



**BIORESOURCES INNOVATIONS NETWORK FOR
EASTERN AFRICA DEVELOPMENT PROGRAMME**

(BIOINNOVATE AFRICA)

Phase III

(1 April 2022 – 31 December 2026)

Improving Lives through Sustainable Biologically Based Innovations

A Technical Summary

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Table of Contents

Abbreviations	iv
List of Tables.....	v
List of Figures	vi
Summary.....	vii
1. Background.....	1
2. Lessons from BioInnovate Africa Phase I and II.....	1
3. BioInnovate Africa Phase III.....	2
4.0 How BioInnovate Africa Contributes to Sida’s Five Perspectives	7
5.0 Gender Considerations.....	7
6.0 Patents and other Intellectual Property Rights.....	8
7.0 Implications of the COVID-19 Pandemic	8
8.0 Monitoring, Evaluation and Learning	8
9.0 References.....	8

Abbreviations

ARM	Annual Review Meeting
AUDA	African Union Development Agency
BA	BiInnovate Africa
COVID-19	Coronavirus Disease 2019
DRC	Democratic Republic of the Congo
EAC	East African Community
GDP	Gross Domestic Product
<i>icipe</i>	International Centre of Insect Physiology and Ecology
ILRI	International Livestock Research Institute
IP	Intellectual Property
IPCC	Intergovernmental Panel on Climate Change
M&E	Monitoring and Evaluation
NEPAD	New Partnership for Africa's Development
PAC	Programme Advisory Committee
PMO	Programme Management Office
R&D	Research and Development
RBM	Results Based Management (Matrix)
SARS-COV-2	Severe Acute Respiratory Syndrome Coronavirus 2
SDG	Sustainable Development Goals
Sida	Swedish International Development Cooperation Agency
ToC	Theory of Change

List of Tables

Table 1: General Criteria for Selection of Proposals..... 5

List of Figures

Figure 1: BioInnovate Africa Theory of Change	4
Figure 2: BioInnovate Africa Two Stage Granting Process	5

Summary

Over 58% of the population of Sub-Saharan Africa live in rural areas and depend directly on biological resources for food, fuel, medicine, housing and other uses (World Bank, 2021). They use the biological resources in raw form and dispose of significant portions as biological waste.

With BioInnovate Africa, scientists in eastern African universities, research institutes and firms can add economic and social value to the biological resources and turn the biological waste into useful substances in ways that create new biologically (bio) based solutions for households and firms. Scientists collaborate with business leaders and government officials within their countries and across the region to co-develop biobased solutions, which include healthy and nutrient-rich foods and feed, safer and cleaner industrial processing methods, and better health care delivery systems. These biobased solutions are designed with the aim of mitigating against and helping communities adapt to climate change, conserve biodiversity, and safeguard the environment. Thus, the scientists improve value chains that link farmers' produce to local and regional markets, especially bioprocessors; and accelerate the transition from subsistence to commercial farming, thereby contributing to poverty reduction in the long term.

BioInnovate Africa provides immense opportunities for scientists to realise their full potential and fulfil their dreams of linking innovative biobased solutions to industry and practical uses in society. The scientists promote regional integration through mutual scientific cooperation as they work together with their counterparts in other countries: Burundi, Democratic Republic of the Congo (DRC), Ethiopia, Kenya, Rwanda, South Sudan, Tanzania, and Uganda. Cooperation is reinforced by progressive policies and practices that foster innovation collaboration, learning and competence building.

1. Background

BiInnovate Africa was established in 2010 with support from the Swedish International Development Cooperation Agency (Sida). It is implemented as a regional science and innovation-driven programme of the International Centre of Insect Physiology and Ecology (*icipe*) since October 2016. *icipe* is headquartered in Nairobi, Kenya, and is responsible for technical, legal, and fiduciary operations of BiInnovate Africa. BiInnovate Africa participating countries include Burundi, Democratic Republic of the Congo (DRC), Ethiopia, Kenya, Rwanda, South Sudan, Tanzania, and Uganda.

