

# Irish Aid Visit Report

Maputo, October 30, 2012



## Main visitors

1. Cait Moran (Director of Thematic Sectors and Special Programmes at Irish Aid HQ)
2. Palmira Vicente (Irish Aid in Mozambique)

## Objectives of the visit

1. Understand CIP's Mozambique broad work, including the progress made by the Niassa Irish Aid funded project
2. Capture some key lessons on the process of the implementation of Niassa project

## The agenda of the visit

Table below shows the agenda of the visit.

Time	Topic	Responsible
9:00	Arrival of Irish AID Delegation at IIAM(Irish Aid Director of Thematic Sectors and Special Programmes)	Maria Andrade/LigiaLanga
9:05-9:15	Opening with an introduction of CIP Mozambique	Maria Andrade
9:15-9:25	Small introduction to Irish Aid project in Niassa	Benjamin Rakotoarisoa
9: 25-9:30	A brief update on the baseline survey in Niassa	Abdul Naico
9:30-9:35	A brief update on RAC and collaboration with HKI Tete	ElijahMunda
9:35-9:40	A brief introduction of IIAM breeding program	Jose Ricardo
9:40-10:00	Tour to tissue culture laboratory	AdiliaViegas& Elisabeth
10:00-10:30	Tour to the screen house facilities	Maria Andrade/Jose Ricardo
10:30-10:45	Visit to quality laboratory	Joao Jeque/Mariana Luabo
10:45-11:00	Visit to the kitchen and taste test of some delicious sweetpotato product	Mariana Luabo/Adilia Viegas/Irene Souza

## Means of verifications

### 1. Hand-out on the CIP's role and important accomplishments

A summary of 8 pages on the main activities CIP and partners have been conducted was prepared and shared with the visitors. The summary comprised a brief rationale of CIP and projects, the breeding/seed system activities, focusing on the most important achievements in terms of varietal release and vine dissemination; and the highlights on the marketing and agro-processing activities coordinated by CIP and projects. Annex 1 presents the complete Hand-out shared with the visitors.

### 2. Power Point Presentations on the progress made by CIP so far

The first activity was the presentation made to overview on the most important activities and progress that have been accomplished by CIP and partners. In total, five presentations were carried out:

- a) Overview of CIP in the context of national and regional coverage (Maria Andrade)
- b) Introduction to Irish Aid project in Niassa, focusing on the progress and accomplishments up to date (Benjamin Rakotoarisoa)
- c) A brief on the monitoring and evaluations, focusing on the baseline related activities and the way forward (Abdul Naico)
- d) A brief update on RAC and collaboration with HKI Tete (Elijah Munda)
- e) A brief introduction of IIAM SP breeding program

After the presentation, the visitors shared their points of view and ask some questions related to the programs and activities that have been conducted. The first question was on the methods and parameters in place to identify potential beneficiaries within the communities in Niassa province.

The answer was by Benjamin (Fig. 1), and confirmed that the beneficiaries are usually identified in coordination with local partner who have been working in other food and nutrition insecurity mitigating programs, such as Progresso, Diocese and UCA. These partners provided the number of their respective beneficiaries and the localities. Two institutions at the same localities are subject to make a good coordination for the implementation. It was insisted that the beneficiaries are normally those vulnerable households with minimal conditions to grow sweetpotato.

**Figure 1.** Benjamin explaining the audience on the most important aspects taken into consideration when picking the beneficiaries in Niassa



The second question was on the criteria used in Niassa, or normally used when setting up an on-farm trial or when establishing sweetpotato plots in the communities.

Once again, Benjamin and Maria replied saying that the process of identifying and sensitization of local potential farmers is led by the local agriculture authorities and extension agents, who, know best the farmers willing to embark and cooperate in such breeding related activity. However, the farmers and the sites for the on-farm trials on December 2013 in the 3 new districts are already selected in September and the actual field identification confirm the farmers' commitment if they already prepared the land.

One of the constraints mentioned by Benjamin in implementing the project in Niassa was the relative high susceptibility of the soils to erosion due to slash and burn which not only lower the soil fertility but also causes soil erosion, and the last question was how the project is coping with this problem to avoid bottlenecks during the implementation of the project.

