



PAEPARD



Better Vegetables, Better Lives

Improving African Indigenous Vegetables
for greater nutrition and income



2 ZERO HUNGER



This project directly responds to the Sustainable Development (SDG) Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture.

Disclaimer: This EU-funded project entitled "Enhancing nutrition security and incomes through adding value to indigenous vegetables in East and Central Uganda" was implemented by the Uganda Christian University (UCU), together with Farmgain Africa, CHAIN Uganda, and the Natural Resources Institute (NRI) under the initiative aimed at promoting Africa-Europe Partnerships for Agricultural Research for Development (PAEPARD) implemented by the Forum for Agricultural Research in Africa (FARA). This publication reflects views of the persons interviewed and those of the authors. The European Union cannot be held responsible for any use which may be made of the information contained therein.

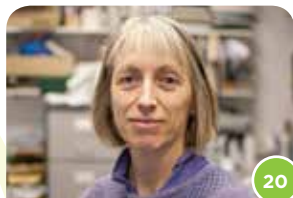
Forward:
Dr. Yemi Akinbamiyo



Community
transformation
through demand
driven research



Providing a platform
for development and
dissemination of key
technologies and
knowledge



5 Big
Wins



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Dr. Joël SOR



Dr. Yemi Akinbami

Forward

Sub-Saharan Africa is the region most affected by undernourishment according to the 2017 report by The Food and Agriculture Organization (FAO). In the report, undernourishment is measured as the number of people older than 15 who are “hungry but did not eat or went without eating for an entire day because there was not enough money or other resources for food.

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The Science Agenda for Agriculture in Africa (S3A) fosters an enabling environment for science, technology, innovations and policy that African initiatives need to respond to the Sustainable Development Goals (SDGs).

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Currently, the World Health Organisation (WHO) recommends at least a dietary intake of at least 400 grams of Fruit and Vegetable each day (about five servings per day). It is also estimated that about 27% of deaths in sub-Saharan Africa are attributed to low consumption of fruits and vegetables. In the project focus country Uganda, it is anticipated that 89% of Ugandan households consume fruits and vegetables, yet this consumption only accounts for 63.5 Kg per person per annum (Nakibirango, 2015).

The international daily requirement for vegetable consumption is 146kg per person per annum. The consumption in Uganda is far less than the required international standard. Vegetables provide an important source of income, minerals and vitamins which are critical for human health, growth and livelihood.

The PAEPARD project “Enhancing nutrition security and incomes through adding value to indigenous vegetables in East and Central Uganda” directly responds to the Sustainable Development Goal 2 on ending hunger, achieving food security and improving nutrition and promoting sustainable agriculture. PEAPARD through the European Union and FARA brokered strategic partnerships and mobilized resources to respond to this global priority area that seeks to address both national and continental concerns on nutrition, food security and sustainable agriculture.

To accelerate this transformation, Science, Technology and Innovations are key drivers. The Science Agenda for Agriculture in Africa (S3A) fosters

an enabling environment for science, technology, innovations and policy that African initiatives need to respond to the Sustainable Development Goals (SDGs). Through this project, we have witnessed tremendous efforts by African partners working with small farming communities in Central and Eastern Uganda to bring about the desired change at both grassroot and national level.

We have observed that nutrition and livelihoods of the farming communities has greatly improved through the launch of this PAEPARD project. Innovations, research and processes developed such as the charcoal cooler, seedling business and packaging materials which reduce vegetable loss during transportation are some of the many initiatives from the project that we are proud of. The innovations and technologies developed under this project are scalable under the South-South cooperation allowing for knowledge and technology transfer; and adoption to other regions in the continent thus improving nutrition and livelihood of Africa’s population. A success we attribute to our strong European and African partnerships.

A special note of appreciation to our partners for this great collaboration affirming the need to broker more European–African partnerships.

Dr. Yemi Akinbamijo
Executive Director,
FARA

Dr. Joël SOR
Directeur des systèmes d’information,
CIRAD/AGRINATURA

OUR IMPACT AT A *Glance*



Over 300 farmers trained on good agronomic practices for Indigenous vegetable production, seed processing, business management and group dynamics in Jinja, Mbale and Wakiso.



47% of households now consume vegetables (3-7 times a week) compared to 20% baseline study carried out in 2015.



