

Makerere implements low cost rain water harvesting, irrigation and postharvest value addition technologies to enhance vegetable production and household incomes in Hoima .

- **Farmers use solar dryers to process local *Nakati* greens into powder.**
- **Stakeholders workshop held to end the project.**

Makerere University School of Food Technology Nutrition and Bio engineering has implemented low cost rain water harvesting, irrigation and postharvest value addition technologies among farmer groups in Mid Western Uganda to improve horticultural production and farmers livelihoods.



Mr. and Mrs. John Byaruhanga of Buswekera village in their gardens

The technologies were implemented under the project titled, “*Promotion of rainwater harvesting and low-head smallholder irrigation systems for sustained market responsive vegetable production in mid-western Uganda,*” funded by the World Bank through NARO Competitive Grants Scheme from 2016-2018.

Multi-disciplinary and multi-institutional partnership approach involving training and research institutions, private sector institutions was used in the implementation of the project.

The project was hosted at the College of Agricultural and Environmental Sciences (CAES), Makerere University as the lead institution. Project collaborators included Agricultural Engineering and Appropriate Technology Research Centre of the National Agricultural Research Organization (AEATREC-NARO) and Hoima District Local Government

It was spearheaded by the Makerere University Don-Dr. Joshua Wanyama as the Principal Investigator, assisted by other researchers including Nanyeenya Ntege William, Mutumba Charles, Tumutegyeize Peter, Komakech Allan, Kiggundu Nicholas, Candia Alphonse, Kiyimba Florence and Kyaligonza Charles.

Speaking during the stakeholder’s workshop to mark the end of the project at KonTIK Hotel in Hoima on 22nd May 2018, Dr. Wanyama said, this project aimed at promoting suitable rainwater harvesting and low-head smallholder irrigation systems for all year round consistent commercial production of traditional and high value vegetables for collective marketing.

In addition, Wanyama said the project focused on facilitating establishment of formal working linkages between farmers and niche markets (existing traders and consumers) through contract farming.



Dr. Joshua Wanyama (PI) speaking during the workshop in Hoima

The project was carried out in the peri-urban areas of Nyabuhere village, Bugambe Sub County and Buswekera village, Busisi and Kikwite Village, Mparo Division, Hoima Municipality. In this area, there is an unexploited niche market from the emerging hotels, rapid urbanization and the emerging oil and gas industry.

The project target according to Dr. Wanyama were the peri-urban farmers due to their proximity to the markets. He said, the project has empowered smallholder vegetable farmers to be business-oriented thus, increasing their income and food security in line with Uganda's National Development Plan (2015-2020) and Vision 2040.

The Principal Investigator said, three farmer groups were purposively selected for piloting the study namely; Katukole Farmers Group: Nyabuhere, Bugambe Sub County; Buswekera Horticulture Modern Farmers Group: Buswekera, Busisi Division, Hoima Municipality and ; Mark-baika Development Farmers Association: Mparo Division, Bwikya ward, Hoima Municipality.

“Specifically the project aimed at: (i) Adapting suitable rainwater harvesting, low-head smallholder irrigation systems and soil nutrient recycling for all year round commercial production of vegetables; (ii) Enhancing farmers capacity for commercial production and collective marketing of traditional and high value vegetables; and (iii) Facilitating establishment of formal working linkages between farmers, value chain actors and niche markets (existing traders and consumers) Dr. Wanyama reported.

Field size for demonstration was based on the average area each household uses for vegetable production of less than one acre. Production was based on flat bed plot of 20 m x 20 m and a *madala* plot of radius 10 m. These were intended to promote insitu rain water harvesting and control soil erosion as soil and water conservation measures in land preparation and crop production stages.



Farmers in Buswekera village in their demonstration gardens

Rainwater harvesting systems demonstrated included underground water storage tanks (unlined/lined with HDPE Dam liner) and shallow wells. Smallholder irrigation systems demonstrated included overhead sprinkler/drag-hose kit system and drum drip irrigation kit.