The answer was that the project is taking this situation as an opportunity to invest in techniques that could mitigate the problem while enhancing the sweetpotato productivity. So far, on-going works on the use of compost matter during the establishment of sweetpotato plots is highly regarded by CIP and local authorities as the biomass as raw material for natural compost is highly available in Niassa province before the slash and burn period.

### 3. Visit of the IIAM tissue culture laboratory

Right after the presentation, the visitors were guided to the tissue culture laboratory. The objective was to show one of the most important steps in the seed systems, as the lab facilities have been used to generate clean planting material that have been used for a broader multiplication and dissemination programs. Figure 2 shows some of the moments during the visit conducted to the tissue culture laboratory, led by the head of the laboratory, Eng. Ricardo Macia.



**Figure 2.**View of some of the moments during the tour conducted to the tissue culture lab,



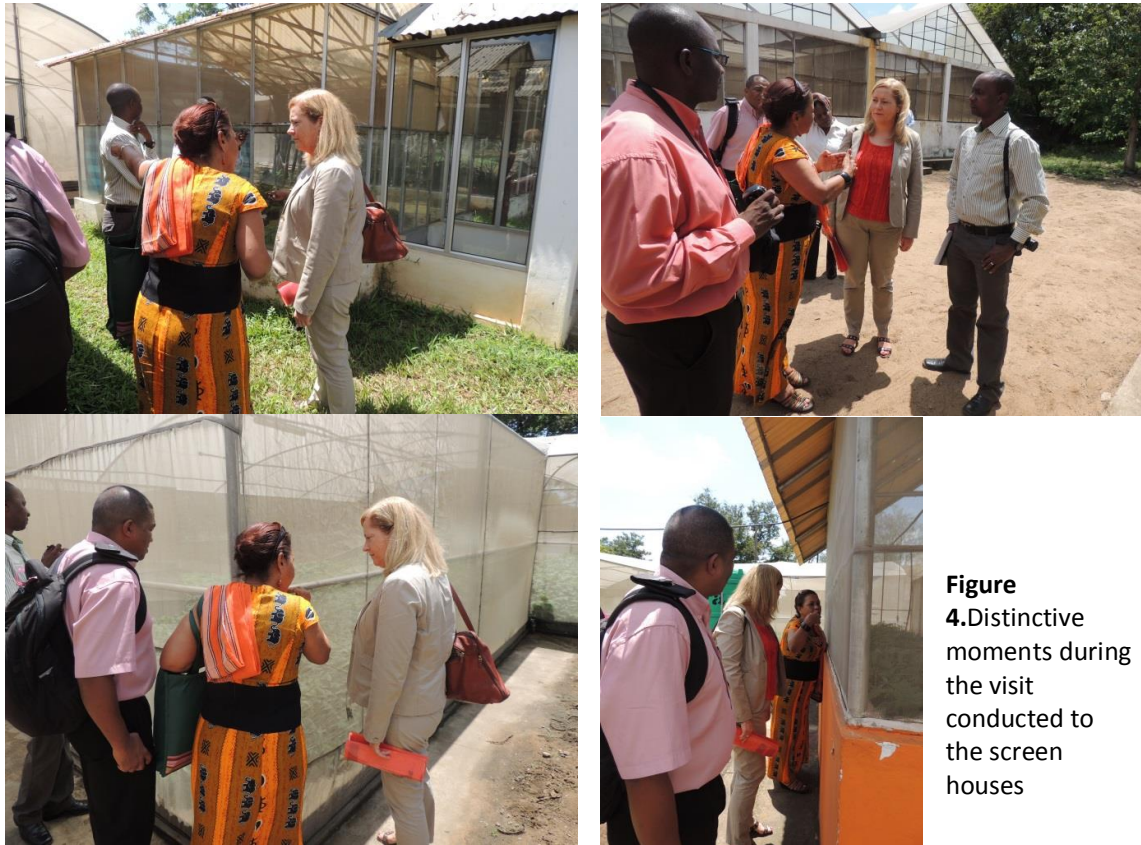
#### 4. Tour to the screen house facilities

The third stage of the visit was conducted in the screen house facilities. As usual, the visitors were briefed by Maria Andrade (Fig. 3) on the most important activities going on in the screen houses and affiliated.

