

YIIFSWA-II Newsletter

Quarterly Report on Yam Seed System Development in Nigeria and Ghana

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Participants of the 2nd YIIFSWA-II annual progress review and planning meeting

Highlights:

- YIIFSWA-II project's 2nd Annual Progress review and planning meeting
- Training of partners on:
 1. Foundation seed production
 2. Breeder seed production
 3. Certified seed production
- Going beyond: training of mkpani farmers on seed yam production
- YIIFSWA-II advocacy and gender stakeholder's meeting
- Many more...

The second year of the Yam Improvement for Income and Food Security in West Africa Phase 2 project (YIIFSWA-II) is focusing on establishing the formal seed yam system. Therefore, the infrastructures and capacities of private seed companies and government institutions and organizations will be reviewed. For this reason, the YIIFSWA-II project will

provide technical support for improving the skills and knowledge of seed actors in seed production and quality management, marketing, and distribution to enhance the uptake of the promoted improved varieties. This will enable the seed enterprises to be commercially viable. The following article describes some project activities in this regard.

YIIFSWA-II organizes 2nd annual progress review and planning meeting

The Yam Improvement for Income and Food Security in West Africa Phase 2 project (YIIFSWA-II) organized its 2nd annual progress review and planning meeting from 5 to 8 March at IITA-HQ, in Ibadan, Oyo State, Nigeria.

The meeting was attended by 43 participants from 17 organizations, namely the Bill & Melinda Gates Foundation (BMGF), the International Institute of Tropical Agriculture (IITA), Context, Sahel Consulting, Alliance for Green Revolution in Africa (AGRA), the National Root Crop Research Institute (NRCRI), National Agricultural Seed Council (NASC), National Centre for Genetic Resources and Biotechnology (NACGRAB), Federal Ministry Agriculture and Rural Development (FMARD), Technical Committee on Nigeria Yam Export Programme, Crop Research Institute (CSIR-CRI), Savannah Agricultural Research Institute (CSIR-SARI), Plant Protection and Regulatory Services Directorate (PPRSD), Biocrops Biotechnology Ltd, Da-Allgreen Seeds Ltd, Nwabudo Agro Seed Ltd., PS Nutraceuticals International Ltd, and Heritage seeds Ltd.

The meeting was organized to review the progress over the last implementation year and to plan for the current implementation year.

A significant achievement of the project this year is the presence of four seed companies who have all signed contracts with the project affirming their desire to participate in the production of high-quality, early generation seed yam using the aeroponics system (AS). Two seed companies are currently building their aeroponics facilities and all the companies will be trained on AS production of foundation seeds.

A business case was developed by IITA and Context/Sahel Consulting for early generation seed production using high ratio propagation technologies (HRPT) developed by YIIFSWA. The business case serves to justify and facilitate investment decisions against the risks and the anticipated benefits and savings to be gained from using HRPTs for the production of high-quality seed yam tubers. After considering operational costing and assumptions, the proposed pricing for breeder seed was set at US\$1.20, and foundation seed at US\$0.49, assuming that the project is built on 100% operational cost recovery. A business case has been submitted to the Foundation for review.

After the three-day progress review and work planning, the Senior Program officer of BMGF commended the project for the good start.



Jason Nickerson presenting the achievements of Context on Business development activities in YIIFSWA-II.



Dr Marian Quain presenting on CSIR-CRI's achievement on the production of early generation seed in Ghana.



YIIFSWA-II partners visiting project's multiplication plots in IITA.



YIIFSWA-II partners visiting AS single node vine cutting nursery.

Also, Robert Asiedu, IITA's West Africa hub director, commonly says, 'well done', but I will say great start! We have a good start here. This is a dynamic learning experience. The aeroponics system and the temporary immersion bioreactor that were developed at the last stages of YIIFSWA are at maturity stage. As these technologies continue to be refined we are still learning from things like the micro tubers." He continued, "The success of the project depends on good coordination, especially as you continue to define what an efficient seed supply chain can be. Different market actors rely on the outputs of others. Systematic coordination is critical for seed production to offtake marketers who need assurance that their growers can access new seed. This requires facilitating sustainable linkages—especially with those national partners, NASC, NACGRAB, NRCRI in Nigeria and parallel partners in Ghana—to the private sector. There is a big task ahead, but also an enormous opportunity, so this coordination needs to be a priority" he said.

"You must also continually educate government of the value and business case for increasing the commercialization of yam. It is one thing to keep emphasizing the high value of the crop, but now you must demonstrate that there is a scaling pathway for the seed system. In the past, we have all heard that, yes, it is important and a lot of people eat yam but the lack of a formal seed system has been hampered by a

low multiplication rate. Now we are saying there are some technical breakthroughs in the seed system, offering a new vision for an economically sustainable seed system. Through this, the enormous value can be realized by farmers, while helping to drive agricultural growth at a national level in Nigeria and Ghana" he concluded.