BiInnovate Africa enables scientists¹ in eastern African universities, research institutes and firms to translate biologically based ideas, inventions and technologies into practical uses that benefit society. This contribution of BiInnovate Africa has become even more crucial today because of the global commitments in implementing sustainable solutions for humanity during this decade leading up to the achievement of the Sustainable Development Goals 2030 (United Nations, 2021). BiInnovate Africa addresses most of the issues residing in the SDGs by bringing together government sectors, academia, private sector, development partners and communities.

Additionally, BiInnovate Africa's contribution is aligned with the aspirations of the African Union Agenda 2063, the Science, Technology, and Innovation Strategy for Africa 2024, the African Union Green Recovery Action Plan 2021-2027 and other related regional and continental development frameworks that promote smart economic growth and social development through sustainable industrialisation. Innovating through biological resources (bioeconomy) is arguably one of the surest ways to provide alternative carbon neutral solutions to the existing patterns of unsustainable production and consumption, and heeds the Intergovernmental Panel on Climate Change (IPCC)'s calls to action to reduce carbon emissions and save the world from further warming (IPCC, 2021).

Overall, BiInnovate Africa supports experimentation of novel ideas and products and promotes incubation and business model innovation, which are essential and integral to the innovation process. BiInnovate Africa enabled activities range from laboratory and field evaluations of biologically based products to production of minimal viable products and testing business models with specific customer segments. These efforts ultimately contribute to diversifying sources of growth and employment by linking primary produce to agro/ bioprocessing and to new market opportunities, especially for small holder farming communities – mostly women and youth - in the region that rely exclusively on biological resources for their livelihoods.

2. Lessons from BiInnovate Africa Phase I and II

During phase I (2010-2015), BiInnovate Africa demonstrated the value of regional collaboration in research and innovation. It cemented relationships among research institutes, universities, and government agencies in eastern Africa, especially in bioscience research and innovation. During phase II (2016 – 2021), BiInnovate Africa further demonstrated the value of regional collaboration in research and innovation. Emphasis was made on ensuring that scientists, businesspeople, and government officials worked co-creatively to develop products, and to offer solutions using appropriate business models.

¹ “Scientists” includes all individuals qualified in and/or creatively practicing physical, natural and engineering sciences, medicine, business, social or other related discipline.

A team of three independent consultants who conducted an external evaluation of BioInnovate Africa from December 2020 to May 2021, noted that all BioInnovate Africa supported projects progressed well despite many institutional and other challenges, including the COVID-19 pandemic. However, many of the projects showed signs that they would be sustainable and could make a difference in creating jobs, improving lives, and supporting sustainable and inclusive growth in eastern Africa.

3. BioInnovate Africa Phase III

3.1 Guiding Principles

BioInnovate Africa phase III is guided by the principles of:

- a. *Innovation* that demonstrates clear environmental, health, social and economic benefits to society,
- b. *Environmental Sustainability* with a goal towards reduced carbon emissions, biodiversity conservation and improved ecosystem services,
- c. *Regional Integration* to encourage mobility of scientists, and knowledge sharing, and create opportunities for investment and trade, and,
- d. *Gender Mainstreaming* ensuring that research and innovation activities are sensitive about and respond to specific needs of women and men, including gender parity and equity.

3.2 Thematic Areas

BioInnovate Africa's thematic areas are:

- a. Value addition to agro-produce and other biological resources

This includes new food production and processing methods that promote circular food systems; new ways of reducing post-harvest losses; novel green industrial chemicals; biomaterials for packaging and construction; and biological fuels. Value addition may also include use of digital tools and enabling technologies such as artificial intelligence and machine learning in conserving biodiversity and ensuring sustainable supply and regeneration of biological resources.

- b. Biological Waste Conversion

Biological waste conversion involves methods of turning agro/biowaste and other feedstock into useful renewable products including product recovery from solid waste, using insects as biowaste converters, watershed preservation, and wastewater treatment and reuse and bioenergy production. Other useful products may include improved feed from waste, bioprocessing using selective biocatalysts/enzymes, or safe green chemicals, agroecological practices and community-based biorefineries that diversify and strengthen value chains.

