Biosciences Innovation Policy Consortium for Eastern Africa (BIPCEA)

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International Livestock Research Institute (ILRI)

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2. Executive summary

Science, technology and innovation (STI) is the driver for economic growth and development, and is currently at the heart of development discussions in Eastern Africa. Governments in the region are increasingly seeking ways to harness the potential of STI to boost economic growth, alleviate poverty and ensure environmental sustainability. This resurging interest in promoting science and technology for growth may be an opportunity for the region to grasp; and the momentum it is creating should be directed and focused on strategic development priorities for the region. Arguably this strategic direction could be in prioritizing biosciences as it is an area the region could have a competitive edge given its rich natural resources(especially biodiversity), and the growing global demand for bio-based products and services. Programmes such as BioInnovate are, therefore, well suited to catalyze growth in this direction. Moving forward, it is important to identify demand for specific biosciences and related technologies, and forge the essential links necessary to bring them to market. The Bioscience Innovation Policy Consortium for Eastern Africa (BIPCEA) will make a contribution to this end.

With increasing expectations from the biosciences, there are also growing demands on public research organizations to create and catalyze the development of pro-poor, demand-driven innovations. However, public organizations in Eastern Africa are often ill-equipped to move innovations beyond the initial research stages and meaningfully partner with the private sector in product development and dissemination. The BIPCEA comes in handy with the goal of providing policy support services which are necessary to move research ideas and products to the market, and ultimately lead to a vibrant bio-economy in Eastern Africa. It is expected that through this project Bio-Innovate partner organizations will increasingly be able to develop and commercialize their bioscience innovations; and that policies, strategies and plans to promote bioscience innovations generally will be more prominent in the policy and development agenda in Eastern Africa.

A key question for the project is to establish the extent to which BioInnovate partner organizations can play leading roles in advancing bioscience innovations for socio-economic development of Eastern Africa; and also examine what specifically would be required from them to play a catalytic role in the innovation process. These issues will be explored through a number of strategies including establishing a regional bioscience platform for dialogue, advocacy and information exchange, and supporting BioInnovate projects with appropriate tools to help them overcome policy challenges associated with their projects and organizations.

The project is to be implemented by Councils, Commissions and Ministries for Science and Technology in the region, closely working with regional STI policy organizations, among which are the African Technology Policy Studies Network, the International Livestock Research Institute, the International Service for the Acquisition of Agri-biotech Applications as well as international organizations in this case the Stockholm Environment Institute in Sweden. The activities of the project range from strategic policy studies to rending practical policy support to BioInnovate and other related projects in the region.

In summary, the project will provide new ways of doing business for bioscience innovation in Eastern Africa. By supporting BioInnovate's project teams, the project will ultimately result in measurable social, economic and environmental benefits in Eastern African countries.

3. Background and rationale for the Project

3.1 Development challenge: Realizing the potential of science, technology and innovation investments

"It is no secret that Africa's history has been marked by a development narrative in which the benefits from science, technology and innovation have been enjoyed by few, instead of being seen as tools for the development of all citizens. Today this is changing and Africa's leaders view science, technology and innovation as critical to human development, global competitiveness and ecological management."[1]

Science, technology and innovation (STI) policies are currently at the heart of national development discussions in Africa. In Eastern Africa, governments are beginning to actively support STI development[2] including biotechnology as tool for modernizing agriculture and ensuring environmental sustainability. In all Eastern Africa countries STI policies are beginning to take root. Some countries like Tanzania are reviewing their S&T policies, while other countries like Uganda are preparing strategies and plans for their implementation. This renewed emphasis on STI as a driver for economic growth and development reflects the African Union (AU) commitment to advancing S&T in continent and in some ways addresses the goals of AU/NEPAD Africa's Science and Technology Consolidated Plan of Action, 2006-2010.

Expectations regarding enhanced STI investments are spurred by guarded optimism over Africa's economic prospects. With particular reference to agricultural development, Juma (2010) notes: "*African agriculture is currently at a crossroads, at which persistent food shortages are compounded by threats from climate change. But […] Africa faces three major opportunities that can transform its agriculture into a force for economic growth: advances in science and technology; the creation of regional markets; and the emergence of a new crop of entrepreneurial leaders dedicated to the continent's economic improvement.*"[3]

Arguably, the continent, and Eastern Africa in particular, could have a competitive edge in developing a bio-resource based economy. Already, revolutionary advances in the field of biosciences are changing the conditions for the utilization of biological resources worldwide, including Eastern Africa. The application of modern biosciences is, for example, assisting in crop and animal breeding and improving efficiency in the production of disease and pest resistant cultivars for small scale farmers. Advances in the field of biosciences could present new agro-processing opportunities, and lead to diversification of small-holder production. And this would increase demand for local crops, thereby improving rural livelihoods. Furthermore, bioscience innovations will help agro-process industries to be more productive and sustainable where agro-

[1] *From*: Juma, C. and I. Serageldin (Lead Authors). 2007. *Freedom to Innovate: Biotechnology in Africa's Development*. A report of the High-Level African Panel on Modern Biotechnology. Addis Ababa / Pretoria: African Union (AU) / New Partnership for Africa's Development (NEPAD). p. xv

[2] For a recent analysis of STI policies in East Africa, see: Brenner, C., J. Komen, R. Kingamkono, J. Ecuru, J. Omari, D. Njubi, H. Opolot, and P. Chuwa. 2010. *Fostering Bioscience Innovation: Lessons from BIO-EARN*. Kampala, Uganda: East Africa Regional Programme and Research Network for Biotechnology, Biosafety and Biotechnology Policy Development.

[3] Juma, C. 2010. The New Harvest: Agricultural Innovation in Africa. New York: Oxford University Press.

waste could be converted into valuable products such as feed, bio-energy and other valuable by-products and at the same time reduce environmental impacts. BioInnovate coupled with the BIPCEA project, is uniquely positioned to support the necessary institutional change for countries to benefit from emerging opportunities foreseen with bioscience innovations.

In most of the Eastern African countries, the necessary organizations and policies seem to be in place. These should provide a more enabling environment for the biosciences. However, policy coordination between different branches of government is often lacking, e.g., in the development of policies and regulations regarding intellectual property protection and biosafety. The key to addressing this gap is in forging links among key actors at the appropriate time in the innovation cycle and, more particularly, in the life of the innovations in question. These links will differ according to the type of technological innovation (agricultural, environmental, or industrial) and according to whether the innovation will be disseminated through commercial (market) or, as in the case of "public good" technologies, through non-market channels. This Project will focus more on creating the necessary linkages, promoting policy coordination, and information sharing among key actors in the bioscience innovation system. An important element in this effort will be to effectively communicate for policy influence, regarding the impacts and potential of bioscience innovations in Eastern Africa.

3.2 Making the link: the Biosciences Innovation Policy Consortium

The BIPCEA project will help ensure that STI investments generally, and BioInnovate's efforts in particular result in tangible products and innovations in partner countries. This will be done by tackling a number of important regional policy challenges affecting bioscience innovations in the region, which include among others, limited access to new, affordable and eco-friendly technologies for crop production and agro-processing; difficulties in information exchange, including sharing of germplasm and its fair and equitable utilization; and few sustainable financing mechanisms for value addition activities and for creation of bio-based business enterprises. The project will approach these challenges through a participatory and action oriented analysis of the bioscience policy environment to facilitate evidence based decision making, and to provide direction for growth of a bio-economy in Eastern Africa.

BIPCEA project is to be implemented by Science and Technology Councils, Commissions and Ministries in Eastern Africa and supported by regional S&T policy organizations and abroad which in this case are the African Technology Policy Studies Network (ATPS), International Service for the Acquisition of Agri-biotech Applications (ISAAA), International Livestock Research Institute (ILRI)- Legal and Intellectual Property Office, and the Stockholm Environment Institute (SEI) to promote environmental sustainability issues and also to promote north south cooperation in STI development. The involvement of these lead S&T agencies in the region and abroad is expected to result in a true regional bioscience platform that will forge close linkages and synergies with relevant public- and private-sector R&D partners and the business community in each country, regional and international bioscience programs, and with donor agencies that share an interest in supporting bioscience innovations.

4. Adding value to existing efforts

The Project is fully complementary with, and adds value to other ongoing efforts in bioscience research and policy development. The Project will actually fill an important gap in providing a bridging function between (i) overall bioscience and STI policy initiatives in the region (e.g., under AU and NEPAD); (ii) international and regional initiatives for bioscience capacity development (e.g., BECA hub), and (iii) existing research networks in the region (e.g., ASARECA). All these initiatives are making important contributions to STI development in the region. However, as noted in section 3 above, further efforts are required to ensure that research outputs are indeed progressing to the product development and dissemination stages, and can do so within an enabling policy framework with the support of the S&T Councils and Commissions in Eastern Africa.

Notably, the BIPCEA will add significant value to other BioInnovate supported projects which in general aim at generating value added bio-based processes and products with high commercial potential. This Project will provide the necessary policy support services to the BioInnovate projects and assist them translate research efforts into tangible innovations for the market.

The BIPCEA will build on previous BIO-EARN program efforts in institutional intellectual property (IP) development in the network institutes, and product development partnerships in the region. While building on expertise developed and networks formed under the BIO-EARN program, this Project is different as it brings a broader and more comprehensive set of skills and expertise to the BioInnovate program and projects including policy analysis and policy advocacy. It extends to Rwanda and Burundi which were not formally part of the BIO-EARN, and will work closely with regional S&T policy organizations to promote biosciences communication and advocacy, business development and incubation as well as tackling regulatory bottlenecks such as in seed registration and access to germplasm and benefit sharing. BIPCEA is also unique in the sense that it will focus on supporting tangible innovations through systematic technological innovation systems analysis, and in working at the policy level to encourage implementation of policies and policy recommendations. The project will also bring in new features in terms of a constructive and interactive bioscience policy dialogue and advocacy. To date, civil society - agricultural professionals, producers, marketing agents, consumers and even legislators - have had no forum for discussing issues affecting innovations development generally and bioscience innovations in particular. BIPCEA will strive to bridge this gap.

5. Potential for economic, environmental and social impact

The role of science and technology in meeting sustainable development goals was recognized during the World Summit on Sustainable Development (WSSD) in 2002. The supports technology development, transfer and diffusion in Africa. The WSSD resolutions are reflected in NEPAD's African Bioscience Initiative and in numerous national strategies and development plans. Similar initiatives, such as the UN Millennium Project's Taskforce on Science, Technology and Innovation[4] underscore the critical importance of knowledge and innovation for

[4] Further details and background documents can be found at URL: http://www.unmillenniumproject.org/reports/tf_science.htm

development in every country. Technological innovation and associated institutional change should underpin long-term growth and must be at the center of any strategy to strengthen the private sector.

While bioscience plans and policies are increasing, what is important in current and future bioscience programs, such as BioInnovate, is to identify demand for a specific technology, and to plot and forge the essential links as early as possible in the research, development, and dissemination process. This policy challenge will be addressed in this Project. With increasing expectations from the biosciences, there are growing demands on public R&D organizations to create and catalyze the development of pro-poor, demand-driven innovations. However, public organizations in Eastern Africa are often ill-equipped to move innovation beyond the initial research stages and meaningfully partner with the private sector in product development and dissemination. This Project will provide policy support services which are necessary to move research ideas and products to the market, and ultimately lead to a bio-economy in Eastern Africa.

6. Regional and international collaboration

Taking a regional, Eastern Africa approach in this project is considered essential. In addition to the collaboration between universities, industry, end-users and government at the national level, collaborations across borders also have to be stimulated. This will encourage an open, problem-focused sharing of experiences and collaboration. To ensure the successful implementation of STI programs and activities in different countries in Africa generally, there is need for proper coordination and integration of programs and activities in the innovation system into all national and regional development planning issues. In R&D as well, countries along common agro-ecological zones would reap significant benefits from regional technology and information exchange, which offer opportunities for sharing research and development overheads, expanding technology markets and associated economic benefits and reducing costs. Over the years, this cross-border technology exchange has proven vitally important in disseminating agricultural and natural resource management technologies.

The BioInnovate supported projects aim at generating regional public-good innovations, and this development will be supported by this project. The BIPCEA will work as a fully functional regional mechanism, spearheaded by a team with broad bio-policy and innovation expertise, and actively involving institutions from the BioInnovate partner countries as well as regional and international S&T policy organizations in addition to the Project's implementing partners ATPS, ISAAA, ILRI Legal and Intellectual Property Office and SEI. The Consortium may also draw on expertise from the Economic and Social Research Foundation in Tanzania and the Pan African Competitiveness Forum, and any other relevant innovation policy actors in the region. All activities planned and implemented under BIPCEA will aim at, and incorporate cross-country, regional sharing of information and learning. This feature will expectedly stimulate adoption of innovations from BioInnovate supported science projects beyond the countries where they are implemented.

7. Project goal and objectives

The overall goal of the BIPCEA, therefore, is **to provide policy support services that will enable BioInnovate projects in Eastern Africa to successfully bring their technologies and business ideas to market**. Achieving this goal will require, among other things, improvement in policies that facilitate linkages between local private actors, academia and the public sector in the bioscience research and innovation process. These linkages should ultimately create opportunities for bioscience business incubation, improve intellectual property management and technology licensing, increase access to genetic resources, and evolve a more sustainable financing mechanism for bioscience research and innovation in the region.

To this end, the specific objectives of the Project are:

a. To identify and evaluate policy support needs of Bio-Innovate projects in Eastern Africa.
b. To establish a platform/forum for interaction and exchange of ideas on bioscience innovations and policies in Eastern Africa.
c. To provide policy support tools for biosciences innovations and related activities in the region.

7.1 Outputs

The Project's key **outputs** expected under each of the above objectives are:

Objective 1: To identify and evaluate policy support needs of BioInnovate projects in Eastern Africa

Outputs:

a. Four (4) case study reports on Bio-Innovate projects.
b. A report on the review of national science, technology and innovation policies in Eastern Africa establishing the extent to which they promote bioscience innovations.
c. A report on the review of the seed certification system in Eastern Africa.
d. A protocol to facilitate seed certification in Eastern Africa.
e. A report on the review of biosafety frameworks of the Eastern African countries.
f. A report on access and benefit sharing regime in Eastern Africa establishing extent to which they support (hinder) exchange of biological materials and products.
g. At least three (3) policy briefs emanating from the above studies.
h. At least two (2) journal articles from the above studies.

Objective 2: To establish a platform/forum for interaction and exchange of ideas on bioscience innovations and policies in Eastern Africa

Outputs:

a. Proceedings of a workshop on a BIPCEA and BioInnovate Projects stakeholder analysis and mapping showing potential strategic partners for advancing biosciences innovations in Eastern Africa.

b. Proceedings of two (2) high-level regional conferences on bioscience innovations and policies in Eastern Africa (one of these conferences shall involve Ministers from STI related sector ministries).
c. At least eighteen (18) annual national round-tables on bioscience innovations and policy issues in all Bio-Innovate countries.
d. Media coverage on key events.
e. At least four (4) sets of bioscience policy communication materials with key messages
f. At least fourty five (45) partnership (breakfast) meetings in all Bio-Innovate countries targeting key players such as Parliamentary committees on S&T, professional bodies, business associations, entrepreneurs and academia).
g. One flagship publication on bioscience innovation system and the emerging bio-economy in Eastern Africa.
h. At least one (1) journal article from the above activities.

