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# Crowdsourcing vegetables for farmers' livelihood improvement: a novel collaborative pilot in Uganda

Resilient seed systems for climate change adaptation and sustainable livelihoods in the East Africa sub-region project progress report

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Tobias Recha<sup>1</sup>, Daudi Mubiru<sup>1</sup>, Ronnie Vernooy<sup>2</sup> and Elizabeth Kabakoyo<sup>3</sup>

<sup>1</sup> Biodiversity International, Uganda

<sup>2</sup> Biodiversity International, The Netherlands

<sup>3</sup> East West Seed Knowledge Transfer, Uganda

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Bioversity International

Via dei Tre Denari 472/a

00054 Maccarese

Rome, ITALY

Cover Photo: Hoima farmers at a Padma tomato variety demo farm in Gulu. Credit: Bioversity International/D. Mubiru.

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## Introduction

East West Seed and Bioversity International, in collaboration with the Wageningen Center for Development Innovation, the World Vegetable Centre and National Agricultural Research Organisation (NARO)-Uganda, are combining the East West Seed (EWS) farmer training approach and Bioversity International's crowdsourcing methodology in a small pilot initiative on vegetables in Uganda under the umbrella of the larger resilient seed systems for climate change adaptation and sustainable livelihoods in the East Africa sub-region project. The targeted portfolio of vegetables include traditional (e.g. green leafy vegetables) and modern ones (e.g. tomato, onion, sweet pepper, cabbage, pumpkin) based on farmers' interests and marketing opportunities, sourced from East West Seed, the World Vegetable Centre and farmers' own gardens.

The main objective is to strengthen farmers' capacity to make better use of crop (vegetable) diversity for multiple livelihood purposes. Based on a situational analysis in the Hoima area, 13 farmers were selected to take part in the pilot. They received training in the various aspects of vegetable management from the East West Seed Knowledge Transfer team in Uganda. The ultimate aim is scale the pilot to about 1,000 farmers. The main research questions for this initiative are:

- What are the promising vegetable varieties that smallholder farmers could integrate in their production system?
- How do social and gender variables influence crop/variety selection?
- What organizational form can best support the testing and adoption of vegetable new species and varieties?

## Preparatory meetings

A preparatory meeting was held on 27 September 2019 at the office of Bioversity International in Kampala, Uganda, attended by Annet Kizza (East West Seed Knowledge Transfer or EWS-KT), Ronnie Vernooy, Tobias Recha and Daudi Mubiru (Bioversity International). The pilot proposal was discussed and plans made for engagement with NARO and farmers in the Hoima region. It was agreed to integrate a research component in the activities by teaching farmers how to use the TRICOT methodology (a kind of citizen science) to evaluate the selected vegetable species/varieties against a set of parameters of interest.

TRICOT will be linked to the EWS-KT methodology, which involves selection of 10-15 key (pilot) farmers who will be trained to set up a demonstration farm allowing another 250-300 farmers to become familiar with vegetable production through a hands-on learning by observing approach. The methodology includes the provision of technical advice and agro-inputs for free during the first season of the pilot with farmers. In the second season, the farmers are expected to buy their own seeds and the rest of agro-inputs and technical support is provided for free. After that, farmers will take over and manage the process on their own. In addition to the agro-inputs, it was agreed to purchase a number of spray pumps. Two farmers can share a spray pump.

The selection of key farmers takes place according to a number of criteria developed by EWS-KT, e.g. commitment, leadership potential and access to (a) nearby water (resource) to enable off-season vegetable

production. Based on Bioversity International's experiences in the Hoima area, it was expected that a total of about 20 farmers could be selected for the pilot.

The main sources of seed are EWS, the World Vegetable Centre in Arusha, Tanzania and farmers' own (locally grown) varieties (NARO does not maintain a vegetable seed collection). Bioversity International worked together with NARO-Bulindi to request seed from the World Vegetable Centre in Arusha, Tanzania, to acquire a number of species with good potential for the Hoima area. (These were received under the Standard Material Transfer Agreement adopted for use by the Governing Body of the Plant Treaty.)