Over 250 farmers trained on marketing and postharvest handling of African Indigenous Vegetables in East and Central Uganda.



The average vegetable harvest increased from 1.8 tons per hectare to a staggering 3.9 ton.



Farmers earn \$6 for each kilo of quality seeds sold and \$0.6 for each kilo of fresh vegetable.



4 farmer preferred candidate lines of vegetables developed



Shelf life extended from one to three days through the use of modern technology (Charcoal coolers).



Capacity building:
11 Undergraduates, 7 Masters and 1 PhD student trained.



Networking: Collaboration between research institutes, local government, universities and Non-Government Organisations - NGOs.



Improved linkages to markets.



Over 16 talk shows in East and central Uganda on raising awareness.



Over 2000 people reached through project dissemination campaigns.



Four (4) documentaries produced and available on the project YouTube channel and website.



1

It is mostly the women who engage in growing indigenous vegetables in a household which is indicative of how important indigenous vegetables are to their livelihoods.



2



Households growing *Amaranthus* sp (Doodo) grew from 15% in 2015 to 64% in 2017 while those growing *Amaranthus blitum* (Bugga) slightly grew from 30% to 32% yet those growing *Spider plant* (Jobyo) grew from hardly any to 20%. Households growing *S. melongena* (Egg plant) grew from 11% to 24% whereas those growing *Brassica oleracea* (Sukuma wiki) slightly increased from 28% to 32%.

3

Higher average proportions for *S. aethiopicum* (Nakati), *S. aethiopicum* *L. Gilo gp* (Entula), *S. anguivi* (Katunkuma), *Amaranthus* sp (Doodo) and *S. melongena* (Egg plant) are currently being sold as compared to what it was in 2015.



Consumption



4

Households consuming leafy/indigenous vegetables 3 – 5 times a week registered an increment from 20% in 2015 to about 47% in 2017 whereas those hardly consuming any in a week dropped from 9% in 2015 to approximately 2% in 2017.



5

In regards to consumption per capita, there has been an improvement in the consumption of vegetables in general and this is from 133 gm/person/day in 2015 to about 162 gm/person/day in 2017.





6

Average sales revenue from indigenous vegetables for households in Jinja district doubled from about Ugx, 503,000 (\$150) in 2015 to Ugx 1,008,000 (\$300) in 2017.



7

Average revenue from sale of seed of indigenous vegetables is highest in Wakiso district with some households registering sales as high as Ugx 800,000 (\$220) annually.



8

Since 2015, average quantities of indigenous/leafy vegetables sold by households in Jinja district have increased by 409% and by 127% in Wakiso district households.

CAPACITY BUILDING & INFORMATION *Dissemination*



9

Training on business dynamics closely followed by training on agronomy recorded the highest attendance overall. Most of the trainings were conducted by the PAEPARD project team members.



10

Approximately 46% of respondents did have a chance of listening to utmost 10 radio shows during the project implementation period whereas 13% had a chance of listening to more than 10 radio shows. These shows focused on production, post harvest, marketing and nutrition aspects of indigenous vegetables.



11

Approximately 29% of the respondents found the trainings to be extremely useful while 55% found them to be very useful and about 9% claimed they were somehow helpful. About 6% of respondents claimed the trainings were slightly helpful while only 1% found them not to be of any use at all.

12

The charcoal cooler was the post harvest technology mostly tried-out by the communities in which the project was implemented. In Jinja district, about 39% of the households claimed to have used it whereas 45% of households in Wakiso had a similar claim. Of those who tried out the charcoal cooler, approximately 52% claimed it was quite expensive in terms of set up and maintenance whereas 23% claimed its water requirements were unmanageable and 17% claimed its size was not sufficient enough.





“Nurturing Strategic
partnerships”

COMMUNITY TRANSFORMATION THROUGH DEMAND DRIVEN *Research*

The twenty-first century globally has seen some of the greatest plights in food and nutrition security- especially in Africa. Ironically, recent decades have also seen current trends in globalization like integration and interdependence, the growth of knowledge-based economies among others, which we expect to improve food security. To address the present predicament, African universities must redefine their traditional roles and mode of training and research as the world transitions through a complex process of globalization and technology change.



