The farmers from this club just completed their OFSP processing on 27 June 2012. During the training, we also trained them on small-scale business from OFSP products. So, we supported them in selling some OFSP products, like OFSP chips and chicken, *mandazi*, porridge, juices, and one mix-pot meal (Fig. 24).

Figure 24 Dr. Erna Abidin (wearing the Rooting out Hunger promotion cloth) briefly explains the project to the new Deputy Minister of Agriculture (red shirt with black suit; left). Kachele Club was selling the OFSP products (left and right; photo taken on 5th July 2012).

Demand for OFSP products was high, and within a short time, the products were sold out. From OFSP chips and chicken sale, the Kachele Club realized a profit of Mk 80 (30 cents) per portion. The price of chips and chicken per portion was Mk 150 (57 cents). *Mandazi* sold for Mk 25 (10 cents) per piece for a profit of Mk 10 (4 cents). Farmers were very excited to have this experience. This indicates that the OFSP project is contributing to poverty alleviation besides food and nutrition security in Malawi. There is a need project M&E. Our M&E specialist will start work by 9 July 2012.

15. GENDER

Gender has essential importance in the Rooting out Hunger project activities and is clearly stated in the overall objective of the 4.5-year project. Both female and male farmers should be equally involved in the trainings, meetings, and implementation. Our target areas are rural poor people, where most female farmers are illiterate. This is a challenge when having to collect their opinions using a questionnaire. Thus, the participation of men also plays its role in all events. For training, we recorded more male participants than female. As seen in Table 5, 47% females and 53% males

participated in various trainings, out of a total of 4,075. If we look at the data of Table 1 (DVMs), in the 2010/2011 rain season, the number of multipliers was 48 females and 52 males 52. In 2011/2012, the number of female multipliers had decreased to 38 while the number of males had increased to 62. But the number of HH beneficiaries who received the 300 OFSP vine cuttings tells a different story: in the 2010/2011 rain season, the number of female beneficiaries was 5,562 HH and males 5,406—roughly equal. Then, in the 2011/2012 rain season, the number of female beneficiaries increased tremendously, to 15,168 HH., and the number of male beneficiaries was 8,767 HH (footnote to Table 4). The IPs have tried to make gender participation equal in the project.

16. CONCLUDING REMARKS, GAPS, AND CHALLENGES

The Rooting out Hunger in Malawi project is very dynamic. In Y3, the project has expanded the implementing areas in the 22 EPAs of 15 districts in the three regions (southern, central, and northern). After two years, we have disseminated the OFSP vine cuttings to 62,425 HH, or 89.2% of the target when the 4.5-year project ends in April 2014. The number of HH beneficiaries for Y3 project implementation is yet to be included by November 2012 when the first showers come as an indication of the 2012/2013 rain season. IPs (CU, MVP, and CADECOM) are currently busy with the registration of the beneficiaries to receive subsidized vouchers, and other partners will disseminate the OFSP based on their own strategy. The DVMs have been established in the 15 districts. At this moment, we have recorded all together 169 DVMs (28.04 ha). The new IPs scattered in the new 10 districts are still establishing more numbers of multiplication sites to fulfill their farmer beneficiaries targeted this coming rain season. Data will be compiled from them and will be reported in the 2012 annual report.

A 1-2-3 seed system is used and this was established in the first year of project activities. This 1-2-3 seed system fits with efforts to grow sweetpotato in Malawi, which may be grown throughout the year. However, pests and diseases present a challenge. We have considered it when setting up this strategy on the seed system. Training on pests and diseases was also conducted and the crop protection module is included in the training manual. The Chichewa version on pests and diseases in the module is yet to be developed. Gaps are seen here. We need to set up some demonstration trials on pests and diseases so farmers could learn about them by observation. This needs to be requested in the next set of project activities for Y4.

Frost is being experienced in Dedza and Dowa and probably in some mountainous areas in Malawi. We had a challenge in Dedza on seed multiplication when frost damaged the sweetpotato crop last year. It might happen in Dowa as well, as we have now expanded the project to this district. Triple S could be a solution to keep planting material away from frost problems. Farmers in Dowa also suggested covering the sweetpotato nurseries with plastic. This could be possible using a method of constructing a small tunnel all over the secondary multiplication plot. This could be a gap that needs our attention. Hence, a number of demonstration trials in Dedza and Dowa, and other mountainous areas like Mulanje, should be included in the Y4 project proposal. The trials can be set up at the DVM sites.

The primary multiplication managed by DARS will expand to another seven sites, including central and northern Malawi. They have received some funds from Irish Aid this year. This fund is separately accounted for and is not through the Rooting out Hunger project budget. Once the

primary multiplication has been established, dissemination of OFSP will reach many more Malawians. The DVMs and mass distribution in partnership with the private sector may be strengthened more to the central and northern region of Malawi. This will be laid out in the Y4 project proposal.

We still need to focus on nutrition education and communication activities in Y4, particularly with partners of Model 1, except for WALA-CRS. WALA has joined the project in January 2012. Others have already had their experience with the project for almost three years.

Some other gaps that the project needs to focus on in Y4 are small-scale business, market orientation, and value chains. The new marketing specialist plays important role in finding markets and giving some training on a simple bookkeeping for farmers. Meanwhile, the new M&E specialist will work on the evaluation and monitoring all the activities that have been done in the last two years. From the M&E work, we will gain more information on the impacts of the project. In Y4, the two specialists will prepare the work plan and budget. It is likely that we will need more funds in Y4 to achieve some excellent results on OFSP activities in Malawi. In fact, the Rooting out Hunger project has significantly contributed to food and nutrition security and poverty alleviation.

17. FINANCIAL REPORT

The detailed financial report is reported separately for submission with this technical report.

18. REFERENCES

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