Agric Ministry: Nigeria cannot meet seed yam demand; calls for adoption of technologies to revive sector

At the 4th Annual Progress Review and Planning Meeting (ARPM) of the second phase of the Yam Improvement for Income and Food Security in West Africa (YIIFSWA-II) project, the honorable Federal Minister of Agriculture and Rural Development (FMARD), Alhaji Sabo Nanono represented by Mrs. Karima Babangida, Director, Federal Department of Agricultural (FDA) in her keynote address to the project stated that “Nigeria so far has been unable to meet its seed yam demand with the prevailing production systems and practices. The current seed yam demand at the office of the FMARD is about 66,000 metric tons (MT) with an approximate value of N26.4 billion ($75.43 million). However, the current annual production of seed yam is approximately 13,200 (MT) valued at N5.2 billion ($15.1 million). This production effectively translates to a supply gap of about 52,800 MT valued at N21.12 billion ($60.33 million). This gap, therefore, requires a seed yam systems revolution in the industry! She commended IITA for developing through YIIFSWA, High Ratio Propagation Technologies (HRPTs), and diagnostic tools “that are capable of raising the productivity of yam within a short period.” She urged both National Research institutes and private seed companies to adopt the technologies to “reverse the unhealthy situation of the yam sector and increase the productivity and competitiveness of Nigerian yam globally.”

Although Nigeria is the largest producer of yam in the world due to the area dedicated to yam production, it has one of the lowest productivities per hectare. Based on FAO statistics, the Nigerian farmers produces only about 7.9 tons per hectare due to several constraint. The foremost is the unavailability of quality seed yam of both popular local and improved varieties. To effectively reverse the current situation in Nigeria, farmers need access to at least 12.5 million MT of quality seed yam to cover the reported area (harvested) of about 6 million hectares (FAO, 2018). Mrs. Babangida stated that the intervention was timely because "the breakthrough would boost the production of seed yam, increase the yields per hectare, boost income for farmers and increase the GDP of the country since quality seed yam accounts for over 50% of the increase in yield." She informed the project stakeholders that the government, for its part, has included yam as a priority crop in the 2020 fiscal year and assured the project of the government’s support.

IITA through YIIFSWA-II has scaled out the HRPTs (temporary immersion bioreactor system, aeroponics system, vine cuttings, and the adapted yam miniset technique) for commercial seed yam production and the diagnostic tools for yam quality assurance to four National Research Institutes, two regulatory agencies and eight private seed companies involved in seed production in Nigeria and Ghana.
The 4th ARPM took place at Bolton White Hotels, Federal Capital Territory (FCT), Abuja, from the 18th to 21st February 2020. The meeting was attended by 60 Scientists, Seed Entrepreneurs, Agribusiness consultants, and civil servants from Nigeria and Ghana.

The ARPM was officially opened with the keynote speech from the FMARD, Alhaji Sabo Nanono, who was represented by Mrs. Karima Babangida. The meeting also included a welcome address from Dr. Gbassey Tarawali, Head of IITA Abuja station and Outreach Coordinator, opening remarks from Dr. Robert Asiedu, Director of IITA West African Hub, and an opening speech from Mr. Lauren Good, the Senior Program Officer (SPO) of BMGF.

The project also received goodwill messages from Dr. Olusegun Ojo, Director General of National Agricultural Seeds Council (NASC), Prof. Joseph Ukpabi, the Executive Director of NRRC, Mr. Aboagye Ebenezer, the Deputy Director of the Plant Protection and Regulatory Services Directorate (PPRSD) of the Ministry of Food and Agriculture (MoFA), and Dr. Saaka Buah, the Deputy Director of CSIR/SARI.

The review of project activities was conducted in thematic plenary sessions where all participants discussed the achievements and lessons learned from the implementation of activities in 2019, including:

- The project (researchers and seed entrepreneurs) needs to come up with best practices through production research to optimize commercial seed production through the utilization HRPTs.
- Seed companies in Nigeria and Ghana successfully established demonstration plots and showcased that IITA improved yam varieties outperformed local varieties.
- In Ghana, commercial yam farmers want quality seed tubers of local varieties Pona and Labrako.
- The project needs to strengthen and integrate the early generation seed activities between the public and private sectors.
- The establishment of an ideal seed yam system needs institutional and policy support to create an enabling environment for participants to thrive.

The ARPM concluded with the Launching of the new facilities for seed certification and quality assurance at NASC’s Headquarters in Sheda and Yam Day at IITA Abuja station.
Seed certification facilities launched at NASC-HQ, Sheda, Abuja

Mr. Good (BMGF), in the presence of IITA and key YIIFSWA partners, inaugurated the Seed Tracker control room at NASC headquarters in Abuja, Nigeria.

NASC and IITA staff demonstrating Seed Tracker system to YIIFSWA-II project partners

Instillation of LAMP and PCR facilities for yam virus diagnostics at NASC Central Laboratory in Sheda, Abuja, Nigeria.