Rev. Dr. John Ssenoyi

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The PAEPARD research has provided a profound sense of awareness on use and consumption of indigenous vegetables in Uganda

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This awareness has catalyzed African Universities to open to more strategic partnerships like North - South and South-South collaborations as universities strive to meet increasing demands on equity, excellence, diversification and internationalisation. In this respect, African universities are positioning themselves to stand at the center of the African development agenda by supplying the required educated cadre, developing ideas and innovations to advance the development agenda whilst engaging end users, especially the communities. Uganda Christian University resonates with the African universities' agenda to engage and transform communities through research and innovations.

Uganda Christian University (UCU) has positioned herself to be 'A Center of Excellence in the Heart of Africa' and is intentional to move into demand driven research that seeks to address national and continental challenges in many respects. Nutrition and food security are some of the challenges that Uganda Christian University has championed for the last three years through the PAEPARD project titled "Enhancing nutrition security and incomes through adding value to indigenous vegetables in East and Central Uganda".

Hosting the project has facilitated the university to conduct demand driven research on African Indigenous Vegetables (AIV), which have received limited attention internationally yet are in great demand locally and regionally by the African population. A brief stop in any market will show this. The focus of this project is directly linked to our mandate as a university on teaching, research and community outreach as we focus on providing sustainable solutions to existing challenges through

science, innovation and technology transfer to communities, in this case, smallholder farmers. The community centered outreach and engagement program based in the Department of Agricultural and Biological Sciences, integrates food security, nutrition, experiential learning and localization of scientific knowledge. We want to affirm that we are a centre of excellence for African Indigenous Vegetables (AIV) research and development in Africa. The PAEPARD research has provided a profound sense of awareness on use and consumption of indigenous vegetables in Uganda in several ways. Farmers have been empowered to commercialize indigenous vegetable farming, which was hitherto a neglected and underutilized area. Secondly, it has provided training- informal (to farmers) and formal (in undergraduate and graduate programs). Thirdly, there has been increased research publications on indigenous vegetables. Fifth, this has generated technologies and processes that are scalable both at national and regional levels. This is the beginning; it is important that this work ultimately puts healthy foods on the tables of them less privileged.

I thank PAEPARD, FARA and RUFORUM for entrusting us with this partnership that has allowed us to learn and grow as an African institute. Our gratitude goes to the European Union too for funding this work. I further thank our Department of Agricultural and Biological Sciences, especially Dr. Elizabeth Balyejusa Kizito and her team, which took up this opportunity enthusiastically to achieve all this.

Rev. Canon Dr. John Musisi Senyonyi

Vice Chancellor, Uganda Christian University

A MULTI-STAKEHOLDER ENGAGEMENT FOR IMPROVED *Livelihood*

The Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) brokered the initial partnership in the Afrisol consortium and facilitated the response to the calls for proposals by PAEPARD. The Ugandan partners comprising of Uganda Christian University, FarmGain Africa and CHAIN Uganda and an European partner Natural Resources Institute - University of Greenwich won a grant under EU/PAEPARD (CRF II) in 2014. The project simply known as African Indigenous Vegetables (AIV) targeted the neglected plant species which, however, provide food and livelihood to thousands of farmers in Uganda. The objective of the AIV consortium was to improve postharvest handling and preservation of AIV (especially Solanaceae species), to prolong their shelf life, to smoothen their seasonal supply and therefore, increase their consumption by populations including the vulnerable ones. Along the way several other multi-stakeholder engagements have ensued involving institutions such as: CABI, the National Agricultural Research Organisation (NARO), CARITAS, the International Institute of Tropical Agriculture (IITA), the WorldVegetable Centre (AVRDC), Makerere University- School of Food Technology, Nutrition and Bio-engineering respective local governments and farmer organisations to mention but a few-all with the purpose of elaborating on how research can address livelihood issues for the small holder farmer.



Dr. Elizabeth Balyejusa Kizito

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These results have potential to be scaled up and out especially in Sub Saharan Africa where addressing agriculture and nutrition challenges still remain.