Objective 3: To provide necessary policy support tools for biosciences innovations and related activities in the region

Outputs:

a. A training manual on entrepreneurship for BioInnovate projects.
b. At least 150 scientists trained in entrepreneurship skills (including technology licensing agreements and business plan development).
c. A report of an assessment of intellectual property assets of all Bio-Innovate partner organizations.
d. A report on Freedom-to-Operate for Bio-Innovate projects.
e. At least 80 Bio-Innovate scientists on IP.
f. At least 100 scientists on science communication skills (including preparation of policy papers and message maps).
g. Twelve (12) institutional IP policies for Bio-Innovate organizations that lack them.
h. At least 1500 laboratory note books printed and distributed to BioInnovate partner project teams.

7.2 Outcomes

The key expected outcomes of this Project are a) that Bio-Innovate partner organizations will increasingly be able to develop and commercialize their bioscience innovations; and b) that policies, strategies and actions to promote bioscience innovations generally will be more prominent in the policy and development agenda in Eastern Africa.

8. Methodology and description of project activities

The Project will employ a participatory and action-orientated analysis and outreach, involving BioInnovate project partners as well as other relevant bioscience programs in region. We will take an innovation systems approach in executing most of the Project's activities. Activities will be further refined through planning meetings, and implemented in a trans-disciplinary manner with scientific, communications, business and regulatory/policy expertise which represent the diverse actors in the bioscience innovation system. The Project's activities will be stretched to

cover all the six BioInnovate participating countries including Ethiopia, Burundi, Kenya, Rwanda, Tanzania and Uganda.

8.1 Description of project activities

Objective 1: To identify and analyze policy issues essential for the success of BioInnovate supported projects

1.1 Carry out four (4) case studies of Bio-Innovate projects to identify policy gaps and needs of BioInnovate projects.

Four (4) case studies of Bio-Innovate projects in the region will be carried out to systematically establish the policy gaps and needs of BioInnovate Project. The case studies will be on projects that represent a combination of crop and environmental bioscience innovations, and geographical balance of BioInnovate partner countries. Some of these projects include, for example:

- Project 1: Delivering new sorghum and millets innovations for food security and improving livelihoods
- Project 2: Enhancing food security through improved seed systems and varieties of cassava, potato and sweet potato resilient to climate change
- Project 4: Sustainable utilization of agro-industrial wastes through integration of bio-energy and mushroom production
- Project 5: Integrated process for sustainable agro-process waste treatment and climate change mitigation

We will use a Technological Innovation Systems (TIS) analytical framework for the case studies as most of them look to developing products and/or processes. The TIS is suitable because it enables analysis of the interactions among actors; and will entail a critical assessment of the knowledge base and diffusion, a review of relevant regional and national policies, entrepreneurial activities, potential markets, resource availability, acceptability of the innovations, and partnerships and networks which support bioscience innovation projects. Based on the TIS analysis, the Project team will determine strategies to address identified gaps and needs, and foster linkages among key actors.

1.2 Review national science, technology and innovation policies in Eastern Africa to establish the extent to which they promote bioscience innovations

While the integration of the East African Community is opening up political, economic and social development cooperation, the lack of policy coherence in areas such as bio-innovation are likely to remain a challenge to this process. It is important, therefore, that strategic science, technology and innovation policy studies are conducted across the region to underscore:

a. Whether or not the countries have appropriate STI policies that support the development, uptake and commercialization of bio-innovations.
b. The interaction between these STI policies with other relevant economic and social development policies e.g. economic planning, competition policies. Etc.

c. Areas where harmonization of STI policies should be pursued for easier integration and trade.
d. The impact of these STI policies on development of bio-innovation in the region
e. Share lessons from the experiences of the countries which are at different stages with their STI policies and bioscience innovation and development.
f. Highlight areas that need urgent investment in capacity building, policy change.

The essence of this policy study is to seek results that can be applied widely to solve problems of bio-innovation in the region, share cross-country experiences, foster networking and learning among the national Councils and Commissions for science and technology with other policy actors in the region, and provide quality advice to governments based on robust results. The Councils and Commissions for S&T will work hand in hand with ATPS to conduct this study. The study will involve engaging with relevant stakeholders (including government departments, policy actors, practitioners, private sector, civil society and journalists/media) in identifying and prioritizing specific research and policy questions to be addressed in each member country. The country-level analyses will be compared and contrasted to give a regional outlook on the status of STI policies in the region and their effect on bio-innovation. The findings of the study will be disseminated and shared during a planned high-level regional conference on bio-innovation in the third year of the project.

1.3 Review the seed certification system in Eastern Africa

The seed certification system in Eastern African still possesses enormous challenges to scientists wishing to commercialize or exchange novel or value added seed varieties in the region. Previous efforts by ASARECA to rationalize the regulatory and legal framework governing the seed industry have not borne the expected fruit and the industry remains small, fragmented and fraught with bottlenecks. This is evidenced by the shortage of planting seed and increasing imports of seed into the region to compensate for the persistent shortfalls. Since a number of BioInnovate projects have seed related products, policy related support in terms of harmonized seed certification procedures and protocols is necessary. The seed certification system in region will be reviewed. The review will involve interviews with actors in the seed industry as well as Bioinnovate project partners working on seed systems. The review will establish status of seed certification in Eastern African with regard to the procedures and seed policies, and challenges this is posing to seed trade and germplasm exchange at the regional level. Based on this review a protocol to facilitate seed certification in Eastern Africa will be developed. The protocol will include regional certification standards, procedures for variety releases, registration, export and import into the BioInnovate participating countries.

1.4 Review biosafety frameworks of the Eastern African countries

Eastern African countries' national biosafety frameworks are at different levels of development and implementation. Though current Bio-Innovate projects are not working with genetically modified organisms, a functional biosafety framework in the country is essential for advancing bioscience innovations overall. This study will establish the status of biosafety development in the region and identify areas where harmonization of biosafety policies may be required. The review shall include the recently adopted Nagoya-Kuala Lumpur Protocol on liability and redress

related to biological safety. Countries in Eastern Africa are making steps to domesticate this agreement, which will potentially have major impact on bioscience innovations in the region.

1.5 Review the access and benefit sharing regime Eastern Africa to establish extent to which they support (hinder) exchange of biological materials and products

This will involve an intensive analysis of the state of implementation of the multilateral system for access and benefit sharing under the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) in Eastern Africa and whether its objectives are being achieved or not at the national and institutional level. The analysis will also include the national PGRFA access systems such as arrangements with private plant breeding companies and the further transfer of PGRFA accessed under the standard material transfer agreement (SMTA). The study will help explore and identify options for accessing materials such as use of bio-cultural protocols and other instruments to develop terms and procedures for accessing materials held by local communities and options for benefit sharing such as through participatory plant breeding and other collaborative projects; and private partnerships to access privately held material. Following this analysis a strategy on how best to access materials for the project partners will be identified.

Objective 2: To establish a platform/forum for interaction and exchange of ideas on bioscience innovations and policies in Eastern Africa

2.1 Undertake a BIPCEA and BioInnovate Projects stakeholder analysis and map potential strategic partners for advancing biosciences innovations in Eastern Africa.

An intensive stakeholder analysis and netmapping exercise to identify key stakeholders, and audiences in the BIPCEA project will be conducted. This will be done by BIPCEA team members through a brainstorming session during which all the stakeholders will be categorized according to their interest and power. 'Interest' will be a measure of the degree they are likely to be affected by the project or policy change, and what degree of interest or concern they have in or about it. 'Power' will be a measure of the influence they have over the project or policy, and to what degree they can help achieve, or block, the desired change. This analysis will also help in understanding groups that advocate or oppose scientific innovations taking into account the threats and opportunities that such groups present. Following this analysis a strategy on how best to engage and sustain relationships with the different stakeholders in the project will be identified. This will be done by bringing together all the identified strategic stakeholders in a workshop during which mechanisms and strategies on how to link actors in the bioscience innovation system will be identified and agreed on.

2.2 Hold 18 annual national round-tables on bioscience innovations and policy issues in all Bio-Innovate countries

These will be country level forums involving a range of actors in the bioscience innovation system such as academia, policy makers, business developers and entrepreneurs and the media. These policy round tables will be planned for between 50 and 70 participants once every four months in all the six countries. They will also involve BioInnovate partners within each country, and may be used an opportunity to create synergies between BioInnovate projects and national

programmes, as well as advocacy and product development partnerships. These round tables will also be useful, among other things, in identifying policy issues as well as on building consensus on how to address those issues. These dialogues which may be one to two days will be convened by the national councils and commissions for science and technology in each country.

2.3 Hold 45 partnership (breakfast) meetings in all Bio-Innovate countries targeting key players such as Parliamentary committees on S&T, professional bodies, business associations, entrepreneurs and academia)

These will be smaller more targeted meetings aimed primarily at influencing policy change and building partnerships for product innovations and enterprise development. The stakeholders for these types of meetings will be business executives, high level policy makers, parliamentarians, science professions, academia, etc. These partnership meetings will be driven mainly by the policy needs of the BioInnovate project partners in each country. In other words, the BioInnovate project teams will work with the Councils and Commissions of science and technology in their respective countries to identify the key actors they would want for the partnership meetings. These meetings would involve no more than twenty participants each time.

2.4 Organizing two high-level regional policy conferences on bioscience innovations in Eastern Africa.

These will be regional conferences which will, among other things, highlight the importance of working regionally to develop bioscience innovations, pooling expertise and sharing resources, and connecting to other institutions worldwide. Each of these high level conferences is planned for up to one hundred (150) participants from the region and abroad. They will include all BioInnovate project partners, policy makers, civil society representation and other regional bioscience related bodies and initiatives. These conferences will be organized by the Councils and Commissions for S&T in consultation with the BioInnovate Program manager. One of these regional conferences shall specifically involve Government ministers and key decision makers from STI related ministries including the Ministries of Finance from each of the six countries in Eastern Africa as well as the East African Community. It is expected that such high level forum and the policy dialogues will present an opportunity for creating synergy between national programs and BioInnovate projects, enhance resource mobilization to support bioscience innovations, align BioInnovate interventions with national and regional development objectives, and help position biosciences among the region's top development priorities.

2.5 Have media coverage on key events

This entails maintaining a sustained engagement of the media through innovative ways and means. This will involve identifying key events such as the ones aforementioned, representing significant opportunities for strategic communication to stakeholders. Some of the media coverage events and engagement strategies will include news conferences, releases, press briefings, feature articles, opinion pieces, news advisories, calls to journalists informing them of key events and photo opportunities among others.

2.6 Develop four (4) sets of bioscience policy communication materials with key messages

This will involve the development of appropriate range of robust and compelling communication materials to promote policy information emanating from the project. Strategic targeting and consistency will be key to project's messages. Several tools and activities informed by the key audiences, messages, or a combination of the two will be used. These will include policy briefs, special papers, working papers and message maps. A core message that will act as the central piece of information that BIPCEA aims to communicate to target audiences through every activity will be developed. It will provide a quick way of capturing attention and communicating outcomes. This will be a simple, realistic and memorable message that can be repeated severally to create understanding, acceptance and lead to ultimate success of the BioInnovate projects project efforts.

2.7 Prepare a flagship publication on bioscience innovation system and the emerging bio-economy in Eastern Africa

The study reports together with the high level regional conference proceedings would result in a printed volume or BioInnovate flagship publication presenting case-study experiences, lessons learned, and prospects for and anticipated impact of current and future bioscience innovations. The book will deal with how bioscience innovations, and in particular the BioInnovate project will contribute to a more profitable, climate smart and resource efficient economy, and include an analysis of potential future socio economic impacts of current and planned bioscience innovation investments. It is expected that book would be launched in towards the end of the third year of BIPCEA. Efforts will be made to engage regional and international publishers to print and disseminate this publication to a large audience.

Objective 3: To establish a forum for communication, dialogue and advocacy on bioscience policy issues in the region

3.1 Develop a training manual on entrepreneurship

This will involve the development of guidelines, processes, and procedures for conducting entrepreneurship training for prospective BioInnovate scientists and practitioners. It will provide the necessary tools for starters and the necessary requirements for successful entrepreneurship.

3.2 Train 150 scientists in entrepreneurship skills (including technology licensing agreements and business plan development)

A training workshop will be convened for BioInnovate scientists/researchers to enable them gain skills on the best practices in enterprise establishment, management and operations. This will include training on making techno-economic feasibility studies on technology dissemination Each training workshop is to be attended by up to 50 participants. The training will include, among others, issues on enterprise due diligence, technology licensing and business plan development.

3.3 Develop intellectual property management tools for all Bio-Innovate partner projects.

This will involve the development and distribution to project partners of a 'common IP operational framework' the purpose of which is to provide common IP management processes

for BioInnovate project partners. The framework will provide Guiding Principles on the identification, monitoring and management of their IP assets to enable the projects to capitalize on the potential benefits. Project partners will be provided with the resources and tools required for the sound management of intellectual assets in accordance with best practices to facilitate in making more informed decisions, such as acquiring other intellectual property assets (licensing in) or licensing out.

3.4 Undertake a Freedom-to-Operate for Bio-Innovate projects

This will be a participatory process involving the creation of IP teams within the projects to keep an inventory of third party IP used by the Project. An analysis of the final product will then be conducted to establish whether the product can be deployed without the risk of infringing existing third party rights.

3.5 Train 80 BioInnovate scientists on IP

The lack of IP awareness coupled with weak institutional mechanisms for IP management are constraining the development and dissemination of bioscience innovations in Eastern Africa. While the Bio-Earn Project, which is a predecessor to the current Bio-innovate program, spearheaded the development of institutional IP regimes in some of the organizations which were part of the program, these regimes have not been sufficiently utilized because of limited awareness and capacity of scientists on IP matters. Based on the planned assessment of intellectual assets of the bio-innovate partner organizations, as well as the freedom-to-operate a one week-long training for up to eighty (80) participants including researchers, policymakers, IP managers, research managers in the BioInnovate partner organizations will be conducted. This activity will draw experiences from ATPS' previous work on strengthening national IP policy and legal frameworks in East and Southern Africa.

3.6 Develop in a participatory manner 12 institutional IP policies for Bio-Innovate organizations that lack them.

This will be a participatory process that will involve identification of the organizations that do not have IP policies and working with the IP teams within the Projects to develop IP policies for these institutions.

3.7 Train 100 scientists on how to reach policymakers with their research findings

Training workshops for scientist involved in the BioInnovate funded projects will be held in the 6 study countries. The objectives of the workshops will be to: i) equip the scientists with communications skills for effective engagement of policy makers; ii) Sharpen the skills of Principal Investigators (PIs) and project's communication personnel on media relations and issue-management; and equip scientists with skills to design and package comprehensive communication messages on the project including preparation of policy papers, special papers, working papers and message maps.

3.8 Print and distribute 1500 laboratory note books to BioInnovate partner project teams

Laboratory note books will be developed, printed and provided to bio-innovate research teams/scientists. This activity builds on the previous BIOEARN Project which demonstrated increased demand and value added in utilizing the laboratory note books among participating organizations. The essence of having laboratory note books is to aide in patenting process should such possibility arise within the projects. Laboratory note books are a powerful tool to verify novelty claims during the patenting process. The Laboratory notebooks will be printed with a logo of the organization involved in the collaborative projects, and will be owned by the organization for which a scientist works.