The above three pictures show some of the water harvesting technologies introduced to the farmers

Training was done on-farm to guarantee hands on-skills development. Emphasis was placed on farmer to farmer peer extension i.e. use of experienced farmers to train the less experienced

farmers. The approach followed vegetable value chain analysis from production through postharvest handling and value addition to marketing.

Capacity building focused on proper system operation and maintenance and commercial production; Soil fertility management (vermi composting); Post harvest handling, quality standards and value addition and; Collective marketing and business planning.

In his welcome remarks read for him by Dr. Hussein Balimunsi during the stakeholders workshop, the Principal CAES hailed the multidisciplinary and multi institutional partnership involving training and research institutions, private sector institutions used in the implementation of the project.



Dr. Hussein Balimunsi speaking on behalf of the Principal CAES during the workshop

The Principal reminded participants that the agriculture sector in Uganda is faced with a lot challenges related to crop, livestock and fisheries production. Crop related challenges he said included; erratic rainfall patterns, poor agronomic practices, poor post-harvest handling and processing constraints, fluctuating price during peak harvesting period perishability and many others.

He said, as a higher education institution, Makerere University has contributed to the generation of solutions to avert these development challenges by supplying knowledgeable and multi-skilled graduates, providing evidence-based options and solutions to support formulation of interventions and appropriate policies for accelerating national and regional development.

“I am happy to note that this project focused on optimal crop water management mainly supplemental irrigation to provide the deficit in soil moisture needed for optimum crop growth, increase and sustain agricultural production for the ever increasing populations.

The university recognizes the project initiative in vegetable value addition geared towards addressing the dynamic nature of demand for vegetables and their perishability as the only option that can give stable products with extended shelf life.

For many years, when you talk of green vegetables especially *Nakati* in Uganda, the mind will quickly switch to the leafy source. As a university, we are proud to be associated with this

project as it has added a powdered source of greens to Uganda's food plate." The Principal stated.



Mrs. Nyangoma Kahwa Tadeo of Nyabuhere village harvesting fresh Nakati

He said, the recognition of poor manure management and decreasing soil fertility has heralded the need to identify alternative ways of mitigating disease transmission and leaching of nutrients to water bodies by focusing on vermin-compositing as non-complex treatment strategy in which manure can be converted into animal feed (worms) and organic fertiliser.

“We are hopeful that farmers participating in this project are ready to develop and commercialize vegetable based products that respond to the needs of communities to promote health, food and nutrition security, especially among the most vulnerable groups.

The university looks forward to seeing Ugandans taste products mixed with vegetable flour such as porridges, snacks and cookies. Secondly, we are ready to witness vegetable production all year round. The products to be manufactured will be rich in high quality protein and other nutrients, especially those of public health concern. This is an innovation we are proud of as an institution and we'll give it all necessary support to ensure its success.” He said.



Mrs. Nyangoma Kahwa dips the fresh Nakati leaves in hot water to kill germs before solar drying and processing as shown in pictures below of Mrs. Sayuni Byaruhanga of Buswekera village







The Principal applauded the School of Food Technology Nutrition and Bio engineering for creating a strong human capital resource for Uganda and engaging in nurturing viable knowledge based agro-processing enterprises, creating employment and improving food and nutrition security.

He thanked the project funders, implementers, development partners and all stakeholders for taking part in this research. He also thanked the Government of Uganda for the support towards research at Makerere University.

Speaking during the same workshop the beneficiary farmers hailed the project for the training. Notable achievements outlined included increase in yields and incomes from vegetables of participating households in addition to improved income and livelihood of farmers. Farmers testified that they have been able to raise funds to educate their children, meet daily basic needs, build new houses, buy motorcycles and smart phones.



Mr. John Byaruhanga got a Medal as best farmer and trainer during the National Labour day celebrations in May 2017.. He explained the importance of keeping farm records during the workshop

Farmers said, they were able to grow more than one vegetable all year round targeting period of high prices and increased capacity for bulking and collective marketing of vegetables.



