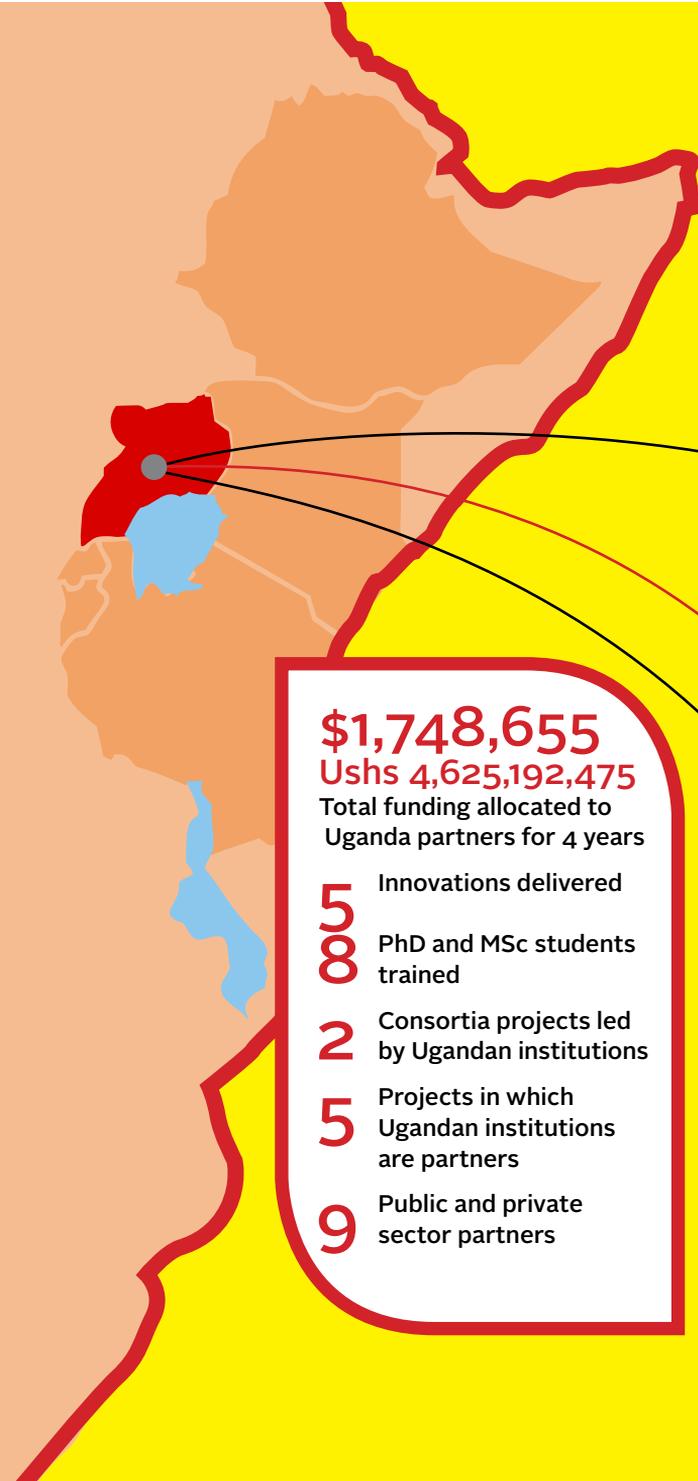


# BioInnovate in Uganda

Creating effective partnerships along bio-innovation value chain



**\$1,748,655**  
**Ushs 4,625,192,475**  
Total funding allocated to Uganda partners for 4 years

- 5** Innovations delivered
- 88** PhD and MSc students trained
- 2** Consortia projects led by Ugandan institutions
- 5** Projects in which Ugandan institutions are partners
- 9** Public and private sector partners



# Bio-Innovate in Uganda

Bio-Innovate Program supports multi-disciplinary biosciences and product-oriented innovation activities in the eastern Africa countries of Burundi, Ethiopia, Kenya, Rwanda, Tanzania and Uganda.