**Figure 3.** Maria Andrade during the introduction to the screen houses activities



The explanations continued throughout the tour of the 12 screen houses managed by CIP, as testified by the images in Figure 4.



**Figure 4.** Distinctive moments during the visit conducted to the screen houses

## 5. Visit of the quality lab

After the visit of the screen houses, the visitors were invited to the quality laboratory, where all work on quality assessment of the sweetpotato clones takes place. After a brief introduction (Fig. 5) of the main activities in the quality lab, the visitors were escorted to the sample processing room, and then to a quick demonstration on how to scan the samples in the NIRS machines (Fig. 6) with very confident results on quality traits.



**Figure 5.** Maria Andrade and João Junior briefing the visitors on the main activities conducted in the quality laboratory



**Figure 6.** João Junior, the NIRS technician explaining the procedures for quality data analysis using the NIRS machine



## 6. Taste test of sweetpotato products

Several products, including cheese cake (Fig. 7), bread, jam, juice, sweetpotato cooked leaves (with peanut), sweetpotato soup (Fig. 8), this one an innovation, and other sweetpotato recipes were tested by the visitors during the taste session conducted in the varanda of CIP kitchen.



**Figure 7.** Sweetpotato cheese cake, by Irene de Souza



**Figure 8.** Sweetpotato soup, by Mariana and João from CIP-Mozambique

Participants had the opportunity to taste and receive explanation on how to make the different products displayed during the taste session. Figure 10-11 show some of the participants during the taste session. The visit ended with the appreciative speeches by the main visitor, Cait Moran, who acknowledged the effort that have been made by CIP and partners to increase the use of OFSP in the country and region.



**Figure 10.** Visitors tasting the new delicious and unanimously acclaimed sweetpotato soup



**Figure 11.** Different instants during the sweetpotato taste test session conducted at the CIP Kitchen, IIAM, Maputo, October 30, 2013





## **Introduction**

In Mozambique, sweetpotato is one of the most important food and cash crops. In general, it ranks third in production, after maize and cassava. The government of Mozambique selected sweetpotato as one of the most important crops for mitigating food insecurity and malnutrition among its 21 million people.

Mozambique was nominated to host the Sweetpotato Support Platform for Southern Africa because of being able to build on the good, existing collaboration between CIP, the Agrarian Research Institute of Mozambique (IIAM) and development partners. In Southern Africa, the breeding program under the Sweetpotato Action for Security and Health in Africa (SASHA) project emphasizes the development of drought-tolerant, beta-carotene-rich parental material that feeds into breeding programs for other Southern African countries. At the present time, Zambia, Malawi, Angola, and South Africa are active members in the platform and direct beneficiaries, and in addition, clones are provided to Madagascar and several other countries in East and Central Africa and West Africa breeding platform.

Under the broader Sweetpotato for Profit and Health Initiative (SPHI) that seeks to reposition sweetpotatoes in food economies of Sub-Saharan Africa countries to alleviate poverty and under-nutrition, the technical capacity supporting IIAM's tissue culture facility has been gradually built, so that Mozambique can serve as the sub-regional center for "cleaning up" virus-infected material and ensuring clean germplasm exchange among Southern African countries. In Mozambique, the USAID bilateral mission is supporting agro-processing and varietal dissemination work which complements SPHI/SASHA activities. From June 2011 to September 2013, OFDA funds were supporting dissemination to over 134,000 households. Additionally, CIP is closely working with the Ministries of Health and Education for the nutrition and market related activities. Starting in 2011, CIP began closely collaborating with Helen Keller International as part of the Reaching Agents of Change Project (RAC). This project is establishing a cadre of Mozambican advocates for OFSP that will enable greater investment in OFSP by government and donors and the establishment of a training course on *Everything You Ever Wanted to Know About Sweetpotato*.

From November 2012, an Irish Aid funded project, a 3.5 year multi-partner initiative "Nutritious Orange-Fleshed Sweetpotato for Niassa" started with the introduction of the new OFSP in four districts. On-farm trials were established and best varieties selected successfully for scale out.

Currently, Mozambique is part of the Scaling Up Sweetpotato Through Agriculture and Nutrition (SUSTAIN) initiative, a 5 years DFID funded project to reach 1.2 million women and 2.4 million children under 5 years of age by 2018. Kenya, Malawi, and Rwanda are also part of SUSTAIN.