It was agreed that EWS-KT would post one staff in the Hoima area to oversee the day-to-day activities. Usually, a single staff engages with 5 to 10 farmers. EWS-KT has staff in other areas including Gulu, Lira and West Nile. It was proposed to explore the possibility to organize a learning and exchange visit for the Hoima farmers to one or more of these sites to practically see a number of on-going vegetable trials/demos. Apart from this type of training, EWS-KT offers an online vegetable production course, for technical staff (a training certificate is given after successful completion of the training). The last element agreed upon was to organize a reflection meeting at the end of every growing season. This meeting will be for technical staff and farmers to evaluate the progress of the pilot and assess the performance of the selected species/varieties.

After the meeting at the Bioversity International Kampala office, the team proceeded to NARO-Bulindi on 30 September 2019 to discuss the pilot with director Dr. Dickson Baguma, Dr. Ronald Kakeeto and Ahumuza Jasper and identify the details of the proposed collaboration. It was agreed that NARO-Bulindi would provide complementary technical support and host a learning site at the research station – in addition to the sites managed by farmers, where staff could use the opportunity to learn from the combined EWS-KT and Bioversity International approach. Seed from EWS-KT, the World Vegetable Center and farmers' gardens will be used for the learning site.

## Introduction of the pilot to farmers in the Hoima area

On 1 October 2019, Bioversity International, EWS-KT and NARO-Bulindi staff met with 20 farmers from the Hoima area (already involved with crop research conducted by Bioversity International and NARO-Bulindi) to introduce the pilot (photo 1).

Farmers were introduced to the objectives of the pilot and to the work of the East West Seed Company and EWS-KT by means of videos about how other farmers are benefiting from similar initiatives (see: <https://youtu.be/aYH8ITRUil> and [https://youtu.be/4VsvG83M1\\_A](https://youtu.be/4VsvG83M1_A)). Farmers appreciated the introductions and expressed strong interest to take part in the pilot. It was agreed to focus on off-season vegetable production to maximize market opportunities. The EWS-KT staff walked farmers through some basic agronomic concepts/practices related to producing high quality vegetables. This included identification and prevention of common pests and diseases, preparation of nursery and seedbeds, and methods of seed harvesting and storage.

Then, the criteria for farmer selection were presented:

1. **Should be a passionate farmer:** a farmer who has interest in farming, has been a farmer for some years and has interest in vegetable production.

2. **Should be committed:** a farmer who is willing to give time to the demonstration garden, ready to learn from the technical officer and influential to the people in the community (to share the experience and learning).
3. **Owns land:** should have secure access to a piece of land to host a demonstration plot, with open access to the plot for the community; the land should have a soil PH ranging from 4-6.5.
4. **Land should be near a water source that can be used for irrigation.**
5. **Visibility of the demonstration site:** it should be located near a road where farmers often transit (the pilot should be easy to observe).
6. **Population of targeted farmers:** the demonstration site should be located in an area with a good number of farmers so that scaling can easily take place.



Photo 1: The inception meeting with farmers at NARO Bulindi, Hoima. Credit: Bioversity International/T. Recha.

Farmers understood and agreed with these criteria. Based on the selection criteria, a follow-up visit was organized to meet with 20 farmers (by EWS-KT and Bioversity International staff). As a result, 13 farmers (sites) qualified to host the first round of demonstration plots (table 1).

**Table 1. Selected sites to host the first round of vegetable demos in Hoima**

	Village	Parish	Crop of interest
1	Kiranga	Kyabanati	Onion
2	Kikoro	Bulindi	Cabbage
3	Kibaire	Bulindi	Eggplant
4	Mpalangasi	Kibugubwa	Cabbage
5	Luhungu	Kisabagwa	Tomato
6	Kisabagwa	Kisabagwa	Tomato
7	Chalugumba	Bulindi	Tomato
8	Nyakakonge	Bulindi	Tomato
9	Kisagala	Bulalu	Eggplant
10	Katikara	Kisabagwa	Tomato
11	Kikungu	Bulindi	Tomato
12	Kibaire	Bulindi	Eggplant
13	Nyakakonge	Bulindi	Sweet pepper