- c. Biologically based Healthcare Products

This includes biopharmaceuticals and diagnostics for key human diseases affecting the region. It also involves use of indigenous knowledge and standardized dosages, which make traditional medicine safer and more efficacious. Other products may include biologically based topical applications for skin care that are derived from the region's biodiversity and would target niche markets or benefit from fair trade initiatives for poorer communities in the region.

3.3 Goal and Objectives

The overall goal of BioInnovate Africa is to improve the lives of people in eastern Africa through sustainable biologically based innovations.

The development objective of BioInnovate Africa is to strengthen capacity of eastern African universities, research institutes and firms for translating biologically based ideas, inventions and technologies into new practical solutions that address development challenges of the region and benefit society, while conserving biodiversity, mitigating, and adapting to climate change.

The specific objectives are to:

- a. develop capacity of scientists for translation of research outputs into practical solutions.
- b. create enabling environments within eastern African universities, research institutes and firms for innovation collaboration.
- c. study innovation collaboration models that are relevant for and foster development of a sustainable bioeconomy in eastern Africa.

3.4 Theory of Change

BioInnovate Africa's interventions ultimately contribute to poverty reduction in the countries and communities where its beneficiaries come from in eastern Africa. In making this contribution, BioInnovate Africa assumes that the innovation process of translating scientific knowledge and research outputs from universities, public research institutes and firms into practical solutions is the basis for economic growth, social development, and poverty reduction. New practical solutions stimulate entrepreneurial activities, which in the case of BioInnovate Africa, would involve primary biological resource producers, agroprocessors, and several service providers along the value chains, thereby creating job opportunities (especially for women and the youth), widening the tax base for countries, increasing incomes for households, and ensuring that people live in a safe and clean environment and enjoy healthy lifestyles. For this to happen, scientists from universities, research institutes and firms should have the capacity to innovate, and the institutional environment where they work should facilitate creative and collaborative activities with businesspeople, government officials and communities. Evidence should be generated continuously to support policy and investment decisions on biologically based solutions and the conservation of biodiversity as the raw material resource base. Therefore, BioInnovate Africa's interventions involve developing capacity of scientists to translate research outputs into practical solutions, making institutional environments conducive to their work and conducting innovation studies to strengthen the evidence base for policy and decision making. This theory of change is illustrated in Figure 1.