9. Pathway to impact

Science-based innovation has been a key element in the long-term elevation of living standards worldwide. However, for such innovations to deliver benefits geared to economic growth, development and environmental sustainability, requires conducive policy environment. This project provides new ways of doing business for bioscience innovation in Eastern Africa. This way, the project will have direct impacts on public- and private-sector partners involved in bioscience innovation projects. Such direct impacts will be in terms of new partnerships, and improved organizational performance to develop and disseminate pro-poor innovations. In addition, the project's activities and outputs aimed at science communication, policy advocacy and outreach will be gauged in terms of, for example, increased funding allocations to biosciences, policy reforms that promote appropriate innovations - based on research-based policy recommendations - and in terms of the project's contributions to innovation policy developments and harmonized approaches in regional bodies.

By actively supporting BioInnovate's project teams to ensure that research products progress through the product development and dissemination pipeline, within an enabling policy environment, this Project will ultimately result in measurable social, economic and environmental benefits in Eastern African countries. Globally, the project's impacts will be assessed in terms of its contributions to the body of literature on STI and bioscience innovation policy in Eastern Africa.

10. Team Leadership, Composition and Roles of Partners

The Project will be implemented by the national Councils, Commissions and Ministries for science and technology in the region. These organizations are particularly well placed to address bioscience and general science, technology and innovation (STI) policy questions at the country level, and have a strong convening role for both public and private R&D partners. They will work hand in hand with science and technology policy organizations in the region and abroad which in this case are ATPS, ISAAA, ILRI, and SEI. The regional STI policy organizations will provide any necessary expertise for the Councils, Commissions and Ministries for S&T to successfully carry out activities of this Project. Such expertise which has been identified in this Project includes, but is not limited to, STI policy analysis, entrepreneurship skills development, intellectual property management and science communication.

11. Competence and skill track record of Principal Investigator

The team leader / PI is Mr. Julius Ecuru[5], at present the Assistant Executive Secretary of the Uganda National Council for Science and Technology. At UNCST, he is responsible for research and development policy management and oversight, management of science and innovation projects, ensuring human and environmental safety in the conduct of research, and institutional development planning. His division has 12 core technical and professional staff. Mr. Ecuru brings over 12 years of experience in STI policy development and implementation. He is well connected to several regional initiatives in STI, and participated as co-PI in the BIO-EARN policy project, leading the development of several STI policy studies, policy briefs and outreach events. Mr. Ecuru brings broad project management experience and communication skills to the team, which is essential in leading a multi-country, multi-disciplinary team. His recent track record includes the following research grant management experiences:

(1) Project Implementation Coordinator, Uganda Millennium Science Initiative (MSI, 2006-2011): Uganda MSI is a 5-year US$ 33.35 million, being implemented by UNCST. It is co-financed by the World Bank (US$ 30 million) and Government of Uganda (US$ 3.35 million). MSI has two components: 1) grants facility and 2) institutional strengthening. Component 1 currently has 39 research and curriculum development projects running, while component 2 refurbished pilot plants and set up a business incubation service and a technology development centre at the Uganda Industrial Research Institute. The second component also involved strengthening UNCST and science outreach, policy studies and monitoring and evaluation. The project has a core team of 10 members.

(2) Co-PI, Enhancing product development opportunities and supportive policies (2006-2010): This was part of an East African regional project under BIO-EARN aimed at bioscience policy analysis and institutional policy development. Budget for the Uganda component totaled around US$ 180,000. The project initiated processes for establishing policies that promote product development and commercialization of innovations, including management of intellectual property in selected organizations and strategic partnerships for uptake of innovations. The project team involved 7 members in Uganda.

(3) Project Manager (Technical), Strengthening the scientific and ethical review system in Uganda Project (2008-2010). This was a Euro 50,000 European and Developing Countries Clinical Trials Partnership (EDCTP) grant aimed at setting up accreditation system for research ethics committees, and establishing networking forums for bioethics in Uganda. The project had a core team of 5 members.

The PI's host institute, UNCST, has a strong track record in adequately managing and accounting for externally funded projects. These include, apart from the projects mentioned above, the following:

[5] **Suggested referees**: (i) Dr. Maxwell Otim, deputy Executive Secretary, Uganda National Commission for Science and Technology (UNCST); e-mail: info@uncst.go.ug; (ii) Prof. Panta Kasoma, Executive Director, Jane Goodall Institute, Uganda; e-mail: info@jgiuganda.org

- ACACIA Project for Information and Communication Technology for Rural Development, funded by IDRC (Canada)
- UNEP-GEF Project on the Implementation of a National Biosafety Framework, funded by the Global Environment Facility (GEF)
- Bioethics Capacity Building, funded by the National Institutes of Health (NIH) and Johns Hopkins University
- Project on Bioremediation, funded by the European Union

12. Matching funds

This Project benefits from strong buy-in by the Councils and Commissions for S&T in the region as well as the collaborating organizations. Matching support will include, but will not be limited to the following:

- Staff time: The project team members will be financially supported by their own organizations to ensure proper implementation of collaborative activities, as well as providing support staff involved in organizing policy analysis activities and outreach events;
- Supporting meetings and events: Further in-kind contributions are provided by participating organizations hosting planning and coordination meetings, outreach and training events, providing facilities and logistical support at no charges;

13. Institutional support

Support letters from partner organizations are submitted to BioInnovate separately, confirming staff availability and matching contributions to ensure proper implementation of project activities. The Project builds on structures and practices developed under the BIO-EARN's policy project, which benefited from strong institutional support by S&T commissions / councils in partner countries Ethiopia, Kenya, Tanzania and Uganda and now extending to Burundi also. Buy-in from national government agencies will ensure continuity from previous activities and project impact, beyond the life of this 3-year project.

14. Monitoring and Evaluation, dissemination and communication plan

Considerable attention will be paid to tracking the Project's performance and analyzing its impact, in consultation with the BioInnovate team and Technical Advisory Committee (TAC). The following main mechanisms and specific steps will be used to implement rigorous monitoring and evaluation, and to establish a performance-based team culture:

(1) Regular performance-based planning, monitoring and evaluation will be a critical feature, supported by the Project's overall logframe and GANTT charts. Annual work plans for the Project, and for specific activities, will include a performance plan organized around the key expected outputs and outcomes, associated performance indicators and show how planned activities contribute to achieving the project's objectives. The implementing partners are primarily responsible for timely execution of activities. Regular team interactions (face-to-face meetings, in-country visits, e-mail exchange / listserver and via telephone Skype conference

calls) and action points will serve as the main monitoring tool for the management team, in addition to regular reporting and progress and performance.

(2) Work plan development will be informed by seeking critical inputs from a wide range of project partners and public / private stakeholders. Planning meetings will be held either prior to completion of annual work plans, or as a mid-term review meeting, with a view to ensuring strategic direction, coordination and coherence across countries and thematic areas. Project progress reports will be submitted every 6 months to BioInnovate management. Such reports will be focused on actual achievements and performance indicators, while an annual impact report will be submitted with more detailed descriptions of completed activities and milestones achieved.

(3) Outreach activities will be systematically evaluated by standardized participant surveys and action plans that monitor the results of outreach and training events after they have taken place. Any printed publications will undergo external peer review prior to printing and distribution.

(4) It is proposed that an external evaluation will be commissioned early on in the 3rd year of project, possibly as part of an overall BioInnovate external evaluation, to provide an independent assessment of actual results against performance targets, and analyzing overall impact from BioInnovate's support.

These mechanisms will ensure the overall Project quality and resulting outputs, and the Project's relevance in relation to expected outcomes.

14.1 Communication and dissemination plan

Outreach and communication activities, primarily aimed at policymakers in national and regional organizations, are an integral part of this Project as shown in the summary of the Project's objectives, methodology and planned activities. In collaboration with project partners, in particular the ISAAA-AfriCenter and ATPS a detailed communication strategy will be developed and adopted early-on in the Project. Generally, all outputs and recommendations emerging from this Project will be reviewed and disseminated through policy dialogues, consultations and seminars at country- and regional level, in order to ensure that policy recommendations and management guidance are actually taken up by government agencies, and public- and private-sector institutions.

15. Intellectual Property and other policy issues

The intellectual property envisaged to arise from this Project relate mainly to copyright. The Project team will acknowledge every source of material that will be accessed and used in the studies. Significant contributions from individuals and organizations made to this Project will also be acknowledged. Policy briefs, reports, journal articles, proceedings and similar works will be co-authored by the Project team and implementing partners, except for very specific national activities where the other partners are not actively involved. Activities at national and regional level will acknowledge "BIPCEA" and all the implementing and collaborating partners, including where appropriate logos of the organizations involved. Due credit and recognition shall be given to Sida and the BioInnovate programme for their support of the Project. Since this

Project does not aim at collecting personal identifiable information, we do not envisage any serious ethical issues. However, where key informant interviews will be necessary informed consent of the respondents will be obtained appropriately prior to the interviews. In addition, where necessary the Project team shall maintain confidentiality of information deemed to be confidential by the persons or organizations providing it. Lastly, the Project does not pose any environmental or social risks.

16. Milestones and time frame

This is a 3-year project with a tentative timeframe from August 1, 2011 – July 31, 2014. Detailed GANTT charts showing major activities by objectives and associated milestones will be included as part of the project's annual work plans. The Project activity plans (section 18 below) and logical framework matrix (Annex 1) provide details regarding the Project's major milestones and timeframe.

17. Indicators of progress towards results

Performance indicators for the Project and cumulative targets for the period August 2011- July 2014 are included in the logframe below. More detailed, annual targets will be defined as part of annual work plans for each country and across countries for regional activities and events.

18. Project activity plan

Table 1 below shows the major activities plan and the implementing partners.

Table1: Project activity plan

	Activity	**Year 1**		**Year 2**		**Year 3**		**Implementing partners**
		1 H	**2H**	**1H**	**2H**	**1H**	**2H**	
1.1	Project inception meeting							UNCST
1.2	Case studies of Bio-Innovate projects.							UNCST+NCSTs
1.3	Review national STI policies in Eastern Africa.							ATPS +NCSTs
1.4	Review seed certification system in Eastern Africa.							KNCST+NCSTs
1.5	Develop a protocol to facilitate seed certification.							KNCST+NCSTs
1.6	Review biosafety frameworks of Eastern Africa.							COSTECH + SEI
1.7	Review access and benefit sharing regime in Eastern Africa.							MoST/AAU + ILRI + NCSTs
2.1	Workshop on BIPCEA and BioInnovate Projects stakeholder analysis and mapping							UNCST + ISAAA
2.2	Annual national round-tables on bioscience innovations and policy issues in all Bio-Innovate countries.							NCSTs
2.3	Partnership (breakfast) meetings in all Bio-Innovate countries.							NCSTs
2.4	High-level regional conference on bioscience innovations and policies in Eastern Africa.							UNCST + DSTR
2.5	Media coverage on key events.							ISAAA
2.6	Preparation of bioscience policy communication materials with key messages							ISAAA

2.7	Preparing a flagship publication on bioscience innovation system and the emerging bio-economy in Eastern Africa.							UNCST+SEI
3.1	Preparing training manual on entrepreneurship for BioInnovate projects.							ATPS
3.2	Entrepreneurship skills training for scientists.							ATPS
3.3	Preparing IP management tools for all Bio-Innovate partner organizations.							ILRI
3.4	Freedom-to-Operate assessment for Bio-Innovate projects.							ILRI
3.5	IP training for BioInnovate scientists.							ATPS
3.6	Developing institutional IP policies for Bio-Innovate organizations that lack them.							ILRI + NCSTs
3.7	Science communication skills training for BioInnovate Scientists.							ISAAA
3.8	Printing & disseminating lab note books BioInnovate project teams.							COSTECH
3.9	Writing policy briefs, papers & manuscripts							ALL

Note: Milestones are indicated by the shaded regions in the table.

19. Summary project budget (US$)

The total requested grant amounts to US$ 980,175 (Nine hundred and eighty thousand one hundred and seventy five only). The detailed budget is provided as a separate excel file annexed to this proposal. However, below is a summary annual budget for each of the implementing partners.

Table 2: Summary annual budget for each implementing partner

APPROVED PROJECT SUMMARY BUDGET

Budget Title: Biosciences Innovation Policy Consortium for Eastern Africa (BIPCEA)
Lead Implementing Institution: Uganda National Council for Science and Technology (UNCST)
Partner Implementing Institutions: ILRI, ISAAA, KNCST, MoST-AAU, SEI, DST-Rwanda, ATPS, COSTECH,
Period: 3 year, 2011-2014

Year 1											
Activity	**Budget Categories**	**UNCST**	**MoST/AAU**	**KNCST**	**DST-MoE-R**	**COSTECH**	**ATPS**	**ISAAA**	**ILRI**	**SEI**	**Total**
A	Equipment and Consumables	1,500	1,500	1,500	1,500	1,500	-	-	-	-	**7,500**
B	Travel	3,000	3,000	3,000	4,000	3,000	3,000	3,000	3,000	6,000	**31,000**
C	Field work, training and dissemination	38,700	25,650	26,650	26,400	48,700	31,900	36,700	26,700	5,450	**266,850**
D	General project expenses	7,550	1,800	2,600	1,450	1,850	2,100	2,100	2,100	2,550	**24,100**
E	Overheads	2,538	1,598	1,688	1,668	2,753	1,850	2,090	1,590	700	**16,473**
	Total Year 1	**53,288**	**33,548**	**35,438**	**35,018**	**57,803**	**38,850**	**43,890**	**33,390**	**14,700**	**345,923**
Year 2											
Activity	**Budget Categories**	**UNCST**	**MoST/AAU**	**KNCST**	**DST-MoE-R**	**COSTECH**	**ATPS**	**ISAAA**	**ILRI**	**SEI**	**Total**
A	Equipment and Consumables	-	-	-	-	-	-	-	-	-	-
B	Travel	3,000	3,000	3,000	4,000	3,000	3,000	3,000	3,000	6,000	**31,000**
C	Field work, training and dissemination	91,400	26,650	27,150	26,200	28,600	28,900	32,600	24,100	10,950	**296,550**
D	General project expenses	6,600	1,600	900	1,100	1,850	1,100	1,200	1,100	2,200	**17,650**
E	Overheads	5,050	1,563	1,553	1,565	1,673	1,500	1,840	1,410	958	**17,260**
	Total Year 2	**106,050**	**32,813**	**32,603**	**32,865**	**35,123**	**34,650**	**38,640**	**29,610**	**20,108**	**359,310**
Year 3											
Activity	**Budget Categories**	**UNCST**	**MoST/AAU**	**KNCST**	**DST-MoE-R**	**COSTECH**	**ATPS**	**ISAAA**	**ILRI**	**SEI**	**Total**
A	Equipment and Consumables	-	-	-	-	-	-	-	-	-	**-**
B	Travel	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	6,000	**30,000**
C	Field work, training and dissemination	22,500	21,300	21,800	94,500	20,300	2,300	11,300	6,800	14,500	**215,300**
D	General project expenses	6,300	850	1,050	1,200	850	750	650	850	1,050	**13,550**
E	Overheads	1,590	1,258	1,293	4,935	1,208	303	748	533	1,078	**12,943**
	Total Year 3	**33,390**	**26,408**	**27,143**	**103,635**	**25,358**	**6,353**	**15,698**	**11,183**	**22,628**	**271,793**
	Total Year 1 - Year 3	**192,728**	**92,768**	**95,183**	**171,518**	**118,283**	**79,853**	**98,228**	**74,183**	**57,435**	**980,175**

Appendix A: Work plan and Budget

Project Title: Biosciences Innovation Policy Consortium for Eastern Africa (BIPCEA)

Partner Institution: Uganda National Council for Science and Technology

Description of project Activities

Objective 1: To identify and analyze policy issues essential for the success of BioInnovate supported projects

1.1 Carry out four (4) case studies of Bio-Innovate projects to identify policy gaps and needs of BioInnovate projects.

Four (4) case studies of Bio-Innovate projects in the region will be carried out to systematically establish the policy gaps and needs of BioInnovate Project. The case studies will be on projects that represent a combination of crop and environmental bioscience innovations, and geographical balance of BioInnovate partner countries. Some of these projects include, for example:

- Project 1: Delivering new sorghum and millets innovations for food security and improving livelihoods
- Project 2: Enhancing food security through improved seed systems and varieties of cassava, potato and sweet potato resilient to climate change
- Project 4: Sustainable utilization of agro-industrial wastes through integration of bio-energy and mushroom production
- Project 5: Integrated process for sustainable agro-process waste treatment and climate change mitigation

We will use a Technological Innovation Systems (TIS) analytical framework for the case studies as most of them look to developing products and/or processes. The TIS is suitable because it enables analysis of the interactions among actors; and will entail a critical assessment of the knowledge base and diffusion, a review of relevant regional and national policies, entrepreneurial activities, potential markets, resource availability, acceptability of the innovations, and partnerships and networks which support bioscience innovation projects. Based on the TIS analysis, the Project team will determine strategies to address identified gaps and needs, and foster linkages among key actors.