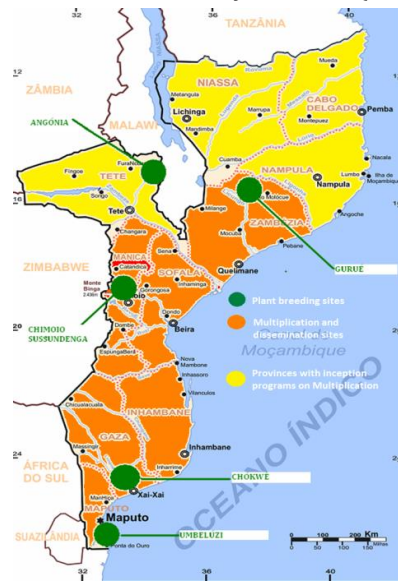
## **Main Activities on Sweetpotato Breeding & Seed Systems, and Capacity strengthening**

Mozambique is a regional platform (Southern Africa) for breeding for drought tolerance and for improving beta-carotene, iron, and zinc content in sweetpotato. The CIP-IIAM varietal development and screening program conducts trials in 4 provinces with distinct agro-ecologies: Maputo (Umbelúzi), Gaza (Chókwè), Tete (Angónia), and Zambézia (Gurué) (Fig. 1). About 349 breeding trials involving 85,529 different genotypes were




established in the last four years. Figure 2 shows one of the advanced yield trial (AYT) established in Gurue.

**Figure 1.** Map of breeding sites



**Figure 2.** View of the AYT of 16 clones established in January 13, 2012, in Gurue, Zambezia province

 Building upon breeding work that started with Rockefeller Foundation funding in 2006 and continued with AGRA then SASHA support, CIP Mozambique has been introducing a new way of breeding sweetpotatoes by combining different breeding methods:

1. ***So called “accelerated breeding”*** in which we multiply new breeding lines in the screen-houses, glasshouses, and irrigated fields and use more sites at earlier stages in the breeding cycle to substitute for fewer sites over longer periods of time. This enables the time for varietal development to be cut down from 8 years to 4-5 years. As part of this program, 15 green houses with breeding material were established at IIAM headquarters in Maputo (Fig. 3 and 4).



**Figure 3.** Seedlings from the controlled crosses growing in the screen houses 1 and 2 (IIAM-Maputo)



**Figure 4.** Potential clones in conservation in the field at IIAM headquarters in Maputo

**Fifteen new, more drought-tolerant orange fleshed sweetpotato varieties were released in February 2011, the first varieties ever released using the accelerated breeding approach.** These varieties are now being multiplied in the research stations, in the local communities via trained de-centralized vine multipliers (DVM) (Fig. 5), and in collaboration with prominent commercial farmers (Fig. 6).

**Figure 5.** View of one DVM plot (variety Irene) belonging to Mr. Ivo Eurico Mutine; established in Gurue, Zambezia



**Figure 6.** View of 6 hectares established in collaboration with LOZANE Farm, a commercial farm in Boane district, Maputo province

The idea of investing in identifying and training DVMs is to create a network of multipliers that will provide local communities sustained access to quality planting material. Local agricultural authorities and NGOs collaborate with the DVMs in the distribution process. To date, 278 DVMs have been established in the country, and more than 341,000 households received the new drought tolerant planting material through OFDA dissemination Project and USAID Bilateral. The main characteristics of the varieties are presented in Table 1. Figure 7 shows the storage roots of some of the 15 released varieties, and a vine distribution day in Manhiça, Maputo province. Average rainfed yields are around 15-20 tons/ha depending on the region. However, these varieties under high input conditions (fertilizer and irrigation) can reach 40 tons/ha.



In October 2013, 4 multilocation trials (purple flesh clone, best bet orange, dual purple) planted to target variety realease in 2014 and 2015. These materials are more adapted than the previous one.