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Within the 3-year period, the AIV consortium has registered some achievements:

- A collection of indigenous vegetables from all parts of Uganda has been assembled and characterized.
- Technologies for prolonging the shelf life of vegetables after harvest have been developed and disseminated. These include a charcoal cooler as well as several types of packaging.
- Delivery pathways for indigenous vegetables have been established and some farmers have been linked to very lucrative markets. Benefits and costs of indigenous vegetable trade have been established and quantified.
- Farmers have undergone training on several aspects of indigenous vegetables which include seed production, crop husbandry, storage, packaging, processing, nutrition and cooking as well as business dynamics. As outcome, households consuming leafy/ indigenous vegetables 3-5 times a week increased from 20% in 2015 to about 47% in 2017 whereas those hardly consuming any in a week dropped from 9% in 2015 to approximately 2% in 2017.
- Increased gender empowerment as seen in the increased participation of women and youth in the value chain.
- Increased mean incomes (110%) in East and Central Uganda from vegetable production.
- Capacity building at different levels: 1 PhD, 7 masters and 11 undergraduates have benefited in terms of conducting their research. This has resulted in 8 peer reviewed publications so far.

Key sustainability pathways for this work include;

- Institutionalising vegetables in the university community outreach programs through teaching and learning.
- Key linkages with government eg the Mukono local government, the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF)
- Continued research with National, Regional and International institutes (NARO, NIAB-UK, WorldVeg, MARI-Tanzania, ICRAF, CRG-Spain)
- Membership in important Networks such as RUFORUM, SOLGenomics

These results have potential to be scaled up and out especially in Sub Saharan Africa where addressing agriculture and nutrition challenges still remain. Among these include how to narrow the nutrition gap, that is, reducing the difference between actual and optimal intake and the incidence of undernourishment. Also connecting smallholder farmers to markets, increasing opportunities for rural employment and becoming more productive, reducing risk and vulnerability among others. This underscores the relevance of sustainable and substantial support to food security and nutrition policies and programmes in the region if the SDGs' target 2 should be met.

I am thankful to have been part of this project; I am grateful for the support from EU through PAEPARD/ FARA; and most indebted to all the partners and stakeholders on the team that have made this possible.

Dr. Elizabeth Balyejusa Kizito

Uganda Christian University



Dr. Apolo Kasharu

LINKING FARMERS TO *Consumers*

Chain Uganda, a community-based organisation in Uganda supports farming communities in response to widespread household poverty, food security, poor health and social welfare. The lack of coordinated efforts in agriculture, nutrition and enterprise development interventions in Uganda inspired its creation.

“When people are looking for quality seed, they come to us.”

Central to our work is building capacity of small holder farmers through supporting formation and coordination of self-help groups to effectively transition from subsistence to commercial farming for improved incomes and livelihood. The PAEPARD project titled “Enhancing nutrition security and incomes through adding value to indigenous vegetables in East and Central Uganda”, has been instrumental in achieving this goal.

Chain Uganda brings experience in mobilizing and sensitizing farmers from rural communities to engage on this project. Our knowledge in enabling access to appropriate technologies such as improved seeds, farm management systems, micro finance and access to markets enriches our role on this project. Working with farmers, we have been able to identify technologies that are appropriate for farmers to reduce post-harvest losses and maximise profits such as the charcoal cooler and the packaging materials.

The production of quality seed by the farming communities and distribution to the mainstream market has made us visible both at national level. When people are looking for pure seed, they come to us. This is an attribute to the strategic partnership on this project.

Through this project, we have linked with other players in the nutrition sector such as the health clinics and Makerere University School of Food Technology, Nutrition and Bio-engineering which is processing, and packages powdered vegetable.

Strategic partnership and networking opportunities at both national and international fora have given us the required visibility resulting into another funding opportunity by NWO/WOTRO (The Netherlands). We have observed increased vegetable demand and consumption, an indication that this project is sustainability and demand driven.

We created a platform where farmers and traders liaise improving business relations and reducing post-harvest losses while the vegetables are in transit to the market.

On behalf of Chain Uganda, I thank all the partners we have worked with on this project. We have previously worked with various projects and this has been one of the best projects we have worked on. I am so happy and grateful that we have been able to communicate.

A special note of appreciation to the farmers communities in Jinja, Wakiso and Mbale. I have seen them move from tiny gardens to big hectares of garden. Am grateful for their support and continued interested in this project.

Dr. Apolo Kasharu,
Executive Director, Chain Uganda

PROVIDING ACCESS TO *Market*

FarmgainAfrica, an agribusiness support organization based in Uganda works on agricultural value chains by rendering agribusiness-related services to clients mostly in agricultural value chains and humanitarian agencies.