1.2 Review national science, technology and innovation policies in Eastern Africa to establish the extent to which they promote bioscience innovations

While the integration of the East African Community is opening up political, economic and social development cooperation, the lack of policy coherence in areas such as bio-innovation are likely to remain a challenge to this process. It is important, therefore, that strategic science, technology and innovation policy studies are conducted across the region to underscore:

g. Whether or not the countries have appropriate STI policies that support the development, uptake and commercialization of bio-innovations.
h. The interaction between these STI policies with other relevant economic and social development policies e.g. economic planning, competition policies. Etc.
i. Areas where harmonization of STI policies should be pursued for easier integration and trade.
j. The impact of these STI policies on development of bio-innovation in the region
k. Share lessons from the experiences of the countries which are at different stages with their STI policies and bioscience innovation and development.

l. Highlight areas that need urgent investment in capacity building, policy change.

The essence of this policy study is to seek results that can be applied widely to solve problems of bio-innovation in the region, share cross-country experiences, foster networking and learning among the national Councils and Commissions for science and technology with other policy actors in the region, and provide quality advice to governments based on robust results. The study will be done hand in hand with ATPS. The study will involve engaging with relevant stakeholders (including government departments, policy actors, practitioners, private sector, civil society and journalists/media) in identifying and prioritizing specific research and policy questions to be addressed in each member country. The country-level analyses will be compared and contrasted to give a regional outlook on the status of STI policies in the region and their effect on bio-innovation. The findings of the study will be disseminated and shared during a planned high-level regional conference on bio-innovation in the third year of the project.

1.3 Review the seed certification system in Eastern Africa

The seed certification system in Eastern African still possesses enormous challenges to scientists wishing to commercialize or exchange novel or value added seed varieties in the region. Previous efforts by ASARECA to rationalize the regulatory and legal framework governing the seed industry have not borne the expected fruit and the industry remains small, fragmented and fraught with bottlenecks. This is evidenced by the shortage of planting seed and increasing imports of seed into the region to compensate for the persistent shortfalls. Since a number of BioInnovate projects have seed related products, policy related support in terms of harmonized seed certification procedures and protocols is necessary. The seed certification system in region will be reviewed. The review will involve interviews with actors in the seed industry as well as Bioinnovate project partners working on seed systems. The review will establish status of seed certification in Eastern African with regard to the procedures and seed policies, and challenges this is posing to seed trade and germplasm exchange at the regional level. Based on this review a protocol to facilitate seed certification in Eastern Africa will be developed. The protocol will include regional certification standards, procedures for variety releases, registration, export and import into the BioInnovate participating countries.

1.4 Review biosafety frameworks of the Eastern African countries

Eastern African countries' national biosafety frameworks are at different levels of development and implementation. Though current Bio-Innovate projects are not working with genetically modified organisms, a functional biosafety framework in the country is essential for advancing bioscience innovations overall. This study will establish the status of biosafety development in the region and identify areas where harmonization of biosafety policies may be required. The review shall include the recently adopted Nagoya-Kuala Lumpur Protocol on liability and redress related to biological safety. Countries in Eastern Africa are making steps to domesticate this agreement, which will potentially have major impact on bioscience innovations in the region.

1.5 Review the access and benefit sharing regime Eastern Africa to establish extent to which they support (hinder) exchange of biological materials and products

This will involve an intensive analysis of the state of implementation of the multilateral system for access and benefit sharing under the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) in Eastern Africa and whether its objectives are being achieved or not at the national and institutional level. The analysis will also include the national PGRFA access systems such as arrangements with private plant breeding companies and the further transfer of PGRFA accessed under the standard material transfer agreement (SMTA). The study will help explore and identify options for accessing materials such as use of bio-cultural protocols and other instruments to develop terms and

procedures for accessing materials held by local communities and options for benefit sharing such as through participatory plant breeding and other collaborative projects; and private partnerships to access privately held material. Following this analysis a strategy on how best to access materials for the project partners will be identified.

Objective 2: To establish a platform/forum for interaction and exchange of ideas on bioscience innovations and policies in Eastern Africa

2.1 Undertake a BIPCEA and BioInnovate Projects stakeholder analysis and map potential strategic partners for advancing biosciences innovations in Eastern Africa.

An intensive stakeholder analysis and netmapping exercise to identify key stakeholders, and audiences in the BIPCEA project will be conducted. This will be done by BIPCEA team members through a brainstorming session during which all the stakeholders will be categorized according to their interest and power. 'Interest' will be a measure of the degree they are likely to be affected by the project or policy change, and what degree of interest or concern they have in or about it. 'Power' will be a measure of the influence they have over the project or policy, and to what degree they can help achieve, or block, the desired change. This analysis will also help in understanding groups that advocate or oppose scientific innovations taking into account the threats and opportunities that such groups present. Following this analysis a strategy on how best to engage and sustain relationships with the different stakeholders in the project will be identified. This will be done by bringing together all the identified strategic stakeholders in a workshop during which mechanisms and strategies on how to link actors in the bioscience innovation system will be identified and agreed on.

2.2 Hold 3 annual national round-tables on bioscience innovations and policy issues in all Bio-Innovate countries

These will be country level forums involving a range of actors in the bioscience innovation system such as academia, policy makers, business developers and entrepreneurs and the media. These policy round tables will be planned for between 50 and 70 participants once every four months in all the six countries. They will also involve BioInnovate partners within each country, and may be used an opportunity to create synergies between BioInnovate projects and national programmes, as well as advocacy and product development partnerships. These round tables will also be useful, among other things, in identifying policy issues as well as on building consensus on how to address those issues. These dialogues which may be one to two days will be convened by the national councils and commissions for science and technology in each country.

2.3 Hold 9 partnership (breakfast) meetings in all Bio-Innovate countries targeting key players such as Parliamentary committees on S&T, professional bodies, business associations, entrepreneurs and academia)

These will be smaller more targeted meetings aimed primarily at influencing policy change and building partnerships for product innovations and enterprise development. The stakeholders for these types of meetings will be business executives, high level policy makers, parliamentarians, science professions, academia, etc. These partnership meetings will be driven mainly by the policy needs of the BioInnovate project partners in each country. In other words, the BioInnovate project teams will work with the Councils and Commissions of science and technology in their respective countries to identify the key actors they would want for the partnership meetings. These meetings would involve no more than twenty participants each time.

2.4 Organizing one high-level regional policy conferences on bioscience innovations in Eastern Africa.

These will be a regional conference which will, among other things, highlight the importance of working regionally to develop bioscience innovations, pooling expertise and sharing resources, and connecting to other institutions worldwide. The high level conference is planned for up to one hundred (150) participants from the region and abroad. It will include all BioInnovate project partners, policy makers, civil society representation and other regional bioscience related bodies and initiatives. The conference will be organized by the UNCST consultation with the BioInnovate Program manager. The conference shall specifically involve key decision makers from STI related ministries including the Ministries of Finance from each of the six countries in Eastern Africa as well as the East African Community. It is expected that such high level forum and the policy dialogue will present an opportunity for creating synergy between national programs and BioInnovate projects, enhance resource mobilization to support bioscience innovations, align BioInnovate interventions with national and regional development objectives, and help position biosciences among the region's top development priorities.

2.7 Prepare a flagship publication on bioscience innovation system and the emerging bio-economy in Eastern Africa

The study reports together with the high level regional conference proceedings would result in a printed volume or BioInnovate flagship publication presenting case-study experiences, lessons learned, and prospects for and anticipated impact of current and future bioscience innovations. The book will deal with how bioscience innovations, and in particular the BioInnovate project will contribute to a more profitable, climate smart and resource efficient economy, and include an analysis of potential future socio economic impacts of current and planned bioscience innovation investments. It is expected that book would be launched in towards the end of the third year of BIPCEA. Efforts will be made to engage regional and international publishers to print and disseminate this publication to a large audience.

Objective 3: To establish a forum for communication, dialogue and advocacy on bioscience policy issues in the region

3.6 Develop in a participatory manner 12 institutional IP policies for Bio-Innovate organizations that lack them.

This will be a participatory process that will involve identification of the organizations that do not have IP policies and working with the IP teams within the Projects to develop IP policies for these institutions.

3.7 Project Inception Meeting

Organize BIPCEA project inception meeting. About 40 participants from the region including the BIPCEA project team are expected to attend the Project inception meeting. BioInnovate TAC and Secretariat will be invited as well as representatives from BioInnovate supported projects. The purpose of the meeting is to engage with BIPCEA stakeholders early on in the project and understand their expectations of BIPCEA, to bring all Project partners to the same page and clarify to them implementation issues, and garner support for BIPCEA from leadership of the implementing partner's organizations. The inception meeting will take place in Kampala and will be hosted by the UNCST.

Project Title: Biosciences Innovation Policy Consortium for Eastern Africa (BIPCEA)

Partner Institution: Ministry of Science and Technology/Addis Ababa University

Description of project Activities

Objective 1: To identify and analyze policy issues essential for the success of BioInnovate supported projects

1.1 Carry out four (4) case studies of Bio-Innovate projects to identify policy gaps and needs of BioInnovate projects.

Four (4) case studies of Bio-Innovate projects in the region will be carried out to systematically establish the policy gaps and needs of BioInnovate Project. The case studies will be on projects that represent a combination of crop and environmental bioscience innovations, and geographical balance of BioInnovate partner countries. Some of these projects include, for example:

- Project 1: Delivering new sorghum and millets innovations for food security and improving livelihoods
- Project 2: Enhancing food security through improved seed systems and varieties of cassava, potato and sweet potato resilient to climate change
- Project 4: Sustainable utilization of agro-industrial wastes through integration of bio-energy and mushroom production
- Project 5: Integrated process for sustainable agro-process waste treatment and climate change mitigation

We will use a Technological Innovation Systems (TIS) analytical framework for the case studies as most of them look to developing products and/or processes. The TIS is suitable because it enables analysis of the interactions among actors; and will entail a critical assessment of the knowledge base and diffusion, a review of relevant regional and national policies, entrepreneurial activities, potential markets, resource availability, acceptability of the innovations, and partnerships and networks which support bioscience innovation projects. Based on the TIS analysis, the Project team will determine strategies to address identified gaps and needs, and foster linkages among key actors.

1.2 Review national science, technology and innovation policies in Eastern Africa to establish the extent to which they promote bioscience innovations

While the integration of the East African Community is opening up political, economic and social development cooperation, the lack of policy coherence in areas such as bio-innovation are likely to remain a challenge to this process. It is important, therefore, that strategic science, technology and innovation policy studies are conducted across the region to underscore:

a. Whether or not the countries have appropriate STI policies that support the development, uptake and commercialization of bio-innovations.
b. The interaction between these STI policies with other relevant economic and social development policies e.g. economic planning, competition policies. Etc.
c. Areas where harmonization of STI policies should be pursued for easier integration and trade.
d. The impact of these STI policies on development of bio-innovation in the region
e. Share lessons from the experiences of the countries which are at different stages with their STI policies and bioscience innovation and development.

f. Highlight areas that need urgent investment in capacity building, policy change.

The essence of this policy study is to seek results that can be applied widely to solve problems of bio-innovation in the region, share cross-country experiences, foster networking and learning among the national Councils and Commissions for science and technology with other policy actors in the region, and provide quality advice to governments based on robust results. The study will be conducted hand in hand with ATPS. The study will involve engaging with relevant stakeholders (including government departments, policy actors, practitioners, private sector, civil society and journalists/media) in identifying and prioritizing specific research and policy questions to be addressed in each member country. The country-level analyses will be compared and contrasted to give a regional outlook on the status of STI policies in the region and their effect on bio-innovation. The findings of the study will be disseminated and shared during a planned high-level regional conference on bio-innovation in the third year of the project.

1.3 Review the seed certification system in Eastern Africa

The seed certification system in Eastern African still possesses enormous challenges to scientists wishing to commercialize or exchange novel or value added seed varieties in the region. Previous efforts by ASARECA to rationalize the regulatory and legal framework governing the seed industry have not borne the expected fruit and the industry remains small, fragmented and fraught with bottlenecks. This is evidenced by the shortage of planting seed and increasing imports of seed into the region to compensate for the persistent shortfalls. Since a number of BioInnovate projects have seed related products, policy related support in terms of harmonized seed certification procedures and protocols is necessary. The seed certification system in region will be reviewed. The review will involve interviews with actors in the seed industry as well as Bioinnovate project partners working on seed systems. The review will establish status of seed certification in Eastern African with regard to the procedures and seed policies, and challenges this is posing to seed trade and germplasm exchange at the regional level. Based on this review a protocol to facilitate seed certification in Eastern Africa will be developed. The protocol will include regional certification standards, procedures for variety releases, registration, export and import into the BioInnovate participating countries.

1.4 Review biosafety frameworks of the Eastern African countries

Eastern African countries' national biosafety frameworks are at different levels of development and implementation. Though current Bio-Innovate projects are not working with genetically modified organisms, a functional biosafety framework in the country is essential for advancing bioscience innovations overall. This study will establish the status of biosafety development in the region and identify areas where harmonization of biosafety policies may be required. The review shall include the recently adopted Nagoya-Kuala Lumpur Protocol on liability and redress related to biological safety. Countries in Eastern Africa are making steps to domesticate this agreement, which will potentially have major impact on bioscience innovations in the region.

1.5 Review the access and benefit sharing regime Eastern Africa to establish extent to which they support (hinder) exchange of biological materials and products

This will involve an intensive analysis of the state of implementation of the multilateral system for access and benefit sharing under the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) in Eastern Africa and whether its objectives are being achieved or not at the national and institutional level. The analysis will also include the national PGRFA access systems such as arrangements with private plant breeding companies and the further transfer of PGRFA accessed under the standard material transfer agreement (SMTA). The study will help explore and identify options for

accessing materials such as use of bio-cultural protocols and other instruments to develop terms and procedures for accessing materials held by local communities and options for benefit sharing such as through participatory plant breeding and other collaborative projects; and private partnerships to access privately held material. Following this analysis a strategy on how best to access materials for the project partners will be identified.