Yam Day at IITA-Abuja

Dr. Beatrice Aighewi showcasing ongoing seed yam production research at IITA-Abuja Station to participants

Africa Yam breeder, Dr. Amele Asrat showcasing new improved varieties to participants

Participants viewing the storage of tubers harvested by Biocrops at IITA-Abuja
IITA invests in the development and implementation of seed yam certification system in Nigeria

IITA renovated and equipped the diagnostic laboratory of the National Agricultural Seed Council (NASC) at their headquarter in Sheda, Abuja, with equipment worth $100,000 for seed quality control and Seed Tracker e-certification system. A PCR for DNA amplification and other laboratory equipment will allow technicians of the seed regulatory agency to conduct diagnostics and seed quality testing in line with the amended existing standards for seed yam.

Strengthening and equipping the diagnostic laboratory of NASC in Nigeria and the Plant Protection and Regulatory Services Directorate (PPRSD) in Ghana with new tools for seed yam quality inspection is one of the outputs of the establishing a fit-for-purpose quality assurance system for seed yam quality component of the YIIFSWA-II project.

"The renovation of the laboratory and the installation of new equipment is one of the most important components for building a sustainable and viable formal seed yam system in Nigeria. This is one of our primary strategies for ensuring the availability and use of quality seed yam and planting materials in West Africa," said Dr. Lava Kumar, Head Germplasm Unit, and Virology and Molecular Diagnostics Unit at IITA, who leads the YIIFSWA-II "Seed Quality" component.

“Through projects like YIIFSWA-II, IITA has initiated several activities to support the establishment of a quality assurance and seed certification system.” said Dr Philips Ojo, Director-General of NASC. One of these activities involved revising and amending the seed yam certification standards for the quality control of seed yam production. In October 2018, IITA hosted and facilitated a workshop on Quality Management Protocol (QMP). The meeting produced standards for quality control and parameters for inspection and certification. In August 2019, NASC hosted national stakeholder consultations to raise awareness on the new standards.
IITA also trained the technical staff of the regulatory agencies in yam diagnostics, seed testing standards, and field inspection methods for seed yam certification. Along with training, the regulatory agencies were also given the robust diagnostic tools developed in YIIFSWA for seed yam certification.

In February 2020, IITA, in conjunction with NASC, launched the Google.Org award winning Seed Tracker e-certification control room institutionalizing the digital system to facilitate real-time e-certification for yam.

"The main objective of Seed TrackerTM is to support the regularization of the seed sector in Ghana and Nigeria, thus ensuring a sustainable linkage between the value chain actors of the yam production system. This will consequentially result in increased production that will not only contribute to the improvement of farmers’ livelihoods but also promote the market potential of yam in the two countries." Dr. Kumar said.

Optimizing commercial seed yam production

In a bid to address the challenges that commercial seed producers face with cultivating planting materials generated from the HRPTs on the field, IITA is conducting several production researches to develop best practices that commercial seed producers can adopt to boost seed production in Ghana and Nigeria.

In 2019 at the ARPM, seed companies raised concerns about seed yam production using aeroponic system (AS) vine seedlings, particularly the expenses of installing irrigation for the production of seed yam and the fragility of AS vine seedling on the field. So, IITA
took up the challenge to explore seed yam production using AS vine seedlings under rainfed conditions as well as the rooting and survival variability of AS vine cuttings from the top, middle and basal parts of mother plants.

Through the production research, the YIIFSWA-II project ascertained two key hypotheses; firstly, the production of seed yam using AS vine seedlings under rainfed condition is feasible. Secondly, the top and basal parts of the mother plant in the AS were better at rooting and were more productive in the field, respectively. The team recorded more than 90% survival for single node vines cut from the top and about 75% survival of single node vines cut from the basal part of the mother plant.

This year, the team at IITA-HQ, Ibadan under the supervision of Dr. Norbert Maroya, YIIFSWA-II Project Leader and Principal Scientist of the AS research has established a rainfed experimentation in the field to compare the productivity of the top and basal AS single-node vine seedlings from two varieties using planting densities of 40,000, 50,000, 80,000, and 100,000 plants per hectare at the West Bank of IITA lake, Ibadan. During a recent visit to the field, Dr. Maroya indicated that the plants showed good development and with a promise of high yield at harvest. Even with the spacing of 10 cm between plants (100,000 plants per hectare), the plants are doing well, he said.

In conclusion, Dr. Maroya stated that "with such findings, the only challenge for commercial seed producers would be to produce enough planting materials in time for the rains. If producers want to go the route of rainfed agriculture, they should note that the rains become more frequent in May/June, so they should have the vine cuttings in their nurseries by April/May for the roots and shoots to develop in time for planting in June."

In Abuja, the project under the supervision of Dr. Beatrice Aighewi, YIIFSWA-II Seed System Specialist, is exploring how to produce seed yam using cuttings more effectively, efficiently, and economically. Several pieces of research have been set up to determine:

- Suitability of different substrates for rooting yam nodal cuttings.
- Effect of composite substrates on rooting and mini tuber production, with 12 combinations of topsoil rice husk and cocopeat
- Innovative options for rooting cuttings and mini tuber production.
- Rooting in polyethylene plastic sheets
- Direct planting of nodal cuttings on nursery beds (for tuber production)
- Optimizing the use of space in mini tuber production using cocopeat and rice husk
- Performance of different sizes of mini tubers in seed or ware tuber production.
- Effect of plant population on seed yam production.

