Bio-Innovate in Kenya

Creating effective partnerships along bio-innovation value chain

$2,260,502

Kshs. 198,698,125

Total funding allocated to Kenya partners for 4 years

- **5** Innovations delivered
- **5** PhD and MSc Students trained
- **2** Consortia projects led by Kenyan institutions
- **6** Projects in which Kenyan institutions are partners
- **14** Public and private sector partners

Bio-Innovate in Kenya

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.

By 2013, Kenya's population had clocked 44 million people. The country has the biggest GDP in Southeast and Central Africa with a per capita income of $1,800. Kenya has a thriving service industry and a growing manufacturing, industrial and ICT sectors. However, agriculture dominates as the main economic activity employing more than two-thirds of the population and contributes almost 51% of GDP.
The country is a hub for financial, communication and transportation services in the region.

BioInnovate Partners in Kenya

Research and Public Sector Institutions

1. Kenya Agricultural Research Institute
2. Jomo Kenyatta University of Agriculture and Technology
3. Moi University
4. Maseno University
5. University of Nairobi
6. Pwani University
7. National Commission for Science, Technology and Innovation
8. Biosciences for Eastern and Central Africa
9. International Crops Research Institute for the Semi-Aid tropics
10. International Potato Center Sub-Saharan Africa
11. International Service for the Acquisition of Agri-biotech Applications

Private Sector Partners

- The Real IPM Company Limited
- Kilifi Plantations
- Genetics Technologies International Ltd
- Trufoods Ltd

Innovation Products and Technologies Developed

- Drought and disease resistant sorghum, finger millet, sweet potato, cassava, and canning bean varieties
- Technology for utilizing industrial sisal processing waste for mushroom production.
- Technology for bio-enhancing maize and vegetable seeds with bio-pesticides
- Policy and regulatory recommendations developed to support the successful uptake of biopesticides and industrial effluent management technologies in the region

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 and finger millet that are drought tolerant and early maturing are being evaluated in the National performance trials as a prerequisite for commercialization of the varieties

Partnerships

- Moi University
- Maseno University
- International Crops Research Institute for the Semi-Aid tropics

Cassava potato and sweet potato agricultural innovations

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 their lacks an efficient seed delivery system for clean planting material for smallholder farmers that are drought and disease resistant and adaptable to specific agro-ecological zones.

Achievements

Drought and disease resistant varieties of potato, sweet potato and cassava developed.

Partnerships

- Kenya Agricultural Research Institute (KARI)
- International Potato Center (CIP)

Beans agricultural innovations

Kenya has a thriving canning bean industry but is currently not able to meet the demand for canning beans due to lack industrial quality beans. The canning industry in the region has had one canning variety, the Mexican 142 to work with for 60 years. This variety has succumbed to diseases like rust, angular leafspot, bacterial blight and has become susceptible to drought conditions over time. In addition, there is no organized production of certified seed for the bean farmers servicing the canning industry, forcing the industry to import grain from Ethiopia due to productivity shortfalls in Kenya that in most cases is of poor quality and still inadequate.

Achievements

Through a partnership between two research organizations and the canning industry, ten canning bean lines that exhibit higher yields because they combine drought tolerance with multiple disease resistance, and that are also industrially acceptable for processing are currently under evaluation in the national performance trials. This is a prerequisite to commercialization of the varieties.

Partnerships

- University of Nairobi
- Kenya Agricultural Research Institute
- Trufoods Ltd
- Njoro Canners Ltd

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

Integrated waste treatment and value addition innovations for coffee and sisal processing waste project

As African countries strive to shift from primary agrarian economies to industrial based bio-economies with emphasis on value addition, sustainable handling of industrial waste will be key. Eastern Africa produces huge amounts of agro-waste from agricultural activities. This waste is in many cases disposed off haphazardly contributing to pollution that result in the generation of greenhouse gases.

This waste can also be recycled to produce value added products. In the case of sisal processing only 2% of the sisal plant goes into producing sisal fibre with the rest considered waste in addition to huge amounts of wastewater from the processing. Innovation technologies are therefore necessary to not only manage the disposal of agricultural and agro-process biomass but also add value to produce products like food, feed, bio-fertilizer and bio-energy.

Achievements

- Pilot scale system using sisal processing waste to grow mushroom has been tested and optimized in partnership with Kilifi Plantations.
- National Environment Management Authority (NEMA) the regulatory authority has issued a license for approval of waste treatment pilot system.
- Pre techno-economic feasibility studies of producing mushroom from sisal processing wastes has been conducted and found to be economically feasible on the basis of return on investments.

Partnerships

- Pwani University
- Kilifi Plantations

Innovation incubation and promotion of targeted value chains

Bio-enhanced seeds and seedlings project

There are growing global concern on the impact of pesticides on consumer health, and especially so in the traditional export markets of the European Union (EU) which has placed restrictions on certain chemicals as well as maximum residue levels (MRLs) in marketable produce. Recently the European Union the destination of horticultural products from the region, introduced stringent quality control measures to check the conformity to maximum residue limit allowed. Farmers in the region are bearing the brunt of strict EU, regulations on pesticides, which threaten to cripple the horticulture sector. An alternative approach would be to utilize bio-pesticides. Microbial biological control using bio-pesticides offer a much-needed alternative to chemical pesticides. However, this technology has not permeated to smallholder farmers in the region who are in dire need of non-chemical based pest and disease management approaches.

Achievements

The project has developed and produced commercial protocols for tomato, eggplant and maize enhancing with bacterial and fungal based bio-control agents and efficacy tests at experimental fields have been conducted and further validated at farmers' fields in the country.

Partnerships

- Jomo Kenyatta University of Agriculture and Technology
- Real IPM Company Limited

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 offer 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.

Partnerships

- National Commission for Science, Technology and Innovation
- International Service for the Acquisition of Agri-biotech Applications

Achievements

Policy and regulatory recommendations for the successful uptake of bio-pesticides and industrial effluent management technologies in the region have been developed.

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.

Bio-Innovate
Bio-Resources Innovations Network for Eastern Africa Development
Africa

www.bioinnovate-africa.org

ILRI
INTERNATIONAL LIVESTOCK RESEARCH INSTITUTE

SWEDEN

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