**Table 1.** Distribution and characteristics of the new 15 improved OFSP varieties bred in Mozambique under rainfed conditions and no fertilization

Name for Distribution	Clone with Wide or Specific Adap-tation	Virus Symptoms (1=none to 9=severe)	Vine Vigor (1=Not vigorous to 9=Very)	Com-mercial Root Yield (tons /ha)	Total Root Yield (tons /ha)	Total Vine Yield (tons /ha)	% of Dry Matter Content	Beta-Carotene (ug/g of fresh root)	Taste (1=Very Bad; 5=Excel-lent)
Bela	Wide	1.5	5.4	16.6	22.5	23.0	27.5	84	3.6
Namanga	Wide	1.5	5.6	16.6	25.9	19.3	27.0	84	3.4
Lourdes	Wide	1.9	5.2	13.7	18.3	16.5	25.8	99	3.8
Ininda	Wide	1.4	5.7	12.9	22.2	25.4	29.3	53	3.4
Tio Joe	Wide	1.8	5.1	13.7	20.2	17.1	26.7	103	3.8
Irene	Wide	1.4	5.9	13.1	19.6	20.3	28.8	61	3.8
Melinda	Specific	1.6	5.3	21.1	27.1	24.0	23.6	57	3.4
Sumaia	Specific	1.9	5.8	16.3	21.6	14.9	25.2	77	3.4
Erica	Specific	1.4	5.1	17.2	19.6	16.1	25.6	102	3.6
Ester	Specific	1.2	7.8	14.6	18.6	15.8	29.6	47	3.9
Amélia	Specific	2.1	6.4	9.4	17.3	31.0	32.1	50	4.1
Jane	Specific	1.8	5.7	9.6	17.5	21.2	29.2	56	4.1
Cecilia	Specific	3.2	5.4	17.4	18.8	16.9	26.7	60	3.6
Delvia	Specific	1.1	5.8	17.0	23.4	23.2	32.8	55	3.4
Glória	Specific	1.4	5.5	7.0	14.9	26.8	33.5	54	4.0

\*Means and values are from the pooled data of the 4 locations (Umbeluzi, Gurue, Chókwè, Angonia)



**Figure 7.** View of different storage roots, and the women dancing after receiving vines in Manhica, Maputo province



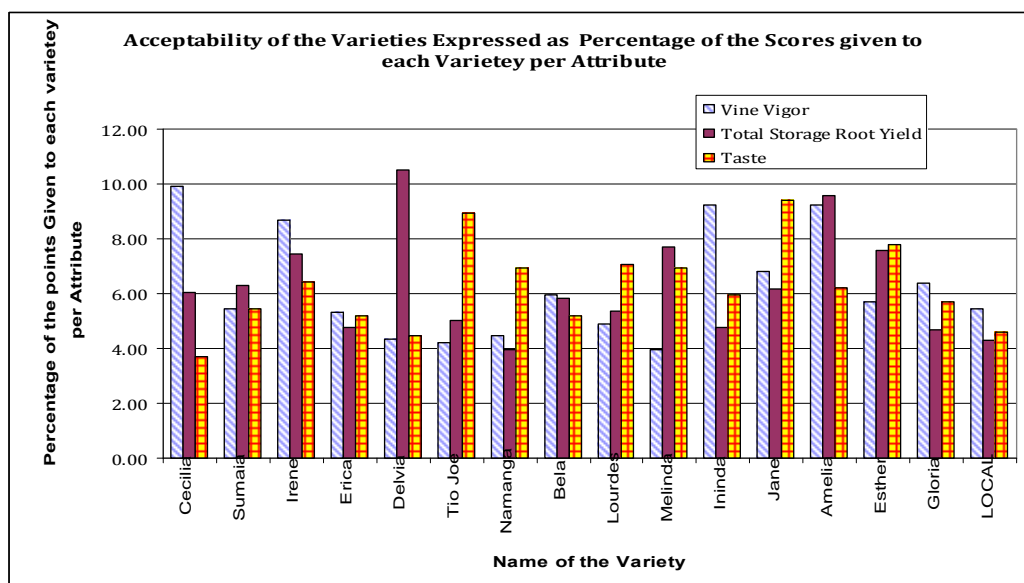
**2. Sweetpotato population development.** Four crossing blocks were established in Umbeluzi, and Gurue (Fig. 8) during the last two years, and more than 528,910 seeds harvested.