After the meeting ended, Dr Norbert Maroya, YIIFSWA-II Project Leader, guided the participants on a tour round IITA. They also visited YIIFSWA-II facilities and multiplication plots to see the activities on ground.



Updates on the establishment of Aeroponics Systems in Ghana and Nigeria

The scaling out of YIIFSWA's high ratio propagation technologies (HRPTs) to partner institutions and private seed companies is rolling full steam ahead. As of the end of the year 2017, and early 2018, three yam aeroponics facilities had been established in a partner institution and two private seed companies, respectively, in Ghana and Nigeria with support from YIIFSWA-II project.

In Ghana, a facility was established in the Savanna Agricultural Research Institute (CSIR-SARI), Nyankpala, Northern Region with the support of Dr Marian Quain from Crop Research Institute (CSIR-CRI) Fumesua, Kumasi. Construction of the facility began in July 2017 and was completed in December 2017. The facility contains 10 AS boxes and is 100% solar powered although provision has been made for electric power. In the first quarter of 2018, trial planting was done to fine tune processes and address the heat challenge. Heat is a major challenge for yam plants in the facility. Yam plants thrive best at temperatures between 25 and 30 °C but temperatures can get as high as 40 °C in the screen house.

In Nigeria, two facilities were established by private seed companies partnering with the project on the delivery of high-quality seed yam tuber to farmers. In the third quarter of 2017, the commercial seed company PS Nutraceuticals Int. Ltd established an aeroponics system in Ogun State. After the completion of the facility, IITA gave the company 500 hardened plantlets from the temporary immersion bioreactor system (TIBS) in October 2017. Another set of 600 hardened plantlets was given to the company in the first quarter of 2018 to populate the tables within the system.

The second commercial aeroponics facility was established by Da-Allgreen Seeds Limited (DAGS) Kaduna with the support of PS Nutraceuticals Int. Ltd. The company received 500 hardened TIBS plantlets to introduce into their newly established aeroponics system and another 800 seedlings were given to populate the system for foundation seed yam tuber production in June 2018.

However, Biocrops Biotechnology Ltd in Abuja and Nwabudo Agro Seed Ltd in Enugu are yet to establish their aeroponics systems.



Officers of private seed companies learning how to transplant seedlings of single node vine cuttings on the field.



Officers of private seed companies practicing the transplanting of TIBS seedlings in the aeroponics system.



Seed officers learning how to harvest seed yam in the aeroponics system.



Dr Lava Kumar with seed production officers at the training.

YIIFSWA-II trains officers of seed companies on clean foundation seed yam tuber production using aeroponics and single node vine cutting

Developing Nigeria's seed yam system can help to produce quality seed yam of improved varieties and improve the livelihoods of farmers living in abject poverty and with food insecurity, participants at the foundation seed yam production training learned last March. To enhance the skills of officers of private seed companies to produce quality seed yam, YIIFSWA-II hosted a five-day foundation seed yam production training workshop at IITA-HQ, Ibadan, Oyo State, Nigeria. The aim of the training was to introduce or familiarize the officers with and enhance their skills to produce foundation seed yam tubers using the HRPT aeroponic system (AS).

According to Dr Norbert Maroya, YIIFSWA-II Project Leader, "the yam seed system has been underdeveloped for some time now due to the challenges of the crop in research and development. Before the development of the HRPTs, yam was a difficult crop to mass propagate. In the conventional system one plant produces one to three tubers but with the HRPT like the AS, one plant can produce as many as 300 plantlets for tuber production. As a result of these novel technologies we were given a second grant to scale out these technologies to private seed companies who are willing to invest in the technology. Four companies have signed onto the project and

are establishing or have established their aeroponics system. We are training their seed production officers on how to use HRPTs like AS and vine cuttings to produce plantlets or seedlings for the production of quality foundation seed tubers of improve varieties."

The training topics included breeder seedling/plantlet production in TIBS, foundation seed production using AS, daily management of AS, quality management and control, and field production and field management of seed production. The training was conducted by the lead scientists of each component with their team namely Dr Morufat Balogun (TIBS), Dr Norbert Maroya (aeroponics system), Dr Lava Kumar (pest and diseases/ quality management protocol).

Participants said the training was beneficial and would help them meet YIIFSWA-II high-quality seed production objectives. The training enhanced their knowledge of YIIFSWA-II's seed technologies and gave them an insight into its role in ensuring food security.

At the end of the training, the Project Leader, Dr Norbert Maroya, presented certificates to the participants and closed the training reiterating the importance of private sector involvement in the formal seed system. He asked the participants to use the training to boost the production of foundation seed and ensure quality control in Nigeria.