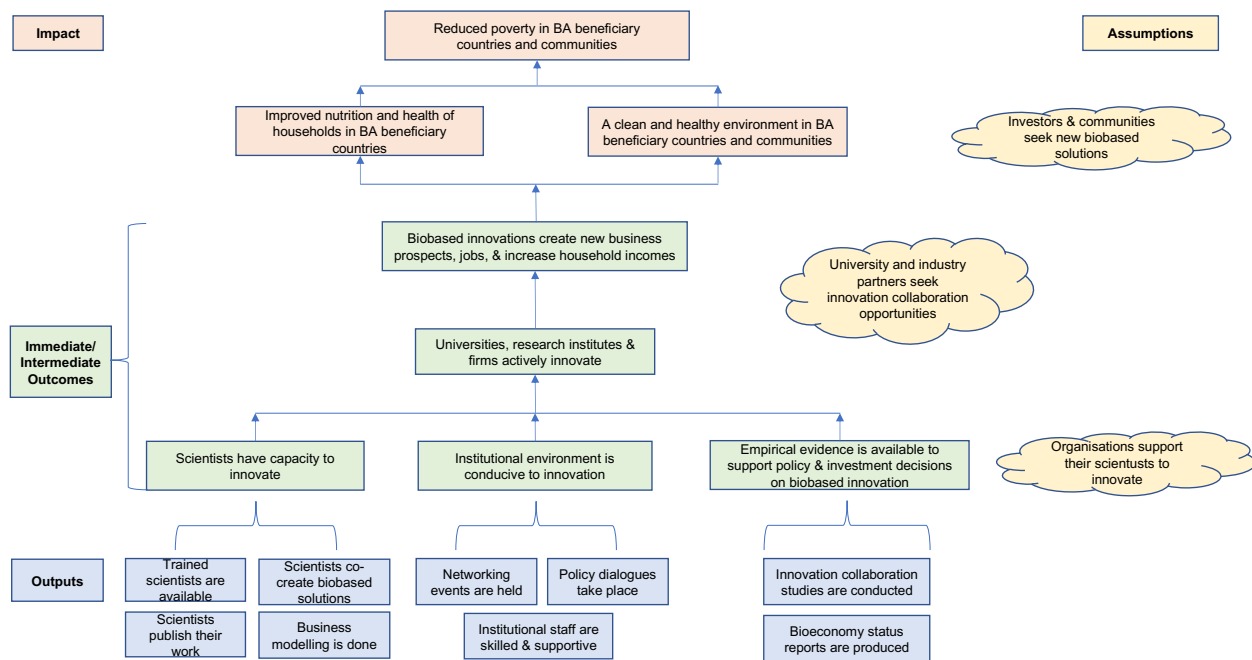


Figure 1: BioInnovate Africa Theory of Change

3.5 Beneficiaries

The primary beneficiaries of BioInnovate Africa are:

- Scientists in universities, research institutes and firms (private sector companies), who translate their innovative biologically based ideas, inventions, or technologies into new practical solutions.
- Mid-career women scientists (fellows) and MSc/PhD students who acquire research and bioentrepreneur skills through their participation in BioInnovate Africa supported projects.
- Universities, research institutes and firms that improve their institutional innovation ecosystem by, for example, introducing new policies and practices that foster creative thinking and innovation, including improvements in financial, administrative and procurement management.
- Farmers (including smallholder and pastoralists) or other custodians or owners of biological resources who get linked to new market opportunities.

3.6 Components

BioInnovate Africa has three programme components, which are briefly described below.

3.6.1 Component One: Grants for Innovation Collaboration Projects

This component comprises grants for innovation collaboration projects involving scientists in eastern African universities or research institutes and their counterparts in firms or industry and government.

a) Types of Grants

Type 1: Grants for Regional Innovation Collaboration Projects

These grants are competitively provided to scientists to carry out innovation projects in BioInnovate Africa’s thematic areas. Scientists form teams and work regionally across countries and collaboratively with private sector companies, the latter being the route to commercialising the innovative biologically based products.

Type 2. Grants for Early-Stage Technology Incubation

These grants are provided to project teams to acquire knowledge, skill and develop tools to participate in the creation or establishment of innovative biologically based enterprises. Innovative ideas may come from university scientists, researchers, or entrepreneurs.

b) Selection Criteria

BioInnovate Africa publishes and widely distributes calls for project proposals in the region and internationally through websites, social media, national newspapers, and networks. After the calls are issued, BioInnovate Africa organises awareness and information sharing workshops or webinars to enable prospective project teams to prepare high quality proposals and respond well to the calls. Women are highly encouraged to participate in the call process as prospective project team leaders and members of the project team.

BioInnovate Africa uses a two-stage selection process shown in Figure 2. First, concept notes are invited. When the concept notes are received, they are screened for eligibility. An independent expert group of three to five individuals then reviews and assists in preparing a shortlist of the concept notes that should proceed to the next stage of the evaluation. The shortlist is reviewed and decided upon by the BioInnovate Africa Programme Advisory Committee (see section on BioInnovate Africa governance). The shortlisted concept notes then proceed to the next stage of full proposal development.