Uganda land mass is 236,040 km<sup>2</sup> and is recognized for being home to Lake Victoria the largest lake in Africa. As of 2014, Uganda's population had reached 39 million and counting. The country's growth rate of 3.1% annually is considered to be one of the highest in the world. Gross domestic product (GDP) growth averaged 7% per year in the 1990s and the 2000s. This peaked to 5.2% in 2013. Agriculture is at the heart of its economy and accounts for 45% of the country's GDP while engaging 73% of the country's labor force primarily in the rural areas. This forms the livelihood for three million smallholder families. Agricultural productivity remains low despite the favorable agriculture conditions and fertile land available.

## BioInnovate Partners in Uganda

### Public Sector Institutions

1. Makerere University
2. Kachwekano Zonal Agricultural Research and Development Institute
3. National Crops Resources Research Institute
4. Uganda National Council on Science and Technology
5. Biosciences for Eastern and Central Africa (BecA-ILRI hub)
6. International Crops Research Institute for the Semi-Aid tropics
7. International Potato Center Sub-Saharan Africa

### Private Sector Partners

1. Biocrops Limited
2. Lisha Products Limited
3. Peak Value Limited
4. City Abattoir Traders Development Association

### Not for Profit Sector Partner

HarvestPlus

## Innovation Products and Technologies Developed

- Drought and disease resistant sorghum, sweet potato and cassava varieties developed.
- Low cost and rapid tissue culture multiplication protocol for sweet potato developed
- Integrated industrial effluent management technology combining bio-digestion and artificial wetlands to produce bio-energy, bio-fertilizer and recyclable water from slaughterhouse waste has been pilot-tested.
- Prototype sorghum-based instant flour, non-alcoholic clear malt drink and ready to eat snack bars developed.
- Policy and regulatory recommendations that will support the uptake of bio-pesticides and industrial effluent management technologies in the region developed.

# Improving Food and Nutrition Security, Climate Change Adaptability, Productivity



## Sorghum and finger millet innovations project

Sorghum and finger millet has been essential staple foods in the semi-arid tropics of Africa for centuries. Nutritionally these grains are a good source of protein and other minerals. However, productivity remains below their genetic potential due to low research investment that can address these challenges. Overall the project is looking into technologies that can minimize climate change effects, raise productivity and increase income.

### Achievements

Superior lines for sorghum that are drought tolerant evaluated and identified.

### Partnerships

- Makerere University
- National Crops Resources Research Institute

## Cassava potato and sweet potato agricultural innovations project

Cassava, potato and sweet potato are three important cash and food crops that can provide food security and adaptation to climate change in the sub-Saharan sector. Productivity is a challenge as there lacks an efficient seed delivery system for smallholder farmers as well as clean planting material that are drought and disease resistant as well as being adaptable to specific agro-ecological zones.

### Achievements

Drought and disease resistant varieties for sweet potato and cassava developed.

### Partnerships

- Makerere University
- Kachwekano Zonal Agricultural Research and Development Institute
- HarvestPlus
- Uganda National Seed Potato Producers Association
- Biocrops Limited

# Waste Treatment, Production of Bio-energy from Renewable Bio-resources and Securing Fresh Water Resources



## Integrated wastewater treatment and value addition project

In the eastern African region, it is estimated that only 10% of the existing industries treat their wastewaters to any degree. The majority of the agro-process industries discharge their effluents directly into nearby water bodies and open land without any form of treatment.

The discharge of untreated wastewaters is affecting the health of the people living in downstream communities as well as posing a significant threat to the biological resources in the region.

Hence there is need to develop adaptable technologies to manage and add value to agro-industrial waste and wastewater. The project has

technologies that combined bio-digestion and wetlands technologies to produce bio-energy, bio-fertilizers and recyclable water.

### Achievements

A fully operational integrated industrial wastewater management system combining bio-digestion and artificial wetlands to produce bio-energy, bio-fertilizer and recyclable water from slaughterhouse waste has been piloted in a partnership between Makerere University and Kampala City Abattoir.