Students on a different function at the hotel thronged the farmers stall to buy fruits and vegetables during the workshop

With training in value addition, farmers said they no longer fear to produce in large quantity in case there is no market for fresh vegetables because of value addition technology where greens especially Nakati is solar dried and processed into powder form. As result farmers have expanded their area under crop production and are assured of an income and food all year round.

With adaptation of rainwater harvesting and small holder irrigation, farmers reported that they have sustainable access to water for agricultural production which guarantees sustained market responsive vegetable production all year round. Increased production of the right quantities and quantity and collective marketing will sustain availability of good quality vegetables on the market for the consumers, enhance contract farming and guarantee farmers premium prices from the niche markets.



Beneficiary farmers display some of the products from their gardens during the workshop

Cultivated area with improved soil and water management practices increased in the participating farmer groups by 400% from 0.4 ha to 2 ha. Farmers have been able to invest in expanding the area under irrigation by an additional shallow well and pipes. The demand for the overhead sprinkler/drag-hose irrigation system is emerging in the farmer groups as they appreciate irrigation benefits from the pilot demonstration sites.

There has been creation of rural/peri-urban employment opportunities along the vegetable value chain especially for women and unemployed poor youth.

The workshop was also attended by the representatives from Hoima Local Government including the Chief Administrative Officer (CAO) and the District LCV Chairperson.

Speaking on behalf of Hoima District Chief Administrative Officer, Evelyn Busingye implored farmers and district officials to ensure that the project activities are sustained.

“We do not want this project to stop here. We want to sustain the activities to avoid wasting money. We want to proceed and improve on production and as stakeholders in vegetable production we should start laying strategies”. Busingye said.



Participants posing for a group photograph after the closure of the workshop in Hoima

The CAO also said the district was not ready to see the project equipment go to rust. She pledged the district commitment to mobilize more farmers to join vegetable production.

Busingye also expressed the district readiness and willingness to provide technical services to sustain and improve the project activities.

“The project activities will be included in the district plans and budgeting. We shall see how to bring up extension staff and link up with the municipal council”. She promised.

While closing the workshop on behalf of the LCV chairman, the district secretary in charge education and health Jackson Mulindambura expressed gratitude about the project’s output and the selection of Hoima district in the pilot process.

Mulindambura appreciated the project’s approach bringing together all environmental aspects without destruction of the environment .

“ This is the kind of approach the country should adopt - where you are conserving water, irrigating, mulching and increasing wealth without destruction of the environment. Our farmers are now technical experts in the way they are handling agriculture.” Mulindambura said.

He advised farmers to organize themselves in associations and cooperatives if they are to benefit from government programmes and financing from other stakeholders.

“ We are in the liberalized economy where government has no control over prices. It remains the will of the people to form cooperatives.

These three groups of farmers can form cooperatives for recognition and demand for inputs.

If you resolve now or today to form a cooperative, the CAO and the district officials will do the needful. Start now and come and we register you”, He emphasized.

He disclosed that the district has many prospects and ongoing projects providing resources and opportunities that farmers can tap into. These include resources in the Office of the Prime Minister for cage fish farming and water conservation, the Refugee desk which can fund some farmer activities, funds for corporate responsibilities from companies constructing the airport and the oil refinery.

He also urged farmers and all stakeholders in vegetable production to take standardization seriously if they to compete on the market.

“The more we increase production, the better we shall feed the market. There are so many prospects and projects in Hoima. There is more licensing of three other oil blocks. More people coming in, will need more vegetables”, He noted.

Mulindambura thanked the Makerere team and collaborators for the project implementation in Hoima and the resultant outcome that has improved livelihoods.

He pledged the district commitment to mobilize support through proposal writing and wooing investors in the district to support agricultural activities for improved nutritional security and farmers incomes.

“ The recent Uganda demographic survey indicated that 6 out of every 10 children in Hoima are malnourished and stunted largely because of the attitude. When you produce these vegetables, do not sell everything but ensure that it is on your family menu too.

He described the project activities as an opportunity to transform Hoima and her people. He also thanked farmers associations involved in the project for their commitment saying, this was a demonstration that Banyoro are hardworking people.

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