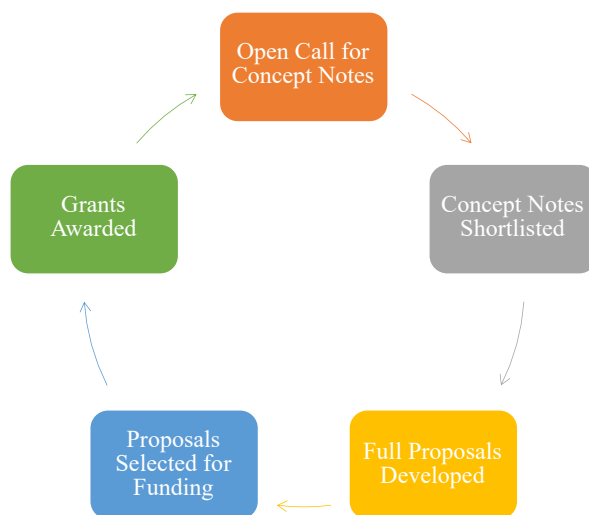


Figure 2: BioInnovate Africa Two Stage Granting Process

Each full proposal is externally evaluated by two or three experts. The evaluators use the general criteria for selection of proposals shown in Table 1.

Table 1: General Criteria for Selection of Proposals

No.	Criterion
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1	Regional relevance or benefit of the project
2	Innovativeness of the proposed solution (scientific and technical aspects)
3	A well-articulated need that the solution will address
4	Environmental sustainability of the project, its contribution to carbon emissions reduction and biodiversity conservation and ecosystem services improvement
5	Team composition and motivation of the members (gender balance in the team is highly encouraged)

The PAC makes the final selection of proposals to be funded based on the external evaluation report on each proposal and their own assessment of the quality, feasibility, and potential impact of the proposal. The PAC may or may not invite project teams to present their full proposals as part of the evaluation process. The selected proposals are forwarded to *icipe* and Sida for their endorsement, and afterwards, the award process commences.

The award process involves assessment of the administrative and financial management capacity of the prospective grantees, and other verifications that may be required. Furthermore, projects selected for funding are subjected to a preparatory phase, where they adjust their proposals based on PAC and expert reviewers' comments, refine their results matrices, prepare procurement plans, and conclude budget preparations and other contracting issues. The preparatory phase also allows for assessment of capacity gaps or training needs of the grantees. The collaborating project partners also use this time to discuss and agree on intellectual property rights and arrangements for sharing benefits that may arise from the products developed and commercialised or from enterprises that may be established. The project effectiveness date is the date of the first signing of the project agreement.

3.6.2 Component Two: Institutional Innovation Ecosystem Strengthening

Activities under this component include networking, community engagement, innovation policy dialogues with government officials responsible for science, industry, finance, and the national economy. The dialogues focus on pertinent issues of a policy nature, such as guidelines for registration of bioproducts, standards setting, intellectual property management, benefit sharing, access to finance, etc., that are important for building a sustainable and resilient bioeconomy in the region.

3.6.3 Component Three: Innovation Studies

Under this component, BioInnovate Africa carries out systematic reviews and studies of models for innovation capacity strengthening and professional biobased incubation as part of the innovation ecosystem support. Generating evidence and documenting lessons learned improve BA programming and inform policy processes that seek to connect academia and industry and translate research outputs to practical uses in society.

3.7 Governance

The governance structure of BioInnovate Africa comprises the Annual Review Meeting (ARM), Programme Advisory Committee (PAC), and a Program Management Office (PMO). The ARM is a joint *icipe*-Sida forum to review implementation progress, including making decisions on the programme's design, financial performance and funding needs, annual audits, administration and human resource needs, and other strategic matters. The PAC provides both technical and strategic guidance. The PAC also contributes towards BioInnovate Africa's visibility, ownership, and

sustainability within the region and abroad, and ensure that BioInnovate Africa's goals are aligned with national and regional priorities. The PMO is responsible for the day-to-day management and operation of BioInnovate Africa.

3.8 Cooperative Activities

As an active player in the innovation ecosystem of eastern Africa, BioInnovate Africa engages with policy institutions and governments, especially links with the East African Science and Technology Commission, and the ministries, commissions and councils of science and technology in the BioInnovate Africa participating countries. Furthermore, BioInnovate Africa partners with other Sida supported research or science related initiatives in the region. BioInnovate Africa also participates in continental activities of the African Union and the African Union Development Agency-NEPAD and in international bioeconomy development efforts such as the Global Bioeconomy Summit, and other relevant initiatives or networks that share BioInnovate Africa's vision of a sustainable and resilient African bioeconomy.