Training of trainers of seed companies on certified seed production using the adaptive yam miniset technique at IITA-Abuja station

The training of trainers (ToT) on certified seed production using the adaptive yam miniset technique (AYMT) was held at IITA-Abuja from 25 to 27 April 2018. The training was organized to train extension service providers of seed companies who will in turn train prospective seed producers on the principles and practices involved in the production of certified seed yam.

The training was attended by 15 participants from the Sahel Consulting, Biocrops Biotechnology Ltd, Da-Allgreen Seeds Ltd, Nwabudo Agro Seed Ltd, PS Nutraceuticals International Ltd, and two other external organizations—Anderson Farms and NASICL

According to Dr Beatrice Aighewi, YIIFSWA-II's Seed System Specialist, "there are two major sources in the seed yam value chain; traditional multiplication, which is more common, and the formal seed system

that supplies high-quality breeder, foundation, and certified seed for distribution. The project aims to strengthen the capacity of seed companies and seed producers at all levels of the seed production spectrum to ensure that quality seed tubers of improved varieties are available and accessible to farmers. After this training the trainers will be expected to train other seed producers and promote the use of quality certified seed yam tuber to farmers".

In the two-day program, the trainers learned how to select healthy mother tubers; cut them into setts; prepare a chemical cocktail for sett treatment; observe health and safety precautions, and land preparation and planting. Hands-on activities in the field facilitated discussions on certified seed production, and record keeping and planning of activities for seed yam production, which were also covered in the training program.



Officers of private seed companies learning how to cut yam setts for planting.



Officer of private seed companies learning how to cut yam setts for planting.



Private seed companies learning how to select healthy yam tubers to cut.



Participant receiving a certificate acknowledging his participation in the training.

Training of Biocrops Biotechnology officer in charge of the temporary immersion bioreactor system (TIBS) for breeder plantlet production



Chinyere cutting single node vines for further multiplication in the TIBS.

Poised with a scalpel in her right hand to cut and forceps in her left hand to hold the plantlets, Chinyere Ogbu carefully cut vines from plantlets for further multiplication in the TIBS.

Chinyere Ogbu, a laboratory technician from Biocrops Biotechnology Ltd, was trained on the production of yam plantlets using TIBS to optimize production at the seed company.

As an agro biotech company in Nigeria, Biocrops had been involved in the production of seedling materials for crops such as sugarcane and through the YIIFSWA-II project it has become involved in the mass propagation of foundation seed tubers for certified seed yam production using a TIBS and the aeroponics system established in YIIFSWA Phase 1.

According to Dr Morufat Balogun, YIIFSWA-II Tissue Culture Specialist, “the role that Biocrops will play in supplying early generation seed yam to commercial seed companies in the private sector is a critical one. During our recent visit to the company’s production center, we noted that the officer in charge of TIBS needed training on the production of breeder plantlets. One of the reasons for this training is to ensure that quality is maintained throughout the production process of breeder and foundation seed tubers to guarantee that quality certified seeds are delivered to yam farmers in Nigeria. This year we are trying to build up stock for commercial purposes. Already demands are pouring in and IITA cannot meet it alone.”

One of the major bottlenecks limiting farmer access to good quality seed yam in Nigeria is the shortage of early generation seed (breeder and foundation) to produce sufficient quantities of certified seed yam. Addressing this gap is critical to the doubling of productivity, growth, and transformation of the yam value chain.

According to Chinyere Ogbu, “the training has been edifying. It was a much-needed training for me particularly the need to keep records of activities for quality control. Thank you for giving me this opportunity. I never thought such a thing could happen to me. I am extremely grateful.”



Chinyere receiving a certificate of participation in the training.

Transforming yam production in Nigeria one community at a time: Mkpani farmers learn about better quality seed production

Yam farmers in Mkpani community, Yakurr Local Government in Cross River State were trained on the miniset technique and good agricultural practices (GAP) for quality seed yam production in March 2018. Although Cross River State was not selected as a beneficiary state of the project, YIIFSWA-II was invited to conduct training on seed yam production because yam is one of the major crops cultivated in the state and farmers are interested in cultivating the crop for export to improve their livelihood.

The training was organized by the Nigerian Export Promotion Council (NEPC) Assistance Office Calabar in collaboration with the leadership council of Mkpani village and All Farmers Association of Nigeria (AFAN) Cross River State chapter. A total of 198 people participated in the training.

During the opening session the representative of the commissioner of agriculture implored the farmers to pay close attention to the training and take advantage of the opportunity given. He stated, "I call on all participants to take full advantage of this program to acquire and adapt the new technologies that IITA is bringing to achieve rewarding and empowering agricultural revolution in Cross River State."

During a discussion session YIIFSWA-II learned that yam is a cash crop in the Yakurr community. Mkpani farmers indicated that they only plant profitable yam varieties like Abang, Pasisi, and Obia. They often intercrop yam with cassava, maize, and cocoyam due to loss of agricultural land and land right issues. They also indicated that they were interested in adopting new varieties that are marketable.