**Figure 8.** View of the new crossing block established at Mutelequesse Research Station in Gurue, Zambezia province



Recently, 97,600 seeds harvested during the last two years were distributed to 10 countries, namely Malawi (20,000), Ghana (20,000), Kenya (15,000), Zambia (9,000), Madagascar (8,600), Burkina Faso (5,000), Nigeria (5,000), Ethiopia (5,000), Tanzania (5,000), and Rwanda (5,000). Last season in June 2013 close to 45,000 seeds were distributed to all those mentioned countries and Uganda.

**3. On-farm trials.** In 2010 the focus was on participative testing of the 64 clones from which the new 15 varieties were selected from. From 2011 to 2013, in general, 457 on-farm trials were established and all 15 varieties were evaluated under farmers' conditions. Figure 9 shows the preference scores of the new varieties compared to the local varieties. In general, farmers preferred the new varieties to the local check, and particularly liked Delvia, Amelia, and Melinda.



**Figure 9.** Results of the acceptability assessment of the varieties (pooled data from Umbelúzi, Chókwe, and Angónia) expressed as percentage of the scores given to each variety per attribute (vine vigor, total storage roots yield, and taste)

**4. The use of thermotherapy growth chamber to remove virus from varieties and a new kitchen/laboratory:** A new kitchen/lab and a thermotherapy machine were installed at IIAM headquarters in Maputo. These facilities are considerably improving the capacity of the virologist, post-harvest team and partners in developing new products and services. Furthermore, the thermotherapy machine and virus indexing capacity are enabling IIAM to become a center for diagnosing viruses in Southern Africa and cleaning up of infected material. The Near Infra-red Spectrometer enables the macro- and micronutrient content of a clone to be determined in 2 minutes and is the central feature of the quality determination in the breeding program. Figure 10 shows the new kitchen/lab with the thermotherapy, NIRS, and freeze drier machines. Up to date, about 15,000 samples were scanned and information on Fe, Zn, Bc, sucrose, fructose, glucose for each sample are available.

**Figure 10.** New kitchen and lab at IIAM in Maputo

with the thermotherapy machine, freeze drier, and NIRS machine



The program has also established a screen house and quarantine screen houses (Figure 11) for virus cleaning and indexing (grafting) at IIAM headquarters. The in vitro/virologist technician under SASHA was recruited and has completed all phases of training from a specialist from CIP headquarters. More than 60 clones from farmers in Mozambique has been cleaned (meristem, thermotherapy, grafting, ELISA) and more than 25,000 plants micro-propagated in the last two seasons in the laboratory.

**Figure 11:** The new screen house for virus cleaning and indexing (grafting)



Material from the regions (Zambia and Malawi) were cleaned and repatriated last year.

#### **5. Improve access to new production, storage, and processing technologies through improved marketing linkages**

**Marketing-related activities.** One of the pillars of the program is the promotion and marketing-related activities. Different activities such as field days (Fig. 12) with displays of health planting material and agro-processed products (Figs 13-15), work with



bakeries, participation in workshops and conferences with agro-processed products are undertaken with active local and national media participation to promote the 15 new drought-tolerant OFSP varieties.



**Figure 12.** View of the Field days conducted in Walate and Ambrosio, Maputo province (up), and Sussundenga, Manica province (right)



**Figure 4.** View of the members of Mozambique parliament during the exposition conducted on May 31, in Gurue



**Figure 13.** View of the promotional session of the new 15 released varieties



**Figure 15.** View of the promotional field day conducted at IIAM with one group of dignitaries from the Irish AID, March 12, 2013



A new manual on sweetpotato production (Fig. 16) was released in 2010, and more than 3,800 farmers (63% female) and 750 technicians trained on the multiplication, production, and agro-processing aspects. Most of the technicians were trained on production/DVM related technologies, on-farm trials, agro-processing, NIRS/virology, and data management/Clone Selector/Knowledge portal. Concerning student internships during the last 3 years, one (1) MSc student, seven (7) BSc students and fourteen (14) technical level students were trained under the auspices of CIP-Mozambique.



**Figure 16.** Cover page of the new manual on sweetpotato production launched in July 2010 in Maputo

Two training on *Everything You Ever Wanted to Know About Sweetpotato* with 48 TOT were carried out in the last two years in collaboration with UEM.

**Key Donors:** CIP-Mozambique has been receiving special funds from SASHA (Bill & Melinda Gates Foundation) and USAID. It also has receiving support from AGRA, Irish Aid, DFIS, and the Government of Mozambique.

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