Objective 2: To establish a platform/forum for interaction and exchange of ideas on bioscience innovations and policies in Eastern Africa

2.2 Hold 3 annual national round-tables on bioscience innovations and policy issues in all Bio-Innovate countries

These will be country level forums involving a range of actors in the bioscience innovation system such as academia, policy makers, business developers and entrepreneurs and the media. These policy round tables will be planned for between 50 and 70 participants once every four months in all the six countries. They will also involve BioInnovate partners within each country, and may be used an opportunity to create synergies between BioInnovate projects and national programmes, as well as advocacy and product development partnerships. These round tables will also be useful, among other things, in identifying policy issues as well as on building consensus on how to address those issues. These dialogues which may be one to two days will be convened by the national councils and commissions for science and technology in each country.

2.3 Hold 9 partnership (breakfast) meetings in all Bio-Innovate countries targeting key players such as Parliamentary committees on S&T, professional bodies, business associations, entrepreneurs and academia)

These will be smaller more targeted meetings aimed primarily at influencing policy change and building partnerships for product innovations and enterprise development. The stakeholders for these types of meetings will be business executives, high level policy makers, parliamentarians, science professions, academia, etc. These partnership meetings will be driven mainly by the policy needs of the BioInnovate project partners in each country. In other words, the BioInnovate project teams will work with the Councils and Commissions of science and technology in their respective countries to identify the key actors they would want for the partnership meetings. These meetings would involve no more than twenty participants each time.

Objective 3: To establish a forum for communication, dialogue and advocacy on bioscience policy issues in the region

3.6 Develop in a participatory manner 12 institutional IP policies for Bio-Innovate organizations that lack them.

This will be a participatory process that will involve identification of the organizations that do not have IP policies and working with the IP teams within the Projects to develop IP policies for these institutions.

Project Title: Biosciences Innovation Policy Consortium for Eastern Africa (BIPCEA)

Partner Institution: National Council for Science and Technology, Kenya (KNCST)

Description of project Activities

Objective 1: To identify and analyze policy issues essential for the success of BioInnovate supported projects

1.1 Carry out four (4) case studies of Bio-Innovate projects to identify policy gaps and needs of BioInnovate projects.

Four (4) case studies of Bio-Innovate projects in the region will be carried out to systematically establish the policy gaps and needs of BioInnovate Project. The case studies will be on projects that represent a combination of crop and environmental bioscience innovations, and geographical balance of BioInnovate partner countries. Some of these projects include, for example:

- Project 1: Delivering new sorghum and millets innovations for food security and improving livelihoods
- Project 2: Enhancing food security through improved seed systems and varieties of cassava, potato and sweet potato resilient to climate change
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We will use a Technological Innovation Systems (TIS) analytical framework for the case studies as most of them look to developing products and/or processes. The TIS is suitable because it enables analysis of the interactions among actors; and will entail a critical assessment of the knowledge base and diffusion, a review of relevant regional and national policies, entrepreneurial activities, potential markets, resource availability, acceptability of the innovations, and partnerships and networks which support bioscience innovation projects. Based on the TIS analysis, the Project team will determine strategies to address identified gaps and needs, and foster linkages among key actors.

1.2 Review national science, technology and innovation policies in Eastern Africa to establish the extent to which they promote bioscience innovations

While the integration of the East African Community is opening up political, economic and social development cooperation, the lack of policy coherence in areas such as bio-innovation are likely to remain a challenge to this process. It is important, therefore, that strategic science, technology and innovation policy studies are conducted across the region to underscore:

a. Whether or not the countries have appropriate STI policies that support the development, uptake and commercialization of bio-innovations.
b. The interaction between these STI policies with other relevant economic and social development policies e.g. economic planning, competition policies. Etc.
c. Areas where harmonization of STI policies should be pursued for easier integration and trade.
d. The impact of these STI policies on development of bio-innovation in the region
e. Share lessons from the experiences of the countries which are at different stages with their STI policies and bioscience innovation and development.

f. Highlight areas that need urgent investment in capacity building, policy change.

The essence of this policy study is to seek results that can be applied widely to solve problems of bio-innovation in the region, share cross-country experiences, foster networking and learning among the national Councils and Commissions for science and technology with other policy actors in the region, and provide quality advice to governments based on robust results. The study will be conducted hand in hand with ATPS. The study will involve engaging with relevant stakeholders (including government departments, policy actors, practitioners, private sector, civil society and journalists/media) in identifying and prioritizing specific research and policy questions to be addressed in each member country. The country-level analyses will be compared and contrasted to give a regional outlook on the status of STI policies in the region and their effect on bio-innovation. The findings of the study will be disseminated and shared during a planned high-level regional conference on bio-innovation in the third year of the project.

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The seed certification system in Eastern African still possesses enormous challenges to scientists wishing to commercialize or exchange novel or value added seed varieties in the region. Previous efforts by ASARECA to rationalize the regulatory and legal framework governing the seed industry have not borne the expected fruit and the industry remains small, fragmented and fraught with bottlenecks. This is evidenced by the shortage of planting seed and increasing imports of seed into the region to compensate for the persistent shortfalls. Since a number of BioInnovate projects have seed related products, policy related support in terms of harmonized seed certification procedures and protocols is necessary. The seed certification system in region will be reviewed. The review will involve interviews with actors in the seed industry as well as Bioinnovate project partners working on seed systems. The review will establish status of seed certification in Eastern African with regard to the procedures and seed policies, and challenges this is posing to seed trade and germplasm exchange at the regional level. Based on this review a protocol to facilitate seed certification in Eastern Africa will be developed. The protocol will include regional certification standards, procedures for variety releases, registration, export and import into the BioInnovate participating countries.

1.4 Review biosafety frameworks of the Eastern African countries

Eastern African countries' national biosafety frameworks are at different levels of development and implementation. Though current Bio-Innovate projects are not working with genetically modified organisms, a functional biosafety framework in the country is essential for advancing bioscience innovations overall. This study will establish the status of biosafety development in the region and identify areas where harmonization of biosafety policies may be required. The review shall include the recently adopted Nagoya-Kuala Lumpur Protocol on liability and redress related to biological safety. Countries in Eastern Africa are making steps to domesticate this agreement, which will potentially have major impact on bioscience innovations in the region.

1.5 Review the access and benefit sharing regime Eastern Africa to establish extent to which they support (hinder) exchange of biological materials and products

This will involve an intensive analysis of the state of implementation of the multilateral system for access and benefit sharing under the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) in Eastern Africa and whether its objectives are being achieved or not at the national and institutional level. The analysis will also include the national PGRFA access systems such as arrangements with private plant breeding companies and the further transfer of PGRFA accessed under the standard material transfer agreement (SMTA). The study will help explore and identify options for

accessing materials such as use of bio-cultural protocols and other instruments to develop terms and procedures for accessing materials held by local communities and options for benefit sharing such as through participatory plant breeding and other collaborative projects; and private partnerships to access privately held material. Following this analysis a strategy on how best to access materials for the project partners will be identified.

Objective 2: To establish a platform/forum for interaction and exchange of ideas on bioscience innovations and policies in Eastern Africa

2.2 Hold 3 annual national round-tables on bioscience innovations and policy issues in all Bio-Innovate countries

These will be country level forums involving a range of actors in the bioscience innovation system such as academia, policy makers, business developers and entrepreneurs and the media. These policy round tables will be planned for between 50 and 70 participants once every four months in all the six countries. They will also involve BioInnovate partners within each country, and may be used an opportunity to create synergies between BioInnovate projects and national programmes, as well as advocacy and product development partnerships. These round tables will also be useful, among other things, in identifying policy issues as well as on building consensus on how to address those issues. These dialogues which may be one to two days will be convened by the national councils and commissions for science and technology in each country.

2.3 Hold 9 partnership (breakfast) meetings in all Bio-Innovate countries targeting key players such as Parliamentary committees on S&T, professional bodies, business associations, entrepreneurs and academia)

These will be smaller more targeted meetings aimed primarily at influencing policy change and building partnerships for product innovations and enterprise development. The stakeholders for these types of meetings will be business executives, high level policy makers, parliamentarians, science professions, academia, etc. These partnership meetings will be driven mainly by the policy needs of the BioInnovate project partners in each country. In other words, the BioInnovate project teams will work with the Councils and Commissions of science and technology in their

Objective 3: To establish a forum for communication, dialogue and advocacy on bioscience policy issues in the region

3.6 Develop in a participatory manner 12 institutional IP policies for Bio-Innovate organizations that lack them.

This will be a participatory process that will involve identification of the organizations that do not have IP policies and working with the IP teams within the Projects to develop IP policies for these institutions.

Project Title: Biosciences Innovation Policy Consortium for Eastern Africa (BIPCEA)

Partner Institution: Directorate of Science, Technology and Research, Rwanda (DSTR)

Description of project Activities

Objective 1: To identify and analyze policy issues essential for the success of BioInnovate supported projects

1.1 Carry out four (4) case studies of Bio-Innovate projects to identify policy gaps and needs of BioInnovate projects.

Four (4) case studies of Bio-Innovate projects in the region will be carried out to systematically establish the policy gaps and needs of BioInnovate Project. The case studies will be on projects that represent a combination of crop and environmental bioscience innovations, and geographical balance of BioInnovate partner countries. Some of these projects include, for example:

- Project 1: Delivering new sorghum and millets innovations for food security and improving livelihoods
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We will use a Technological Innovation Systems (TIS) analytical framework for the case studies as most of them look to developing products and/or processes. The TIS is suitable because it enables analysis of the interactions among actors; and will entail a critical assessment of the knowledge base and diffusion, a review of relevant regional and national policies, entrepreneurial activities, potential markets, resource availability, acceptability of the innovations, and partnerships and networks which support bioscience innovation projects. Based on the TIS analysis, the Project team will determine strategies to address identified gaps and needs, and foster linkages among key actors.

1.2 Review national science, technology and innovation policies in Eastern Africa to establish the extent to which they promote bioscience innovations

While the integration of the East African Community is opening up political, economic and social development cooperation, the lack of policy coherence in areas such as bio-innovation are likely to remain a challenge to this process. It is important, therefore, that strategic science, technology and innovation policy studies are conducted across the region to underscore:

a. Whether or not the countries have appropriate STI policies that support the development, uptake and commercialization of bio-innovations.
b. The interaction between these STI policies with other relevant economic and social development policies e.g. economic planning, competition policies. Etc.
c. Areas where harmonization of STI policies should be pursued for easier integration and trade.
d. The impact of these STI policies on development of bio-innovation in the region
e. Share lessons from the experiences of the countries which are at different stages with their STI policies and bioscience innovation and development.

f. Highlight areas that need urgent investment in capacity building, policy change.

The essence of this policy study is to seek results that can be applied widely to solve problems of bio-innovation in the region, share cross-country experiences, foster networking and learning among the national Councils and Commissions for science and technology with other policy actors in the region, and provide quality advice to governments based on robust results. The study will be conducted hand in hand with ATPS. The study will involve engaging with relevant stakeholders (including government departments, policy actors, practitioners, private sector, civil society and journalists/media) in identifying and prioritizing specific research and policy questions to be addressed in each member country. The country-level analyses will be compared and contrasted to give a regional outlook on the status of STI policies in the region and their effect on bio-innovation. The findings of the study will be disseminated and shared during a planned high-level regional conference on bio-innovation in the third year of the project.

1.3 Review the seed certification system in Eastern Africa

The seed certification system in Eastern African still possesses enormous challenges to scientists wishing to commercialize or exchange novel or value added seed varieties in the region. Previous efforts by ASARECA to rationalize the regulatory and legal framework governing the seed industry have not borne the expected fruit and the industry remains small, fragmented and fraught with bottlenecks. This is evidenced by the shortage of planting seed and increasing imports of seed into the region to compensate for the persistent shortfalls. Since a number of BioInnovate projects have seed related products, policy related support in terms of harmonized seed certification procedures and protocols is necessary. The seed certification system in region will be reviewed. The review will involve interviews with actors in the seed industry as well as Bioinnovate project partners working on seed systems. The review will establish status of seed certification in Eastern African with regard to the procedures and seed policies, and challenges this is posing to seed trade and germplasm exchange at the regional level. Based on this review a protocol to facilitate seed certification in Eastern Africa will be developed. The protocol will include regional certification standards, procedures for variety releases, registration, export and import into the BioInnovate participating countries.

1.4 Review biosafety frameworks of the Eastern African countries

Eastern African countries' national biosafety frameworks are at different levels of development and implementation. Though current Bio-Innovate projects are not working with genetically modified organisms, a functional biosafety framework in the country is essential for advancing bioscience innovations overall. This study will establish the status of biosafety development in the region and identify areas where harmonization of biosafety policies may be required. The review shall include the recently adopted Nagoya-Kuala Lumpur Protocol on liability and redress related to biological safety. Countries in Eastern Africa are making steps to domesticate this agreement, which will potentially have major impact on bioscience innovations in the region.

1.5 Review the access and benefit sharing regime Eastern Africa to establish extent to which they support (hinder) exchange of biological materials and products

This will involve an intensive analysis of the state of implementation of the multilateral system for access and benefit sharing under the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) in Eastern Africa and whether its objectives are being achieved or not at the national and institutional level. The analysis will also include the national PGRFA access systems such as arrangements with private plant breeding companies and the further transfer of PGRFA accessed under the standard material transfer agreement (SMTA). The study will help explore and identify options for

accessing materials such as use of bio-cultural protocols and other instruments to develop terms and procedures for accessing materials held by local communities and options for benefit sharing such as through participatory plant breeding and other collaborative projects; and private partnerships to access privately held material. Following this analysis a strategy on how best to access materials for the project partners will be identified.

Objective 2: To establish a platform/forum for interaction and exchange of ideas on bioscience innovations and policies in Eastern Africa

2.2 Hold 3 annual national round-tables on bioscience innovations and policy issues in all Bio-Innovate countries

These will be country level forums involving a range of actors in the bioscience innovation system such as academia, policy makers, business developers and entrepreneurs and the media. These policy round tables will be planned for between 50 and 70 participants once every four months in all the six countries. They will also involve BioInnovate partners within each country, and may be used an opportunity to create synergies between BioInnovate projects and national programmes, as well as advocacy and product development partnerships. These round tables will also be useful, among other things, in identifying policy issues as well as on building consensus on how to address those issues. These dialogues which may be one to two days will be convened by the national councils and commissions for science and technology in each country.

2.3 Hold 9 partnership (breakfast) meetings in all Bio-Innovate countries targeting key players such as Parliamentary committees on S&T, professional bodies, business associations, entrepreneurs and academia)

These will be smaller more targeted meetings aimed primarily at influencing policy change and building partnerships for product innovations and enterprise development. The stakeholders for these types of meetings will be business executives, high level policy makers, parliamentarians, science professions, academia, etc. These partnership meetings will be driven mainly by the policy needs of the BioInnovate project partners in each country. In other words, the BioInnovate project teams will work with the Councils and Commissions of science and technology in their respective countries to identify the key actors they would want for the partnership meetings. These meetings would involve no more than twenty participants each time.