## Motivational and learning visit

To introduce farmers to high quality vegetable production, a learning and exchange trip was organized 5-7 November 2019. A total of 16 farmers from Hoima, accompanied by staff from EWS-KT, Bioversity International and NARO-BUZARDI travelled to learning sites in Gulu and Lira. They visited local EWS offices and several demonstration plots of different hybrid vegetables that were being managed by EWS (photo 2). The different demonstration crops included tomato, cabbage, watermelon and eggplant. Other photos of this trip by Daudi Mubiru of Bioversity International can be accessed via

[https://drive.google.com/drive/folders/1xcTPdUYyWldPxAXYZxk9nbY\\_I\\_vkxsm?usp=sharing\\_eil&ts=5de1374d](https://drive.google.com/drive/folders/1xcTPdUYyWldPxAXYZxk9nbY_I_vkxsm?usp=sharing_eil&ts=5de1374d)

In Gulu, the first and second demos were in Unyama sub-county in Agung village. These were hybrid tomatoes (Padma 108F1 variety) that have a plant population of 666 on 250 square meters land. The third and fourth demo sites were in Kulukeno village in Owoo Sub County hosting the same Padma tomato variety and cabbages respectively. The cabbage demo had a plant spacing of 60 by 50 on a 250 square meters plot and was 1 month old. In Lira, the first demo was a 40 days hybrid eggplant called Ajani. The demo size was more than 250m<sup>2</sup>; a scaling decision made by the host farmer and driven by the market. The last demo plot visited was a hybrid watermelon called Almasi (sown 65 days ago), in Babamo village, Nyata Sub County.



Photo 2: Hoima farmers at a cabbage demo farm in Gulu. Credit: Bioversity International/D. Mubiru.

Hosts of all the demonstration plots visited shared their experiences about crop management (e.g. dealing with heavy floods, pests (melon beetle) and diseases). They also shared information regarding fertilizers, source of water, pest control, mulching, transplanting, method of seedling production and how the crops are of important to them. Hoima farmers actively participated in the field and offered feedback about what they learned, general feelings about the visit and expectations.

## Hoima farmers' expectations before the visit

They expected to see and learn about (how to grow) various types of vegetables and how to use farming skills applied by farmers from the two districts. It was fortunate that vegetables like tomato, eggplant, cabbage and watermelon were available for observation. They also expected to compare how they produce their vegetables in Hoima with their counterparts in Gulu and Lira districts. The aim was to grasp new knowledge about vegetable production based on the methodology of EWS-KT already used by the farmers in Gulu and Lira. They also expected to identify existing market opportunities and links to local and regional markets for vegetables. In addition, they intended to find out how profitable vegetable business could be (cost-benefit analysis).

## Observations and lessons learned by the Hoima farmers

Farmers realized that some agricultural tools have multipurpose uses. For example, a spray pump can be used for watering the nursery/trays/pots, not only for spraying chemicals. According to the key farmers in Gulu, it is very important to keep monitoring fields frequently, on a daily basis, in particular for disease and pest identification during early stages of vegetable growth. This is necessary for early application of pesticides for easy control of attacks by pests and diseases.

Farmers learned how to raise seedlings in leaf pots made from mango tree leaves. This technique allows a farmer to have many leaf pots in a small area compared to using polythene pots, plastics or bottles. Application of this particular technique not only saves money, but also is environmentally friendly. Farmers also learned about growing vegetables on ridges and mulches, which act as soil and water conservation measures. Water drains and spreads properly in between the ridges, which avoids soil erosion and protects the plants from getting wiped away by heavy rains and floods. They learned how tomatoes can be trellised or stalked using ropes and pegs (photo 3). The trellis technique is a good method and can be used to grow many vining crops. Trellises keep vining plants like tomatoes off the ground and protect them from pests, diseases and foot traffic. Farmers observed that trellis help plants such as tomatoes to receive adequate air circulation and sunlight, which makes plants healthy and firm.



Photo 3: Preparing beds and trellises for tomato production (Hoima). Credit: East West Seed Knowledge Transfer, Uganda.

Farmers learned about a regular fertilization programme and different fertilizers used at the demo sites. They understood the stepwise application of fertilizers at different vegetable growing stages. After planting, Diammonium Phosphate (DAP) is applied every two weeks (in Hoima farmers used to apply only once for the entire growth period resulting in poor yields and low benefits). In addition, they were introduced to a number of fertilizers that they can choose from. During the visit, farmers were taught about the need to always protect themselves while spraying chemicals. This includes compulsory use of gloves, gumboots, nose and face masks while spraying. This is something that Hoima farmers were not practicing. They realized the need to acquire these items as soon as possible.