During the two-day program farmers were trained on miniset technology, selection of healthy mother tubers, cutting of minisets for seed production, preparation of chemical cocktails for sett treatment, health and safety precautions, land preparation and planting, and positive selection. A demonstration field was set up for farmers to observe and learn from the training.

An area of interest for the farmers was field layout and resource maximization for improved productivity. During an initial tour of farmers' fields around the community, the team noticed that farmers utilized huge mounds due to the hydromorphic nature of the soil. So, on a 100 m² plot of land farmers had about four to five mounds with an average height of 1.3 m and a circumference of about 8 m, and they only planted four seed tubers in it for ware yam tuber production. So, during the training farmers were



trained on field layout and preparation. They were shocked that on a 100 m² piece of land they could plant 100 seed yams for ware yam production and 400 setts or seedlings for seed yam production. After the field demonstration, Mrs Helen Owokure who provided the land for the practice indicated that she was going to clear the rest of her land for seed yam production.

“Yam can be the next cocoa for West Africa,” says Ghanaian Yam Champion at the YIIFSWA-II advocacy planning meeting



The advocacy and gender mainstreaming team of YIIFSWA-II) under the leadership of Dr Regina Kapinga organized a stakeholder’s meeting to strategize on raising the profile of yam in Nigeria and Ghana, for resource mobilization and on gender mainstreaming in the seed yam system.

The objectives of the advocacy component are to (i) increase awareness of the demonstrated economic contribution of the yam sector to the national agricultural GDP leading to increased investments and prioritization by state, national, regional, international programs, and the private sectors and (ii) increase the opportunities for women to earn income from commercial seed production and distribution.

The following champions were present during the two-day meeting which was held from 15 to 16 May 2018 at IITA-Abuja station: Linda Sasu (Ghana), Ndidi Nwuneli (Sahel Consulting), Perpetua Iyere-Usiahon (FMARD), Anthony Sikpa (Grow Africa -FAGE), Simon Irtwange (TCNYEP), and Malachy Akoroda (University of Ibadan). Also, present were YIIFSWA-II staff from IITA and representatives from partner research institutions: Regina Kapinga, Beatrice Aighewi, Norbert

Maroya, Balogun Morufat, Djana Mignouna, Daniel Aihebor, Folake Olokun, Oiwoja Odihi, Emmanuel Chamba (CSIR-SARI), Patricia Acheampong (CSIR-CRI), and Okechukwu Eke-Okoro (NRCRI).

In her presentation, Dr Kapinga reiterated the economic potential of yam citing the FAO statistics on yam production value. In 2013, the production value of yam which was at US\$13.7 billion was twice that of cassava and nine times that of rice. Moreover, if quality seeds of improved varieties were used that value could be more than US\$17 billion in Nigeria.

Speaking on the role of women in the yam value chain, Ndidi Nwuneli stated that “Women make up 60–80% of the agriculture labor force in Nigeria. Although they are involved across the value chain, women participate more in agro-processing activities. About 20% of women in northern and southern Nigeria are involved in yam production.” Women face a lot of challenges in yam production such as limited access to land, markets, and other inputs, and the drudgery involved in operations. There is also limited research work on yam processing. Nwuneli stated that “to increase the participation of women in agriculture, funding opportunities need to be made available to women to finance their activities in the yam value chain.

YIIFSWA-II participation in high profile visits to IITA



Dr Norbert Maroya, promoting YIIFSWA-II activities to the Nigeria agribusiness group (NABG) during their visit to YIIFSWA-II multiplication fields. The group comprised private sector players in Nigeria's agricultural value chain. The purpose of their visit to IITA on 19 February was to explore areas of possible collaboration with the Institute.



Representatives of the World Food Programme visited the Institute on 26 January to deliberate on ways to improve livelihoods and innovations, and encourage youth in agriculture. The team was taken on a tour of the Institute which included the yam aeroponics. The Country Director Myrta Kaulard stated, "this is absolutely innovative, inspiring, and motivating. Congratulations."



Prof. Simon Irtwange, Chairman of the Technical Committee of the Nigeria Yam Export Programme visited IITA on 31 January 2018 to see the innovative technologies on seed yam production and to explore opportunities for collaboration in the promotion of yam in Nigeria.



Other visitors to the YIIFSWA-II multiplication sites and facilities are:

- **Lagos Business School (agribusiness)**
- **Kingdom Advancement College**
- **Frotchery Farms Limited**
- **Oklan Best**



Dr Norbert Maroya explaining HRPT of seed yam production to Professor Steve Yaninek of Purdue University who visited IITA on 26–28 February to explore possible areas of collaboration with IITA.

for more information:

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