2.4 Organizing one high-level regional policy conferences on bioscience innovations in Eastern Africa.

These will be a regional conference which will, among other things, highlight the importance of working regionally to develop bioscience innovations, pooling expertise and sharing resources, and connecting to other institutions worldwide. The high level conference is planned for up to one hundred (150) participants from the region and abroad. It will include all BioInnovate project partners, policy makers, civil society representation and other regional bioscience related bodies and initiatives. The conference will be organized by the UNCST consultation with the BioInnovate Program manager. The conference shall specifically involve key decision makers from STI related ministries including the Ministries of Finance from each of the six countries in Eastern Africa as well as the East African Community. It is expected that such high level forum and the policy dialogue will present an opportunity for creating synergy between national programs and BioInnovate projects, enhance resource mobilization to support bioscience innovations, align BioInnovate interventions with national and regional development objectives, and help position biosciences among the region's top development priorities.

Objective 3: To establish a forum for communication, dialogue and advocacy on bioscience policy issues in the region

3.6 Develop in a participatory manner 12 institutional IP policies for Bio-Innovate organizations that lack them.

This will be a participatory process that will involve identification of the organizations that do not have IP policies and working with the IP teams within the Projects to develop IP policies for these institutions.

Project Title: Biosciences Innovation Policy Consortium for Eastern Africa (BIPCEA)

Partner Institution: Tanzania Commission for Science and Technology (COSTECH)

Description of project Activities

Objective 1: To identify and analyze policy issues essential for the success of BioInnovate supported projects

1.1 Carry out four (4) case studies of Bio-Innovate projects to identify policy gaps and needs of BioInnovate projects.

Four (4) case studies of Bio-Innovate projects in the region will be carried out to systematically establish the policy gaps and needs of BioInnovate Project. The case studies will be on projects that represent a combination of crop and environmental bioscience innovations, and geographical balance of BioInnovate partner countries. Some of these projects include, for example:

- Project 1: Delivering new sorghum and millets innovations for food security and improving livelihoods
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We will use a Technological Innovation Systems (TIS) analytical framework for the case studies as most of them look to developing products and/or processes. The TIS is suitable because it enables analysis of the interactions among actors; and will entail a critical assessment of the knowledge base and diffusion, a review of relevant regional and national policies, entrepreneurial activities, potential markets, resource availability, acceptability of the innovations, and partnerships and networks which support bioscience innovation projects. Based on the TIS analysis, the Project team will determine strategies to address identified gaps and needs, and foster linkages among key actors.

1.2 Review national science, technology and innovation policies in Eastern Africa to establish the extent to which they promote bioscience innovations

While the integration of the East African Community is opening up political, economic and social development cooperation, the lack of policy coherence in areas such as bio-innovation are likely to remain a challenge to this process. It is important, therefore, that strategic science, technology and innovation policy studies are conducted across the region to underscore:

a. Whether or not the countries have appropriate STI policies that support the development, uptake and commercialization of bio-innovations.
b. The interaction between these STI policies with other relevant economic and social development policies e.g. economic planning, competition policies. Etc.
c. Areas where harmonization of STI policies should be pursued for easier integration and trade.
d. The impact of these STI policies on development of bio-innovation in the region

e. Share lessons from the experiences of the countries which are at different stages with their STI policies and bioscience innovation and development.
f. Highlight areas that need urgent investment in capacity building, policy change.

The essence of this policy study is to seek results that can be applied widely to solve problems of bio-innovation in the region, share cross-country experiences, foster networking and learning among the national Councils and Commissions for science and technology with other policy actors in the region, and provide quality advice to governments based on robust results. The study will be conducted hand in hand with ATPS. The study will involve engaging with relevant stakeholders (including government departments, policy actors, practitioners, private sector, civil society and journalists/media) in identifying and prioritizing specific research and policy questions to be addressed in each member country. The country-level analyses will be compared and contrasted to give a regional outlook on the status of STI policies in the region and their effect on bio-innovation. The findings of the study will be disseminated and shared during a planned high-level regional conference on bio-innovation in the third year of the project.

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arrangements with private plant breeding companies and the further transfer of PGRFA accessed under the standard material transfer agreement (SMTA). The study will help explore and identify options for accessing materials such as use of bio-cultural protocols and other instruments to develop terms and procedures for accessing materials held by local communities and options for benefit sharing such as through participatory plant breeding and other collaborative projects; and private partnerships to access privately held material. Following this analysis a strategy on how best to access materials for the project partners will be identified.

Objective 2: To establish a platform/forum for interaction and exchange of ideas on bioscience innovations and policies in Eastern Africa

2.2 Hold 3 annual national round-tables on bioscience innovations and policy issues in all Bio-Innovate countries

These will be country level forums involving a range of actors in the bioscience innovation system such as academia, policy makers, business developers and entrepreneurs and the media. These policy round tables will be planned for between 50 and 70 participants once every four months in all the six countries. They will also involve BioInnovate partners within each country, and may be used an opportunity to create synergies between BioInnovate projects and national programmes, as well as advocacy and product development partnerships. These round tables will also be useful, among other things, in identifying policy issues as well as on building consensus on how to address those issues. These dialogues which may be one to two days will be convened by the national councils and commissions for science and technology in each country.

2.3 Hold 9 partnership (breakfast) meetings in all Bio-Innovate countries targeting key players such as Parliamentary committees on S&T, professional bodies, business associations, entrepreneurs and academia)

These will be smaller more targeted meetings aimed primarily at influencing policy change and building partnerships for product innovations and enterprise development. The stakeholders for these types of meetings will be business executives, high level policy makers, parliamentarians, science professions, academia, etc. These partnership meetings will be driven mainly by the policy needs of the BioInnovate project partners in each country. In other words, the BioInnovate project teams will work with the Councils and Commissions of science and technology in their respective countries to identify the key actors they would want for the partnership meetings. These meetings would involve no more than twenty participants each time.

Objective 3: To establish a forum for communication, dialogue and advocacy on bioscience policy issues in the region

3.6 Develop in a participatory manner 12 institutional IP policies for Bio-Innovate organizations that lack them.

This will be a participatory process that will involve identification of the organizations that do not have IP policies and working with the IP teams within the Projects to develop IP policies for these institutions.

3.8 Print and distribute 1500 laboratory note books to BioInnovate partner project teams

Laboratory note books will be developed, printed and provided to bio-innovate research teams/scientists. This activity builds on the previous BIOEARN Project which demonstrated increased demand and value added in utilizing the laboratory note books among participating organizations. The essence of having

laboratory note books is to aide in patenting process should such possibility arise within the projects. Laboratory note books are a powerful tool to verify novelty claims during the patenting process. The Laboratory notebooks will be printed with a logo of the organization involved in the collaborative projects, and will be owned by the organization for which a scientist works.**Project Title:**Biosciences Innovation Policy Consortium for Eastern Africa (BIPCEA)

Partner Institution: African Technology Policy Studies Network (ATPS)

Description of project Activities

Objective 1: To identify and analyze policy issues essential for the success of BioInnovate supported projects

1.2 Review national science, technology and innovation policies in Eastern Africa to establish the extent to which they promote bioscience innovations

While the integration of the East African Community is opening up political, economic and social development cooperation, the lack of policy coherence in areas such as bio-innovation are likely to remain a challenge to this process. It is important, therefore, that strategic science, technology and innovation policy studies are conducted across the region to underscore:

a. Whether or not the countries have appropriate STI policies that support the development, uptake and commercialization of bio-innovations.
b. The interaction between these STI policies with other relevant economic and social development policies e.g. economic planning, competition policies. Etc.
c. Areas where harmonization of STI policies should be pursued for easier integration and trade.
d. The impact of these STI policies on development of bio-innovation in the region
e. Share lessons from the experiences of the countries which are at different stages with their STI policies and bioscience innovation and development.
f. Highlight areas that need urgent investment in capacity building, policy change.

The essence of this policy study is to seek results that can be applied widely to solve problems of bio-innovation in the region, share cross-country experiences, foster networking and learning among the national Councils and Commissions for science and technology with other policy actors in the region, and provide quality advice to governments based on robust results. ATPS will work hand in hand with the Councils and Commissions for S&T to conduct this study. The study will involve engaging with relevant stakeholders (including government departments, policy actors, practitioners, private sector, civil society and journalists/media) in identifying and prioritizing specific research and policy questions to be addressed in each member country. The country-level analyses will be compared and contrasted to give a regional outlook on the status of STI policies in the region and their effect on bio-innovation. The findings of the study will be disseminated and shared during a planned high-level regional conference on bio-innovation in the third year of the project.

Objective 3: To establish a forum for communication, dialogue and advocacy on bioscience policy issues in the region

3.1 Develop a training manual on entrepreneurship

This will involve the development of guidelines, processes, and procedures for conducting entrepreneurship training for prospective BioInnovate scientists and practitioners. It will provide the necessary tools for starters and the necessary requirements for successful entrepreneurship.

3.2 Train 150 scientists in entrepreneurship skills (including technology licensing agreements and business plan development)

A training workshop will be convened for BioInnovate scientists/researchers to enable them gain skills on the best practices in enterprise establishment, management and operations. This will include training on making techno-economic feasibility studies on technology dissemination Each training workshop is to be attended by up to 50 participants. The training will include, among others, issues on enterprise due diligence, technology licensing and business plan development.

3.5 Train 80 BioInnovate scientists on IP

The lack of IP awareness coupled with weak institutional mechanisms for IP management are constraining the development and dissemination of bioscience innovations in Eastern Africa. While the Bio-Earn Project, which is a predecessor to the current Bio-innovate program, spearheaded the development of institutional IP regimes in some of the organizations which were part of the program, these regimes have not been sufficiently utilized because of limited awareness and capacity of scientists on IP matters. Based on the planned assessment of intellectual assets of the bio-innovate partner organizations, as well as the freedom-to-operate a one week-long training for up to eighty (80) participants including researchers, policymakers, IP managers, research managers in the BioInnovate partner organizations will be conducted. This activity will draw experiences from ATPS' previous work on strengthening national IP policy and legal frameworks in East and Southern Africa.

Project Title: Biosciences Innovation Policy Consortium for Eastern Africa (BIPCEA)

Partner Institution: International Service for the Acquisition of Agri-Biotech Applications (ISAAA)

Description of project Activities

Objective 1: To identify and analyze policy issues essential for the success of BioInnovate supported projects

1.3 Review the seed certification system in Eastern Africa

The seed certification system in Eastern African still possesses enormous challenges to scientists wishing to commercialize or exchange novel or value added seed varieties in the region. Previous efforts by ASARECA to rationalize the regulatory and legal framework governing the seed industry have not borne the expected fruit and the industry remains small, fragmented and fraught with bottlenecks. This is evidenced by the shortage of planting seed and increasing imports of seed into the region to compensate for the persistent shortfalls. Since a number of BioInnovate projects have seed related products, policy related support in terms of harmonized seed certification procedures and protocols is necessary. The seed certification system in region will be reviewed. The review will involve interviews with actors in the seed industry as well as Bioinnovate project partners working on seed systems. The review will establish status of seed certification in Eastern African with regard to the procedures and seed policies, and challenges this is posing to seed trade and germplasm exchange at the regional level. Based on this review

a protocol to facilitate seed certification in Eastern Africa will be developed. The protocol will include regional certification standards, procedures for variety releases, registration, export and import into the BioInnovate participating countries.

1.4 Review biosafety frameworks of the Eastern African countries

Eastern African countries' national biosafety frameworks are at different levels of development and implementation. Though current Bio-Innovate projects are not working with genetically modified organisms, a functional biosafety framework in the country is essential for advancing bioscience innovations overall. This study will establish the status of biosafety development in the region and identify areas where harmonization of biosafety policies may be required. The review shall include the recently adopted Nagoya-Kuala Lumpur Protocol on liability and redress related to biological safety. Countries in Eastern Africa are making steps to domesticate this agreement, which will potentially have major impact on bioscience innovations in the region.

Objective 2: To establish a platform/forum for interaction and exchange of ideas on bioscience innovations and policies in Eastern Africa

2.1 Undertake a BIPCEA and BioInnovate Projects stakeholder analysis and map potential strategic partners for advancing biosciences innovations in Eastern Africa.

An intensive stakeholder analysis and netmapping exercise to identify key stakeholders, and audiences in the BIPCEA project will be conducted. This will be done by BIPCEA team members through a brainstorming session during which all the stakeholders will be categorized according to their interest and power. 'Interest' will be a measure of the degree they are likely to be affected by the project or policy change, and what degree of interest or concern they have in or about it. 'Power' will be a measure of the influence they have over the project or policy, and to what degree they can help achieve, or block, the desired change. This analysis will also help in understanding groups that advocate or oppose scientific innovations taking into account the threats and opportunities that such groups present. Following this analysis a strategy on how best to engage and sustain relationships with the different stakeholders in the project will be identified. This will be done by bringing together all the identified strategic stakeholders in a workshop during which mechanisms and strategies on how to link actors in the bioscience innovation system will be identified and agreed on.

2.5 Have media coverage on key events

This entails maintaining a sustained engagement of the media through innovative ways and means. This will involve identifying key events such as the ones aforementioned, representing significant opportunities for strategic communication to stakeholders. Some of the media coverage events and engagement strategies will include news conferences, releases, press briefings, feature articles, opinion pieces, news advisories, calls to journalists informing them of key events and photo opportunities among others.

2.6 Develop four (4) sets of bioscience policy communication materials with key messages

This will involve the development of appropriate range of robust and compelling communication materials to promote policy information emanating from the project. Strategic targeting and consistency will be key to project's messages. Several tools and activities informed by the key audiences, messages, or a combination of the two will be used. These will include policy briefs, special papers, working papers and message maps. A core message that will act as the central piece of information that BIPCEA aims to

communicate to target audiences through every activity will be developed. It will provide a quick way of capturing attention and communicating outcomes. This will be a simple, realistic and memorable message that can be repeated severally to create understanding, acceptance and lead to ultimate success of the BioInnovate projects project efforts.

Objective 3: To establish a forum for communication, dialogue and advocacy on bioscience policy issues in the region

3.7 Train 100 scientists on how to reach policymakers with their research findings

Training workshops for scientist involved in the BioInnovate funded projects will be held in the 6 study countries. The objectives of the workshops will be to: i) equip the scientists with communications skills for effective engagement of policy makers; ii) Sharpen the skills of Principal Investigators (PIs) and project's communication personnel on media relations and issue-management; and equip scientists with skills to design and package comprehensive communication messages on the project including preparation of policy papers, special papers, working papers and message maps.

Project Title: Biosciences Innovation Policy Consortium for Eastern Africa (BIPCEA)

Partner Institution: International Livestock Research Institute (ILRI)

Description of project Activities

Objective 1: To identify and analyze policy issues essential for the success of BioInnovate supported projects

1.5 Review the access and benefit sharing regime Eastern Africa to establish extent to which they support (hinder) exchange of biological materials and products

This will involve an intensive analysis of the state of implementation of the multilateral system for access and benefit sharing under the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) in Eastern Africa and whether its objectives are being achieved or not at the national and institutional level. The analysis will also include the national PGRFA access systems such as arrangements with private plant breeding companies and the further transfer of PGRFA accessed under the standard material transfer agreement (SMTA). The study will help explore and identify options for accessing materials such as use of bio-cultural protocols and other instruments to develop terms and procedures for accessing materials held by local communities and options for benefit sharing such as through participatory plant breeding and other collaborative projects; and private partnerships to access privately held material. Following this analysis a strategy on how best to access materials for the project partners will be identified.