4.0 How BioInnovate Africa Contributes to Sida's Five Perspectives

The aspirations, goals, and design of BioInnovate Africa phase III are aligned with Sida's five perspectives as follows:

- a. *The Poor*: By adding value to biological resources, farmers can improve their market connection and profitability, and consequently, their productivity. In the long run, household incomes would increase, and food systems would be more sustainable and resilient.
- b. *Human Rights*: BioInnovate Africa exercises fairness and provides equal opportunities for all people who are eligible to compete and receive its grants and other technical support.
- c. *Gender*: BioInnovate Africa promotes gender equality and empowers women, e.g., through the fellowship scheme for mid-career women scientists, which provides opportunities for women to advance their knowledge and skills in bioscience research, innovation, and bio-entrepreneurship. BioInnovate Africa conducts gender analyses and operationalises a gender strategy and yearly gender action plan.
- d. *Environment and Climate Change*: BioInnovate Africa projects and activities are inherently environmentally friendly and promote sustainable nature-based solutions. BioInnovate Africa promotes the ideals of a circular and sustainable bioeconomy, aiming at conservation of biodiversity, and reduced carbon emissions.
- e. *Conflict Prevention*: BioInnovate Africa promotes mutual collaborations among scientists in the region and encourages science diplomacy and diffusion of best practice, which fosters regional integration and contributes to peace building.

5.0 Gender Considerations

Consideration of gender issues is an important aspect of technology development and the innovation process pertaining to biological resources. In households, men and women play specific roles with respect to decisions on conservation and use of biological resources, farm inputs and marketing of produce. Gender issues may differ from community to community, and therefore, should be analyzed and addressed in the specific context. BioInnovate Africa regularly carries out gender analyses of its

interventions, and implements actions aimed at mainstreaming and integrating gender in all its activities.

6.0 Patents and other Intellectual Property Rights

Patents and other forms of intellectual property (IP) rights like copyright, trademarks, industrial designs, and geographic indications are crucial in any innovative activity involving biological resources. BioInnovate Africa's policy regarding IP is that IP belongs to the grantees and is managed according to the prevailing IP policy of the grantee organisation. If the grantee organisation does not have an IP policy, then it may use specific IP guidelines developed by BioInnovate Africa to manage the IP in the project. Grantees working as a project team should sign a collaborative project agreement developed by BioInnovate Africa. The agreement has clauses, which address IP arising from joint project activities, such as background and foreground IP. Additionally, BioInnovate Africa provides technical assistance and training on how project teams and their organisations can improve the management of IP. Other aspects of benefit sharing, which relate to access to genetic resources from farming communities or conservation/protected areas, are managed according to the prevailing regulations in the respective countries.

7.0 Implications of the COVID-19 Pandemic

COVID-19, which was first identified in December 2019 in Wuhan, Hubei Province, China and declared a pandemic by the World Health Organization on 11 March 2020, affected BioInnovate Africa, just like any other persons, organisations, and firms at the time. As part of the lessons learnt, BioInnovate Africa will continue with modest investment in online resources to support blended in-person and virtual activities, adherence to workplace hygiene and safety for staff and visitors and observing any recommended health protocols to prevent or control recurring, emerging or reemerging infections.

8.0 Monitoring, Evaluation and Learning

BioInnovate Africa's results-based management matrix (RBM), which illustrates its impact pathway and expected results is updated annually, and reviewed at the ARM. Each BioInnovate Africa supported project also prepares an RBM as an integral part of the project proposal and project grant agreement. An assessment of outputs is done by reviewing six-monthly progress reports submitted by implementing partners. Lessons learnt through this exercise is used to improve programme implementation. There is also to be a midterm evaluation of BioInnovate Africa phase III, and ex-post evaluation, both of which will be done by independent external consultants.

9.0 References

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