Dr. John Jagwe

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We noticed an increase in the farmer market access and a greater awareness on the importance of indigenous vegetables.

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Farmgain supports farmers in analysing as well as developing agricultural value chains, business plans and establishing agro-enterprises. It also runs a national market information system which collects and disseminates information on 35 agricultural commodities from 11 locations in Uganda on a weekly basis to subscribed users.

Under the PAEPARD project, we supported farmers to market their produce by providing market information on commodities, training and building capacity of the farmers to engage into farming as a business. We also linked farmers to the market and value addition initiatives so that they earn more from what they produce.

Radio remains one of the best communication tools for the rural poor. It is not only affordable; radio broadcasts can reach a wide audience. In Uganda, there is about 200 radio stations. Limited access to internet, enables radio media to remain relevant and one of the best alternative for sharing news and educational information about the vegetable consumption.

Radio stations selection in the target areas of Jinja, Mbale and Wakiso were made for awareness sessions and knowledge dissemination. Online newsletters complimented the dissemination process.

Our role in overseeing the monitoring, evaluation and dissemination of the project findings has enabled us to document some great achievements such as increased awareness on consumption of indigenous vegetables.

In 2017, we noticed the number of households consuming vegetables (3-7 times a week) had increased from 20% to 47% in comparison to the baseline study carried out in 2015.

We also noticed the change in the per capital consumption of vegetables from 133 grams to 167 grams per person per day. Though still below the recommended level by WHO, this is a significant improvement.

There have been emerging businesses anchored around vegetable seed production and marketing for Nakati (Shum group) and Doodo (*Amaranthus dubius*). These achievements are attributed to the collective efforts of the project partners and the awareness radio programs aired to encourage greater vegetable consumption.

The project has been beneficial in creating awareness on the nutritional value of African indigenous vegetables. The partners are champions for indigenous vegetables, research which is now highly appreciated. The project has provided business opportunity for youth and women boosting their livelihood.

Dr. John Jagwe,
Managing Partner, Farmgain Africa

PROVIDING A PLATFORM FOR
DEVELOPMENT AND DISSEMINATION
OF KEY TECHNOLOGIES AND

Knowledge

The Natural Resources Institute (NRI), University of Greenwich UK is a unique multi-disciplinary centre of excellence, with an established reputation for delivering high quality research, advice, teaching and training in support of global food security, sustainable development and poverty reduction. NRI is a leader in natural resources research, promoting efficient management and use of renewable natural resources in support of sustainable livelihoods. Research is primarily focused on developing and emerging economies.



Dr. Deborah Rees

“ Delivering high quality research and training in support of global food security, sustainable development and poverty reduction ”

NRI's presence and research partnerships in developing countries, and its training and capacity building programmes, provide the platform for the Institute to develop and disseminate key technologies and knowledge. This has resulted in substantial impact at farmer and community level, and has made significant contributions to the international research community.

Much of the work also involves interaction with the developed world where it is equally applicable. Postharvest handling of durable and perishable crops to reduce losses, enhance financial or nutritional crop-value, and assure food safety is a particularly area of expertise for NRI.

Research ranges from the fundamentals of storage and preservation of quality throughout the marketing chain, to food-science aspects of agro-processing and responses of consumers to new food products.

Achievements include: development of a reliable technique for predicting risk to farmers of attack by *Prostephanus truncatus*, a devastating stored-grain pest in Africa, and successful application of the technique in Ghana, thus allowing farmers to safeguard their valuable harvest; development of an innovative method for small-holders in sub-Saharan Africa to protect their limited grain stocks against insect damage by using diatomaceous earth (DE), and proven feasibility of exploiting local DE deposits to replace synthetic organophosphate-based insecticides; and development and validation of improved cassava processing systems.

Improved handling, storage and marketing methods for sweet potato, an increasingly important urban food as well as a vital food in times of drought, were adopted and promoted to end users as part of the CGIAR HarvestPlus Challenge Program.

Novel methods were developed to test acceptability of food products to low-income consumers, based on price, nutritional value and sensory preference. Improved understanding of variation of storability amongst sweet potato cultivars has enhanced the breeding programmes of the International Potato Centre.