Objective 3: To establish a forum for communication, dialogue and advocacy on bioscience policy issues in the region

3.3 Develop intellectual property management tools for all Bio-Innovate partner projects.

This will involve the development and distribution to project partners of a 'common IP operational framework' the purpose of which is to provide common IP management processes for BioInnovate project partners. The framework will provide Guiding Principles on the identification, monitoring and management of their IP assets to enable the projects to capitalize on the potential benefits. Project partners will be provided with the resources and tools required for the sound management of intellectual assets in accordance with best practices to facilitate in making more informed decisions, such as acquiring other intellectual property assets (licensing in) or licensing out.

3.4 Undertake a Freedom-to-Operate for Bio-Innovate projects

This will be a participatory process involving the creation of IP teams within the projects to keep an inventory of third party IP used by the Project. An analysis of the final product will then be conducted to establish whether the product can be deployed without the risk of infringing existing third party rights.

3.5 Train 80 BioInnovate scientists on IP

The lack of IP awareness coupled with weak institutional mechanisms for IP management are constraining the development and dissemination of bioscience innovations in Eastern Africa. While the Bio-Earn Project, which is a predecessor to the current Bio-innovate program, spearheaded the development of institutional IP regimes in some of the organizations which were part of the program, these regimes have not been sufficiently utilized because of limited awareness and capacity of scientists on IP matters. Based on the planned assessment of intellectual assets of the bio-innovate partner organizations, as well as the freedom-to-operate a one week-long training for up to eighty (80) participants including researchers, policymakers, IP managers, research managers in the BioInnovate partner organizations will be conducted. This activity will draw experiences from ATPS' previous work on strengthening national IP policy and legal frameworks in East and Southern Africa.

3.6 Develop in a participatory manner 12 institutional IP policies for Bio-Innovate organizations that lack them.

This will be a participatory process that will involve identification of the organizations that do not have IP policies and working with the IP teams within the Projects to develop IP policies for these institutions.

Project Title: Biosciences Innovation Policy Consortium for Eastern Africa (BIPCEA)

Partner Institution: Stockholm Environment Institute (SEI)

NB. SEI will mainly provide technical support/backstopping for the activities described below.

Description of project Activities

Objective 1: To identify and analyze policy issues essential for the success of BioInnovate supported projects

1.1 Carry out four (4) case studies of Bio-Innovate projects to identify policy gaps and needs of BioInnovate projects.

Four (4) case studies of Bio-Innovate projects in the region will be carried out to systematically establish the policy gaps and needs of BioInnovate Project. The case studies will be on projects that represent a combination of crop and environmental bioscience innovations, and geographical balance of BioInnovate partner countries. Some of these projects include, for example:

- Project 1: Delivering new sorghum and millets innovations for food security and improving livelihoods
- Project 2: Enhancing food security through improved seed systems and varieties of cassava, potato and sweet potato resilient to climate change
- Project 4: Sustainable utilization of agro-industrial wastes through integration of bio-energy and mushroom production
- Project 5: Integrated process for sustainable agro-process waste treatment and climate change mitigation

We will use a Technological Innovation Systems (TIS) analytical framework for the case studies as most of them look to developing products and/or processes. The TIS is suitable because it enables analysis of the interactions among actors; and will entail a critical assessment of the knowledge base and diffusion, a review of relevant regional and national policies, entrepreneurial activities, potential markets, resource availability, acceptability of the innovations, and partnerships and networks which support bioscience innovation projects. Based on the TIS analysis, the Project team will determine strategies to address identified gaps and needs, and foster linkages among key actors.

1.2 Review national science, technology and innovation policies in Eastern Africa to establish the extent to which they promote bioscience innovations

While the integration of the East African Community is opening up political, economic and social development cooperation, the lack of policy coherence in areas such as bio-innovation are likely to remain a challenge to this process. It is important, therefore, that strategic science, technology and innovation policy studies are conducted across the region to underscore:

a. Whether or not the countries have appropriate STI policies that support the development, uptake and commercialization of bio-innovations.
b. The interaction between these STI policies with other relevant economic and social development policies e.g. economic planning, competition policies. Etc.
c. Areas where harmonization of STI policies should be pursued for easier integration and trade.
d. The impact of these STI policies on development of bio-innovation in the region

e. Share lessons from the experiences of the countries which are at different stages with their STI policies and bioscience innovation and development.
f. Highlight areas that need urgent investment in capacity building, policy change.

The essence of this policy study is to seek results that can be applied widely to solve problems of bio-innovation in the region, share cross-country experiences, foster networking and learning among the national Councils and Commissions for science and technology with other policy actors in the region, and provide quality advice to governments based on robust results. The Councils and Commissions for S&T will work hand in hand with ATPS to conduct this study. The study will involve engaging with relevant stakeholders (including government departments, policy actors, practitioners, private sector, civil society and journalists/media) in identifying and prioritizing specific research and policy questions to be addressed in each member country. The country-level analyses will be compared and contrasted to give a regional outlook on the status of STI policies in the region and their effect on bio-innovation. The findings of the study will be disseminated and shared during a planned high-level regional conference on bio-innovation in the third year of the project.

1.3 Review the seed certification system in Eastern Africa

The seed certification system in Eastern African still possesses enormous challenges to scientists wishing to commercialize or exchange novel or value added seed varieties in the region. Previous efforts by ASARECA to rationalize the regulatory and legal framework governing the seed industry have not borne the expected fruit and the industry remains small, fragmented and fraught with bottlenecks. This is evidenced by the shortage of planting seed and increasing imports of seed into the region to compensate for the persistent shortfalls. Since a number of BioInnovate projects have seed related products, policy related support in terms of harmonized seed certification procedures and protocols is necessary. The seed certification system in region will be reviewed. The review will involve interviews with actors in the seed industry as well as Bioinnovate project partners working on seed systems. The review will establish status of seed certification in Eastern African with regard to the procedures and seed policies, and challenges this is posing to seed trade and germplasm exchange at the regional level. Based on this review a protocol to facilitate seed certification in Eastern Africa will be developed. The protocol will include regional certification standards, procedures for variety releases, registration, export and import into the BioInnovate participating countries.

1.4 Review biosafety frameworks of the Eastern African countries

Eastern African countries' national biosafety frameworks are at different levels of development and implementation. Though current Bio-Innovate projects are not working with genetically modified organisms, a functional biosafety framework in the country is essential for advancing bioscience innovations overall. This study will establish the status of biosafety development in the region and identify areas where harmonization of biosafety policies may be required. The review shall include the recently adopted Nagoya-Kuala Lumpur Protocol on liability and redress related to biological safety. Countries in Eastern Africa are making steps to domesticate this agreement, which will potentially have major impact on bioscience innovations in the region.

1.5 Review the access and benefit sharing regime Eastern Africa to establish extent to which they support (hinder) exchange of biological materials and products

This will involve an intensive analysis of the state of implementation of the multilateral system for access and benefit sharing under the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) in Eastern Africa and whether its objectives are being achieved or not at the national and institutional level. The analysis will also include the national PGRFA access systems such as

arrangements with private plant breeding companies and the further transfer of PGRFA accessed under the standard material transfer agreement (SMTA). The study will help explore and identify options for accessing materials such as use of bio-cultural protocols and other instruments to develop terms and procedures for accessing materials held by local communities and options for benefit sharing such as through participatory plant breeding and other collaborative projects; and private partnerships to access privately held material. Following this analysis a strategy on how best to access materials for the project partners will be identified.

Objective 2: To establish a platform/forum for interaction and exchange of ideas on bioscience innovations and policies in Eastern Africa

2.4 Organizing two high-level regional policy conferences on bioscience innovations in Eastern Africa.

These will be regional conferences which will, among other things, highlight the importance of working regionally to develop bioscience innovations, pooling expertise and sharing resources, and connecting to other institutions worldwide. Each of these high level conferences is planned for up to one hundred (150) participants from the region and abroad. They will include all BioInnovate project partners, policy makers, civil society representation and other regional bioscience related bodies and initiatives. These conferences will be organized by the Councils and Commissions for S&T in consultation with the BioInnovate Program manager. One of these regional conferences shall specifically involve Government ministers and key decision makers from STI related ministries including the Ministries of Finance from each of the six countries in Eastern Africa as well as the East African Community. It is expected that such high level forum and the policy dialogues will present an opportunity for creating synergy between national programs and BioInnovate projects, enhance resource mobilization to support bioscience innovations, align BioInnovate interventions with national and regional development objectives, and help position biosciences among the region's top development priorities.

2.7 Prepare a flagship publication on bioscience innovation system and the emerging bio-economy in Eastern Africa

The study reports together with the high level regional conference proceedings would result in a printed volume or BioInnovate flagship publication presenting case-study experiences, lessons learned, and prospects for and anticipated impact of current and future bioscience innovations. The book will deal with how bioscience innovations, and in particular the BioInnovate project will contribute to a more profitable, climate smart and resource efficient economy, and include an analysis of potential future socio economic impacts of current and planned bioscience innovation investments. It is expected that book would be launched in towards the end of the third year of BIPCEA. Efforts will be made to engage regional and international publishers to print and disseminate this publication to a large audience.

Objective 3: To establish a forum for communication, dialogue and advocacy on bioscience policy issues in the region

3.3 Develop intellectual property management tools for all Bio-Innovate partner projects.

This will involve the development and distribution to project partners of a 'common IP operational framework' the purpose of which is to provide common IP management processes for BioInnovate project partners. The framework will provide Guiding Principles on the identification, monitoring and management of their IP assets to enable the projects to capitalize on the potential benefits. Project partners will be provided with the resources and tools required for the sound management of intellectual

assets in accordance with best practices to facilitate in making more informed decisions, such as acquiring other intellectual property assets (licensing in) or licensing out.

3.4 Undertake a Freedom-to-Operate for Bio-Innovate projects

This will be a participatory process involving the creation of IP teams within the projects to keep an inventory of third party IP used by the Project. An analysis of the final product will then be conducted to establish whether the product can be deployed without the risk of infringing existing third party rights.

3.6 Develop in a participatory manner 12 institutional IP policies for Bio-Innovate organizations that lack them.

This will be a participatory process that will involve identification of the organizations that do not have IP policies and working with the IP teams within the Projects to develop IP policies for these institutions.

20. Project logframe

A logical framework matrix (logframe) following the template provided by the BioInnovate management team, is included as Annex 1.

Annex 1. Logical framework

Project goal: to provide policy support services that will enable BioInnovate projects in Eastern Africa to successfully bring their technologies and business ideas to market.

Outputs	Outcome	Outcome indicator	Data source	Collection method	Assumptions
Project objectives					
Objective 1: To identify and analyze policy issues essential for the success of BioInnovate supported projects					
1.1Four (4) case study reports on Bio-Innovate projects.	Bio-Innovate partner organizations encounter less policy related obstacles in the process of developing and commercializing their bioscience innovations; Policies, strategies and actions to promote bioscience innovations more prominent in the policy and development agenda in Eastern Africa.	Reported bioscience policy related challenges actively addressed and significantly reduced by end of 2014. Investment in bioscience innovations increased by at least 25% by end of 2014	Firms and organizations reports Organization's budgets; budget speeches	Surveys of firms and organizations Document review;	1. Government commitment to STI is sustained 2. Selected bioscience innovations are economically and environmentally affordable and sustainable
1.2A report on review of national STI policies in EA.					
1.3A report on the seed certification system in EA.					
1.4A protocol to facilitate seed certification in Eastern Africa.					
1.5A report on biosafety frameworks of EA countries.					
1.6A report on access and benefit sharing regime in EA.					
1.7Three (3) policy briefs from the above studies.					
1.8Two (2) journal articles from the above studies.					
Objective 2: To establish a platform/forum for interaction and exchange of ideas on bioscience innovations and policies in Eastern Africa					
2.1Proceedings of a workshop on a BIPCEA and BioInnovate Projects stakeholder analysis and mapping.	Policies, strategies and actions to promote bioscience innovations more prominent in the policy and development agenda in Eastern Africa. .	Investment in bioscience innovations increased by at least by end of 2014	Firms and organizations reports Organization's budgets; budget speeches	Surveys of firms and organizations	1. Government commitment to STI is sustained 2. Selected bioscience innovations are economically and environmentally affordable and sustainable
2.2Proceedings of two (2) high-level regional conferences on bioscience innovations and policies in EA.					
2.3Eighteen (18) annual national round-tables on bioscience					

innovations and policy issues in all Bio-Innovate countries.					
2.4Media coverage on key events.					
2.5Four (4) sets of bioscience policy communication materials with key messages					
2.6Fourty five (45) partnership (breakfast) meetings in all Bio-Innovate countries.					
2.7One flagship publication on bioscience innovation system and the emerging bio-economy in EA.					
2.8A journal article from the above activities.					
Objective 3: To provide necessary policy support tools for biosciences innovations and related activities in the region					
3.1A training manual on entrepreneurship for BioInnovate projects.	BioInnovate partner organizations manage the IP according to international best practice BioInnovate collaborating scientists increasingly bring their technologies to market.	Filing for IP protection doubles in all BioInnovate partner organizations by end of 2014 At least 20% of BioInnovate scientists prepare proposals for start-up bioscience companies	Firms and organization reports;	Document review	1. Government commitment to STI is sustained 2. Selected bioscience innovations are economically and environmentally affordable and sustainable
3.2. One fifty (150) scientists trained in entrepreneurship skills					
3.3IP management tools for all Bio-Innovate partner organizations.					
3.4A report on Freedom-to-Operate for Bio-Innovate projects.					
3.5. Eighty (80) Bio-Innovate scientists on IP.					
3.6. One hundred (100) scientists on science communication skills					
3.7 Twelve (12) institutional IP policies for Bio-Innovate organizations that lack them.					
3.8 One thousand five hundred (1500) lab note books printed and distributed to BioInnovate partner project teams.					

Annex 2. Team leadership details

(1) CV for Principal Investigator

Name: Julius Ecuru
Date of Birth: 4th December 1973
Nationality: Ugandan

Education and Qualification
2004-2006: University of Cape Town, South Africa: Postgraduate Diploma in International Research Ethics
1999-2003: Makerere University, Kampala-Uganda: M.Sc. (Environmental Science)
1994-1998: Makerere University, Kampala-Uganda: B.Sc. Honours (Chemistry)

Short courses
September -October 2006: Ghana Institute of Management and Public Administration, Accra, Ghana: Goods and Equipment Procurement Management, and Selection and Employment of Consultants
September 2006: Inter-University Council for East Africa, Kampala, Uganda: Best Practices in Project Management

Experience
2005 – present: Assistant Executive Secretary and Head, Division of Research and Technology Development- Uganda National Council for Science and Technology, **Uganda**. Responsible for research and development policy management and oversight, management of science and innovation projects, ensuring human and environmental safety in the conduct of research, and institutional development planning.

2006-2010: Co-Principal Investigator for an East African project on enhancing product development opportunities and supportive policies. Initiated processes for establishing policies that promote product development and commercialization of innovations, including management of intellectual property in selected organizations and strategic partnerships for uptake of innovations.

Oct. 1, 2002- July 2004: Science and Technology Management Associate-Uganda National Council for Science and Technology, **Uganda**. Responsibilities included: research policy analysis, corporate management, international liaison in research and technology transfer, and intellectual property management.

Aug. 2001 – 2005: National Focal Point Coordinator for the East African Research Network and Programme for Biotechnology, Biosafety and Biotechnology Policy Development (BIO-EARN). Assisted in developing Uganda's national policy on biotechnology, and establishing a functional biosafety system, as well as institutional mechanisms for technology transfer; also, conducted a series of public awareness programs on environmental and human health considerations of work involving potentially hazardous biological and chemical substances including recombinant DNA technology.