### Partnerships

- Makerere University
- Kampala City Abattoir Traders Development Association

# Innovation incubation and promotion of targeted value chains

## Sorghum and finger millet value addition project

Sorghum and finger millet are two traditional crops that are deeply rooted in agricultural and food systems of the people of eastern Africa. Sorghum and millet are some of the major cereals grown in eastern Africa region. They are nutritionally superior to other mainstream cereals e.g. maize and wheat with substantial amounts of iron, calcium and zinc. In addition, they are resilient and can grow in semi-arid conditions and require relatively low inputs, which partly makes farming of these cereals attractive to farmers. The production of these crops is still very low due to a number of reasons among them the lack of market for the grains.

Traditional processing of sorghum and millet to produce various products is one of the sources of household income. However, commercialization has however been limited due to poor quality, safety and short shelf life. Applying appropriate bio-enrichment technologies leading to

diversification and commercialization of products is envisaged to create a market and demand for these cereals; hence benefiting the key players in the sorghum and finger millet value chain particularly the smallholder farmer and consuming public.

### Achievements

- Prototypes of sorghum-based non-alcoholic clear malt drink and puffed-extruded snack foods developed and subjected to consumer testing in a partnership between Makerere University, Peak Value Ltd and Lisha products Ltd.
- Manual for improved postharvest handling for sorghum and millet adapted to local conditions has been produced and pretested

### Partnerships

- Makerere University
- Lisha Products Ltd
- Peak Value Ltd



# Bio-resource innovation policy analysis and sustainability



## Biosciences innovation policy project

In the region, there has been an awakening with governments realizing that science, technology and innovation (STI) are critical to the transformation of economies, reduction of poverty, and integration of the continent into the global knowledge economy.

Advances in biosciences offers the region opportunities to fully exploit the genetic potential and improve crop productivity, present new agro-processing opportunities to diversify smallholder productions, increase demand for local crops, thereby improving rural livelihoods.

However, enabling policy environment and support system is required that promotes bio-innovation and eventual commercialization of these technologies.

### Achievements

Policy and regulatory recommendations that will support the uptake of bio-pesticide and industrial effluent management technologies in the region have been developed.

### Partnerships

Uganda National Council on Science and Technology

## Bio-Innovate Mandate

Eastern Africa is well endowed with huge renewable bio-resources that can be harnessed to stimulate economic growth and competitively position the region in the global economy. For the region to integrate these bio-resources into economic growth, the link between research, innovation and end users has to be strengthened.

The region faces the challenge of poor crop productivity and resilience to climate change in small-scale farming systems, lack of sustainable industrial waste management systems as well as sustainable use of resources (water and land), minimal investments in technology incubation and other mechanisms for putting research into use, and absence of enabling policy environment for mobilization, catalysis and nurturing of a strong bio-resource and science-led economic growth agenda. Bio-Innovate is providing a regional platform through functional academia and private sector partnerships to support the generation and delivery of bio-innovations that will utilize and translate bio-resources into products and services, as well as innovation policy analysis to support the uptake of these technologies. The Program is supported by the Swedish International Development Cooperation Agency (Sida).

### Vision

The Program's vision is to be a model of how to transform bioscience research to innovation and ultimately pass these products to the end user, and in the process ensure that science, technology and innovation actively contributes to socio-economic development and improve livelihoods in the region.

### Innovation platforms

Bio-Innovate has adopted a unique approach that involves the creation of functional innovation platforms to deliver products to the end users. To actualize this concept, the Program's consortia projects are designed to include key actors along innovation value chains including scientists, private sector, and other market actors.

The Program is providing an innovation platform that transcends universities, national and international research institutes, regional bioscience initiatives, private sector companies, NGOs and other developmental actors in the eastern Africa region.

### Program Management

The Program is hosted at the International Livestock Research Institute (ILRI) in Nairobi, Kenya. The day-to-day management of the Program is conducted by a Program Management Office and supported by a regional technical advisory committee that provides overall Program implementation oversight.



[www.bioinnovate-africa.org](http://www.bioinnovate-africa.org)



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