NRI's current research includes: use of refined behavioural analysis techniques in studies of insect pests of grain, to identify new options for pest management without synthetic pesticides; studies of food safety in the informal food sector of developing countries, to improve quality and safety in a sector vital for employment of poor people; investigating food and energy security to improve sustainability of rural livelihoods in semi-arid developing countries reliant on renewable natural resources; and developing optimum approaches for uptake of post-harvest value-addition in cassava (supported by Bill and Melinda Gates Foundation and EC) and bio-fortified food crops (with HarvestPlus Challenge Program); support to the horticulture sector in managing quality and waste.

Dr. Deborah Rees

University of Greenwich • Natural Resources Institute

A woman wearing a vibrant, multi-colored patterned dress and an orange headscarf is bent over, working in a lush green field. She is holding a blue bowl in her left hand. The background is filled with dense green foliage, and the overall scene conveys a sense of sustainable agriculture.

Creating
Sustainable Solutions



YOUTH WIN BIG IN AFRICAN INDIGENOUS VEGETABLE *Business*

Eriya Matovu, a young man in his 20s born to ordinary farmers Mr. and Mrs. Nsamba has greatly benefited from growing indigenous vegetables. When growing up, his father always encouraged him to pick interest in farming, a mainstay of their household. Upon obtaining his tertiary education, Eriya opted not to go to the big towns to look for white-collar jobs but instead concentrated on expanding their household's farming enterprises which seats on a 10-acres piece of land in Namulonge village approximately 27 KM from Kampala city. The family mostly grows vegetables and have become a model farming household in their community. In 2015, their household was selected for the PAEPARD African Indigenous vegetable project.

During the project life span, Eriya's family got training opportunities in several aspects of indigenous vegetables which included; seed production,

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On average, weekly
sales amount to
about US\$3,200.”

irrigation, agronomy, post harvest handling, storage, processing, cooking and nutrition as well as business dynamics. Exposure to different irrigation technologies inspired the family to install one on their farm and this has enabled them produce vegetables all year round thereby taking advantage of the good prices when supply is generally low. A charcoal cooler installed on their farm helped them store and preserve fresh produce for several days during the bumper harvest.

Having been trained in business dynamics, Eriya got inspired to look for new markets. Currently, Eriya has opened vegetable stalls in three locations within Kampala city and one in Entebbe town. The latter location targets the staff at the UN base while the former locations comprise of a high-end restaurant which opens every Saturday from 9am to 3pm for fresh vegetable vending as well as an international school where expatriate children study and the US embassy. Each day of vending vegetables puts sales revenue approximating US\$ 800 into Eriya's pocket. On average, weekly sales amount to about US\$3,200. Eriya has brought on-board seven other youth (some his siblings) into this trade. This story gives hope that smallholder farmers, particularly youth, when equipped with skills and knowledge can bring about a transformation of not only their lives but an entire economy.



IMPROVED INDIGENOUS VEGETABLE SEED *Processing*

During the project life span, farmers participated and developed on-farm seed varieties lines. In the selected farming communities, the trainings on seed processing and value of vegetable nutrients have increased awareness on the nutritional value and consumption of vegetables in the communities. Farmers can now select the vegetable seed variety and determine the vegetable quality of their harvest. This has improved and sustained the pure seed quality and increase their income resulting from bumper harvests. The participating farmers from Jinja, Mbale and Wakiso are known for their pure seed quality making them reference points for pure seed business.

BUILDING APPROPRIATE TECHNOLOGIES TO REDUCE POST-HARVEST *Losses*

Two charcoal coolers were constructed in Jinja and Wakiso to reduce on the post-harvest losses. Previously, farmers would harvest and keep their vegetables in their houses and some under the tree shade. This has changed with the building of affordable and sustainable charcoal coolers. The vegetable shelf life has increased from 1-3 days allowing the farmers to store any extra vegetables that may have not been sold on that day. Identifying packing materials that address appearance, texture, flavor, nutrition value and safety for the vegetables has enabled better handling and reduced loss of vegetable quality during their transportation to the markets. "Quality is very important for our business to thrive. The improved packaging materials have greatly helped us during transportation of our vegetables to the market." Remarkd Mr. Odongo, farmer from Jinja.