They learned about the need to have some money or capital in hand to respond to emergencies, such as unplanned attacks by pests and diseases. Savings will allow buying chemicals and fertilizers. Not all Hoima farmers have the practice (culture) of saving.

Farmers were motivated by the harvest and sales made from a small plot of 250 square meters. A key farmer from one of the first tomato demos said: "I made a lot of money from the harvests I make from tomatoes." This motivated the Hoima farmers to believe in the possibility of making money from small plots of land at their homes.

All the demo plots were very impressive and well managed. Farmers were attracted by the healthy looking and large sized vegetables, in particular watermelon and tomato. One female Hoima farmer observed: "*These farmers are very well organized compared to us,*" suggesting that the Gulu and Lira farmers are well trained with the help of EWS-KT.

## Hoima farmers' follow up actions after the visit

This trip was very important for all parties. It created a good relationship between farmers and between farmers and EWS-KT, NARO and Bioversity International staff. Farmers learned many things from the visit. Hoima farmers actively participated in the field, interacted and created personal links and connections with their hosts. The connections between farmers from different districts are important for stronger engagements now and in future. This will lead to more knowledge-sharing and transformation of agriculture in the two districts.

At the end of the learning trip, farmers expressed strong motivation to demonstrate the knowledge they acquired from their counterparts. They anticipated adopting better skills of growing vegetables (compared to how they were doing before the trip). This will enable them to generate more income for their household from a small piece of land. They believed that they could turn their small pieces of land into a big source of income through vegetable farming targeting the growing market in their region. Farmers also expect to transfer knowledge and skills they have learned to fellow farmers in their community. Farmers expect EWS-KT and Bioversity International to provide inputs, such as quality and certified seed and technical support when implementing the demos. This support will enable them to manage a successful vegetable demo of their choice.

## Challenges faced by the Hoima farmers during the visit

A challenge was the language barrier for farmer-to-farmer communication. Most Gulu and Lira farmers do not speak Luganda, which is the most spoken local language in Uganda, which Hoima farmers can speak and understand well. The use of English did not solve the problem given that not all Hoima farmers speak and understand English well.

Some demo plots were not easily accessed. The three-day trip took farmers to different areas in Gulu and Lira districts where some of the roads were muddy, narrow and not well aligned. Farmers found the trip exhausting. Hoima farmers would have liked to spend more time in the areas to learn more about the demos and what happens after harvesting. They had many questions about how and where to market the vegetables and whether the vegetables have a steady market.

## Crops selected by Hoima farmers

Based on the experiences from the visit, the Hoima key farmers were able to select the crops they wish to produce. Table 2 gives a summary of the selected crops.

**Table 2: Crops selected by Hoima farmers.**

No.	Village	Parish	Crop
1	Kiranga	Kyabanati	Onion
2	Kikoro	Bulindi	Cabbage
3	Kibaire	Bulindi	Eggplant
4	Mparangasi	Kibugubwa	Cabbage
5	Luhungu	Kisabagwa	Tomato
6	Kisabagwa	Kisabagwa	Tomato
7	Chalugumba	Bulindi	Tomato
8	Nyakakonge	Bulindi	Tomato
9	Kisagala	Bulalu	Eggplant
10	Katikara	Kisabagwa	Tomato
11	Kikungu	Bulindi	Tomato
12	Kibaire	Bulindi	Eggplant
13	Nyakakonge	Bulindi	Sweet pepper

## Next steps

The next activities include setting up various nursery beds, preparing the learning site at NARO-BUZARDI and transplanting of seedlings in the seed beds. Farmers will be trained in the TRICOT methodology to be able to compare and evaluate three blind varieties of the vegetable or vegetables they will be growing (varieties included are those sourced from EWS, farmers and the World Vegetable Centre). For the TRICOT test, farmers will grow the vegetables as recommended by EWS. A baseline survey is being conducted in December 2019 to document farmers' vegetable production, consumption and marketing knowledge and practices, their expectations about the pilot and to obtain a better understanding of the local business dynamics for vegetables.



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