To raise awareness and facilitate the adoption of the best practices developed from the research, IITA will prepare communication materials (leaflets and booklets) that will be disseminated to interested partners.
Why not yam? A case for investment in yam research and
development in Africa

Yam feeds, nourishes, and provides a living for
millions of people in sub-Saharan Africa and
beyond. In the largest yam-producing country in
the world, Nigeria, yam is more than just a crop.
It is the king of crops, and the production value
of yam is higher than the value of cassava and
popular cereal crops (maize and rice) combined.
Moreover, for exporting countries like Ghana,
it commands a premium price in regional
and international markets. So why isn’t Africa
interested in the development of its most valuable
indigenous crop?

According to Dr. Djana Mignouna, who recently
published a paper titled Potential returns to yam
research investment in sub-Saharan Africa and
beyond, “Yam is often referred to as an orphan
crop. It is seen as a minor crop relative to global
crops like wheat, rice, and maize, even though it is
an important economic and food security crop in
sub-Saharan Africa and the diaspora.

Therefore, it receives limited attention from African
governments and regional development agencies.
And due to such neglect, it is underfunded and
under researched and, often not included in
agricultural policies and intervention programs.”

To further illustrate the neglect of the root and
tuber crop, he said, “When we look at Africa’s
contribution to global food production, the
continent contributes about 5% and 50 % of cereal
crops and cassava to the global barn, respectively,
yet African governments amply provide funds for
research and support development programs.
But that is not the case for Yam even though
West Africa accounts for 97% of the total world
production, and more than five million people in
the Yam growing countries directly depend on the
value chain for their food security and livelihoods.”

Although Yam has long been ignored, research
projects like the Yam Improvement for Income and
Food Security in West Africa (YIIFSWA) demonstrate
that with funding technological developments
present an opportunity to make a big difference in
improving the productivity of Yam.

---

Youths Learning how to plant AYMT in Iseyin,
Oyo state

---

<table>
<thead>
<tr>
<th>Crops</th>
<th>Production (‘000 ton)</th>
<th>Area (‘000 ha)</th>
<th>Yield (ton/ha)</th>
<th>Producer Unit Price (US$/ton)</th>
<th>Production value (million US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yam</td>
<td>31,870</td>
<td>3,260</td>
<td>10.11</td>
<td>431</td>
<td>13,741</td>
</tr>
<tr>
<td>Cassava</td>
<td>40,895</td>
<td>4,016</td>
<td>10.48</td>
<td>168</td>
<td>6,856</td>
</tr>
<tr>
<td>Sorghum</td>
<td>7,542</td>
<td>6,362</td>
<td>1.18</td>
<td>327</td>
<td>2,466</td>
</tr>
<tr>
<td>Maize</td>
<td>6,621</td>
<td>4,030</td>
<td>1.65</td>
<td>367</td>
<td>2,430</td>
</tr>
<tr>
<td>Millet</td>
<td>5,433</td>
<td>4,080</td>
<td>1.25</td>
<td>329</td>
<td>1,790</td>
</tr>
<tr>
<td>Rice</td>
<td>3,806</td>
<td>2,389</td>
<td>1.60</td>
<td>389</td>
<td>1,480</td>
</tr>
</tbody>
</table>
The flagship project executed by the International Institute of Tropical Agriculture (IITA) and partners explored major production constraints and developed technologies that could double yam yields and contribute to food security in Nigeria and Ghana. Currently, it is scaling out some of these technologies to address the constraints of lack of sufficient quantities and the absence of quality seed yams.

In the article, Dr. Mignouna showcases how yam research and development programs like the YIIFSWA project can provide high rates of return on investments over 10 to 15 years. He said that based on YIIFSWA’s experience, the adoption of key technologies such as the adaptive yam minisett technique (AYMT), varieties adapted to low soil fertility and drought (VALSFD), nematode-resistant cultivars (NRC), and crop management and postharvest practices (CMPP) could lead to the following results:

- under the baseline adoption scenario, the land area coverable by various technologies ranges between 770,000 ha and 1 million ha in the eight countries of SSA and beyond: Nigeria, Ghana, Benin, Togo, Cote d’Ivoire, Papua New Guinea, Jamaica, and Columbia.
- Currently the value of the various technologies’ ranges from $584 million and $1.392 billion with the highest for NRC.
- Moreover, if adopted, the technologies will lift 1.05 million people out of poverty, and more than 96 million people would be expected to benefit from the technologies in all the yam-producing countries by the year 2037.

In conclusion, Dr. Mignouna stated that “the realization of the potential economic gains depends on the rate and extent of adoption of these technologies. And due to the knowledge-intensive nature of some of these interventions, capacity building of potential adopters will be critical to increasing the sustainability of the yam sector, thereby enhancing food security and reducing poverty.”

2020 Published Journals