MOBILIZING *Resources*

African Indigenous Vegetables research team through this project honed proposal writing, resource mobilization, management and governance skills. The team submitted eight proposals for different calls and won three for funding. One of the proposals approved focuses on the functional vegetable seed system, a result from the prioritization exercise while working with the framers and other stakeholders. Other proposals won include;

1. UCU lead project with funding from Third World Academy of Sciences (TWAS): Phenotyping water use efficiency in *Solanum aethiopicum*, shum group.
2. UCU and CHAIN partnership with funding from (ARF/ WOTRO): Developing a gender responsive commercial seed system for African Indigenous vegetables in Uganda
3. Global Challenges Research Fund (GCRF - SASSA - Sustainable Agriculture for Sub-Saharan Africa): Improving production efficiency of African egg plant, (*Solanum aethiopicum*) for small holder farmers in Sub-Sharan Africa

Chain Uganda also received funding from the Dutch, a result of the efforts from the Indigenous Vegetable project.



Before we were introduced to the charcoal cooler, we used to harvest our vegetables late in the night or early morning, place them under a big tree and sprinkle water on them to avoid losses and ensure that they were fresh for market delivery. When we were introduced to the charcoal cooler, we were able to harvest and supply at anytime of the day. The charcoal cooler is a minimal maintenance technology that relies on wind movement and water circulation to keep the vegetables fresh. We are happy our vegetables stay fresh up to three days.” Anthony Odongo, Butiki-Kyekidde Irrigation farmers, Jinja.

5

Big Wins

Community peer support groups: Working together as farmers has enabled the farming communities in Jinja, Mbale and Wakiso collectives determine better prices and increase their business revenue. They can support each other through mobilizing for resources to build appropriate technologies such as the charcoal cooler.

The Jinja farmers community has grown from 50 members to now 75 farmers including youth and women.





3



2000 people reached through project dissemination campaigns at National Seed Expo, Annual Uganda National Farmers Federation Agricultural Trade show, Annual High School Farm at Gayaza High School and Capitalization workshop in Benin.



4



5



"Collectively, farmers have determined better prices for their vegetables. The price of Dodo vegetable (Ammaranths) increased from UGX500 to now UGX2000 per bundle encouraging more community members to engage in vegetable farming." Anthony Odongo, Butiki-Kyekidde Irrigation farmers, Jinja

"Previously we were a small community saving group before the project introduced us to African indigenous vegetable farming. Through the training they offered us, we began growing indigenous vegetables like Nakati which has improved our income. Some of the women in this group have saved money and educated their children. We no longer heavily depend on our husbands to support the families." Anna, Mbale United Farmers.



This happened in 3 years





- The European Union Commission (**EU**)
- The Platform for African European Partnership on Agricultural Research for Development (**PAEPARD**)
- Forum for Agricultural Research in Africa (**FARA**)
- Uganda Christian University (**UCU**)
- Agricultural Marketing and Market Information - **Farmgain Africa**
- Coalition for health Agriculture and Income Network (**CHAIN Uganda**)
- Natural Resources Institute (**NRI**) - **University of Greenwich**
- African Solanaceae Network (**Afri-Sol**)
- Regional Universities Forum for Capacity Building in Agriculture (**RUFORUM**)
- The Ministry of Agriculture, Animal Industry and Fisheries (**MAAIF**)
- The National Agriculture Research Organization (**NARO**)
- Centre for Agriculture and Bioscience International (**CABI**)
- International Institute of Tropical Agriculture (**IITA**)
- Catholic Relief, Development and social services organization (**CARITAS**)
- Farmer group (**Namulonge Horticulture, Butiki-Kyekidde irrigation and Mbale United farmers**)

Special thanks to the project team of researchers at Uganda Christian University, RUFORUM, Natural Resources Institute (University of Greenwich, United Kingdom), Farmgain Africa and CHAIN Uganda for the work well done in implementing this research. Gratitude extended to the vegetable farmers and local governments in East and Central Uganda, WorldVeg (Formerly AVRDC), CABI, CARITAS, IITA, MAAIF and NARO among many other development partners for their participation. Finally, special thanks go to the European Union who provided funding for this project through the Forum for Agricultural Research in Africa (FARA) and particularly its programme of Promoting African and European Partnerships in Agricultural Research and Development (PAEPARD)

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