Papers
Ecuru, J., Okot-Okumu, J., and Okurut, O. T. (2011) Monitoring residual chlorine decay and coliform contamination in water distribution network of Kampala, Uganda. *Journal of Applied Science and Environmental Management. March 2011. Vol 15 (1). 167-173.*

Ecuru, J., Lating O.P, Ziraba N.Y., and Trojer L (2011) Integrating science, technology and innovation in national development planning process: the case of Uganda: In Proceedings of the 2nd International Conference on Advances in Engineering and Technology, Entebbe, Uganda

Ecuru, J., and Naluyima, H. (2010), Biotechnology development and associated challenges in Uganda. *African Crop Science Journal, Vol. 18, No. 4. pp 133-139.*

Ecuru, J.,Nawegulo, L., Lutalo, R. B., Kasule, D., Tujunirwe, E., and Akampurira, I. (2008) Research in Uganda: status and implications for public policy, Uganda National Council for Science and Technology, Kampala

Ecuru, J., Kingamkono, R.R., Omari, J., Ivar, V., and Komen, J. (2008) Intellectual property management, Policy Brief published by the Inter-University Council for East Africa

Ecuru, J. (2004) An Overview of the status of biosafety in Uganda. In Proceedings of a National Awareness Workshop on Biosafety, Addis Ababa, Ethiopia, EPA

(2) CVs for co-PIs

Margaret Karembu

Nationality: Kenyan
Institution: ISAAAA Africenter
P O Box 70, Uthiru, 00605
ILRI Campus, Old Naivasha Road.
Nairobi KENYA
Tel: 254 20 4223618/5; Cell Phone: 254 738159054
E-mail: m.karembu@cgiar.org; m.karembu@isaaa.org

Current Position

Regional Director, International Service for the Acquisition of Agri-biotech Applications ISAAA Africenter, Nairobi, KENYA

Responsibilities: Managing, implementing and coordinating selected ISAAA-facilitated technology transfer and communications' projects in Africa and carrying out needs assessment and technology diffusion studies on the newly emerging field of modern biotechnology.

Specialty Areas: Environmental Science Education and Communications, Technology Transfer, Policy Outreach.

Education:

1. Ph.D. Environmental Science Education, Kenyatta University (2002)
2. M.Ed. Environmental Studies - Kenyatta University (1990)
3. B.Ed (Science) Kenyatta University, (1987).
4. SI (Diploma eqv.) Science Teacher Education–Kenya Science Teachers College (1982)

Recent selected short courses attended relevant to current project:

(i) ***Champions for Change Leadership Course*** under USAID/CAADP- Comprehensive Africa Agriculture Development Program Capacity-building project March, 2011, Nairobi, Kenya.
(ii) ***Strategic Leadership and Change Management*** for Directors of State Corporations, Kenya Institute of Administration, February 2011.
(iii)***Science, Technology and Innovation Policy*** Course at Harvard Kennedy School of Executive Education, Harvard, University, USA, 2009.

Membership in Institutional and Professional Associations

- Council Vice-Chair, Meru University College of Science and Technology
- Open Forum on Agricultural Biotechnology in Africa (OFAB)
- Kenya Network for Dissemination of Agricultural Technologies (KENDAT)
- African Biotechnology Stakeholders Forum (ABSF)
- Kenya National Biotechnology Awareness Creation Task Force (BIOAWARE)
- African Council for Communication Education (ACCE)

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EDUCATION:

2005 PhD in Biology, Lund University, Lund, Sweden
2000 M.Sc. Lund University, Lund, Sweden (Ecology)
1998 M.Sc. Addis Ababa University, Ethiopia (Biology)
1983 B.Sc. Addis Ababa University, Ethiopia (Biology)

WORK EXPERIENCE:

Present Academic staff, Biotechnology Program, Faculty of Science.
2008 – 10 Registrar, Addis Ababa University
2007 – 08 Associate Dean for Business and Administration, Faculty of Science, AAU.
1995 – 99 Research Associate, Addis Ababa University, Addis Ababa

RESEARCH INTERESTS:

Plant Ecology, Biosafety, Gene flow and hybridization between crop-to-wild/weedy relatives, and conservation biology.

RESEARCH GRANT

2005-2010 Gene flow from cultivated rice (*Oriza sativa)* to its AA genome wild relatives in the East African Region: key research for transgenic risk assessment supported by USAID through its Program for Biosafety Systems (PBS).

SHORT TERM TRAINING/WORKSHOPS:

27-30 November 2004: Natural hybridization and introgression: from genomics to ecology, Denmark.

24 March- 11 April 2004: Genetically modified crop plants in practice- Biosafety and the route from gene to market, Svalöv, Sweden.

3-7 June 2002*:* Introduction to biosafety and risk assessment for the environmental release of Genetically Modified Organisms (GMOs): Theoretical approach and scientific background, Trieste, Italy.

8-22 June 2000**:** BIO-EARN course on Risk Evaluation of GMOs, Lund, Sweden.

PUBLICATIONS:

Haileselassie, T., Nkya, M. and Skogsmyr, I. (2005). Effects of nutrients on maternal choice and siring success in *Cucumis sativus* (Cucurbitaceae). Evolutionary Ecology: *In press*.

Haileselassie, T. (2001). The effects of Environmental factors on male and female reproductive functions. Introductory Paper no. 127.

Name: **Ivar Virgin**

Date of Birth: 17th November 1961
Nationality: Swedish

Education and Qualification

- Jan 1993 - April 1994. Postdoctoral Fellow, Institute fur Genforschung (IGF), Berlin, Germany
  Jan 1988 - May 1992 Ph.D. in Biochemistry, Stockholm University, Sweden

Experience
Dr.Ivar Virgin is a Senior Researcher at the Stockholm Environment Institute (SEI). He is also the Project Manager of the Biosafety and Biotechnology Policy Programme which is a part of the overall SEI Programme. For the past 15 years at SEI he has done extensive research and managed numerous projects in the field of biotechnology-biosafety, food safety, biodiversity, forest genetic resources, climate change, impacts/risks/costs/benefits of modern agricultural biotechnology, bioresources and innovation, Intellectual Property Rights (IPR) and access to genetic resources, water quality monitoring and EIA, especially related to environmental problems and capacity building and institutional building in third world countries. The work has primarily focused on Southern and Eastern Africa and South East Asia and but he has also worked in China, India and in Latin America. Responsibilities has covered expert level research and evaluation as well as all aspects of project management, such as project development, team selection and stakeholder involvement, implementing workplans, financial management and project evaluation.

Dr Virgin has a Ph.D. in Biochemistry from Stockholm University. The thesis focused on the understanding of the molecular responses to stress in higher plants. During his Postdoctoral Fellowship at Institute fur Genforschung (IGF) in Berlin, Germany his research focused on the development of genetically modified crops producing modified starch for the utilisation as biodegradable packaging material. During his time at SEI he has also published extensively in the area of agricultural biotechnology technology transfer, cost/benefits of agricultural biotechnology, food safety, biosafety risk assessment and biosafety capacity building in developing countries (see below). Dr. Virgin has also developed and is managing the Sida supported *East African Regional Programme and Research Network for Biotechnology, Biosafety and Biotechnology Policy Development (BIO-EARN)*. He has developed and is managing the SEI research project; *Integrating Biosafety into Biotechnology Development: Comparative Analyses of Policies and Strategies in Asia and their Implications*. He is also a founding partner of the Sida supported course and capacity building project; *Genetic Resources and Intellectual Property Rights – Pathways for Development.*

Papers

Francis X. Johnson and Ivar Virgin(2010) *Future Trends In Biomass Resources For Food And Fuel. In An Informed Introduction to Biofuels*, Edited by Frank Rosillo-Calle and Francis X. Johnson, ISBN: 9781848133822, a ZED book (www.zedbooks.co.uk/book.asp?bookdetail=4364)

Virgin, I. Bhagavan, M. Komen, J. Kullaya, A., Louwaars E. N, Morris, J. Okori P. and Persley, G. (2007) *Agricultural Biotechnology and Small-scale Farmers in Eastern and*

Southern Africa (56pp) Stockholm Environment Institute, Stockholm, ISBN: 978-91-976022-1.

Indira, A., Bhagavan, M. and Virgin, I. Agricultural Biotechnology and Biosafety in India: Expectations, Outcomes and Lessons. 138 pp. Stockholm Environment Institute, Stockholm, *ISBN 91 975238 01*

Bhagavan, M.R. and Virgin, I. (2004), *Agricultural Biotechnology in Developing Countries: A Briefing Paper for Sida*, (46 pp) Stockholm Environment Institute, Stockholm, ISBN 91 88714 92 6.

Virgin, Ivar (2002). *Long-Term Strategies for Strengthening Agricultural Biotechnology Research and Development Capacity in Tanzania"* (82 pp). Consultancy Report for the Department of Research and Development (DRD) and the Ministry of Agriculture and Food Security (MAFS) in Tanzania funded by the World Bank and TARP II project. Report well received by DRD/MAFS officials.

Name:	**Komen**
Christian names:	Johannes Cornelis Everardus (John)
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Home address:	Duinoordstraat 69, 2023 WC Haarlem
	tel. +31-23-5263125; +31-6-10528453 (cell)
	jce.komen@planet.nl

Main fields of expertise

Research policy and strategy; Research management; International agricultural development; International technology transfer; Research capacity building; Policy and management aspects of new agricultural technologies.

Education

1990: MA degree Political Sciences, University of Amsterdam

Main subject:	International Relations and Public International Law
Main subsidiary:	Development Economics
Other subsidiaries:	Economics, Contemporary History

Recent work experience

2004 – present: Advisor on Biotechnology and Biosafety, Haarlem, The Netherlands. Main assignments:

- International Food Policy Research Institute (IFPRI), Washington D.C., USA: Managing the planning and implementation of research and technical assistance activities under the Program for Biosafety Systems (PBS). PBS supports partner countries as they develop the policy and legal framework, administrative procedures, technically qualified personnel and outreach mechanisms integral to their national biosafety systems. Specific responsibilities for (i) implementing activities in PBS partner countries in sub-Sahara Africa and Southeast Asia; (ii) work plan development, technical progress and impact reports, monitoring and evaluation. Ongoing assignment.

- Stockholm Environment Institute (SEI), Sweden: Work as external advisor on (a) Supporting planning and implementation of research and education activities on policy aspects of agricultural biotechnology, including biosafety and intellectual property management, under the BIO-EARN (Sweden – East Africa) program; (b) Contributing to the planning processes and implementation of policy activities defined for Phase III (2006-09) of BIO-EARN; (c) Reviewing proposals for competitive research grants; (d) Advising on new regional initiative, BioInnovate, starting 2010. BIO-EARN aims to build capacity in biotechnology in East Africa, and promote appropriate research and related policies. Ongoing assignment.
- United Nations Environment Programme (UNEP), Switzerland: (i) Act as resource person in the planning and implementation of a regional biosafety implementation workshop in Tblisi, Georgia. Supported the development of Medium-Sized Projects (MSPs) for biosafety framework implementation in Georgia, Armenia, Moldova. January 2005 (completed); (ii) Develop an analysis and report of accomplishments and lessons learned from 8 UNEP-GEF demonstration projects on biosafety framework implementation. May 2007 – April 2008 (completed); (iii) Conduct expert review and report (with Peter Morgan, consultant) on the Effectiveness of Various Approaches to Biosafety Capacity Building. February – September 2010 (completed).
- Asian Development Bank (ADB) / AgriCo, New Zealand: Serve as Biosafety Policy Specialist for the ADB-supported "Strengthening Capacity and Regional Cooperation in Advanced Agricultural Science and Technology in the Greater Mekong Subregion Project". Analyze implications of international biosafety agreements and guidelines, assess national capacities, and develop capacity development action plans for Cambodia, Laos, Thailand, Vietnam. October 2005 – January 2007 (completed).

Selected, recent publications

- (with Carliene Brenner, Rose Kingamkono, Julius Ecuru, Jane Omari, David Njubi, Hellen Opolot and Pantaleon Chuwa). 2010. Fostering Bioscience Innovation: Lessons from BIO-EARN. Synthesis chapter of a study on Innovation systems for Biotechnology in Kenya, Tanzania and Uganda, BIO-EARN, June 2010.
- (with Rosemary Wolson, Elijah Ateka and Ivar Virgin). 2009. Analysis of the Potential for Value Addition and Product Development Partnership Opportunities Emerging from the BIO-EARN R4D Projects: Policy recommendations. Policy Brief No.2. Kampala: East African Regional Programme and Research Network for Biotechnology, Biosafety and Biotechnology Policy Development (BIO-EARN).
- (with Idah Sithole-Niang). 2009. Regulatory Requirements and Technology Diffusion: The Case of Biotech Cotton. Paper presented at the technical seminar on "Biosafety Regulations, Implementation and Consumer Acceptance", at the 68th plenary meeting of the International Cotton Advisory Committee. September 10, 2009, Cape Town, South Africa.
- (with Catarina Cronquist). 2008. The Program for Biosafety Systems: Best Practices and Lessons Learned. *Biosafety Protocol News*, Vol.3, No.5 (December 2008), pp.12-14.
- 2008. Towards functional biosafety regulatory frameworks in sub-Sahara Africa: Achievements and lessons learned. Paper presented at the 1st BIO-EARN/VicRes Scientific Conference, 24-27 November 2008, Kampala, Uganda.
- (with Walter S. Alhassan, Catarina Cronquist, Alick Manda, Boniface Mkoko, Theresa Sengooba, Idah Sithole-Niang, David Wafula). 2008. Towards functional biosafety regulatory frameworks in Kenya, Uganda, Ghana and Malawi: Activities and

achievements under the Program for Biosafety Systems. Paper presented at the 1st All Africa Biotechnology Congress, 22-26 September 2008, Nairobi, Kenya.

- 2008. Guidance towards Implementation of National Biosafety Frameworks: Lessons Learned from the UNEP Demonstration Projects. Report for the UNEP-GEF Biosafety Unit. Geneva: United Nations Environment Programme.
- (with Ivar Virgin, Malur Bhagavan, Alois Kullaya, Niels Louwaars, E. Jane Morris, Patrick Okori and Gabrielle Persley). 2007. Agricultural Biotechnology and Small-scale Farmers in Eastern and Southern Africa. Stockholm: Stockholm Environment Institute.

Shumu Teferra
Ministry of Science & Technology
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1. **Educational Background**

2000 Post graduate course on Food Technology, Hebrew University of Jerusalem, Israel.
1979 Msc. In Food Processing Engineering, Krasnodar Polytechnic Institute, Krasnodar, former USSR.
1980 Diploma in Animal production Technology, Awasa Junior College of Agriculture, Awassa, Ethiopia.

2. **Employment**

10/2007-10/2008 Deputy Director General, Ethiopian Science and Technology Agency.
08/1997-10/2007 Head, Industry Department, Ethiopian Science and Technology Commission (ESTC).
07/1994-07/1997 Team leader & Acting Head, Industry Department, (ESTC).
06/1993-06/1994 Senior Expert, Handicrafts and Small Industries Technology, ESTC.
11/1987-05/1993 Expert, Industry and Technology Research Council, ESTC.
08/1980-12/1981 Assistant Head, Addis Ababa Milk Processing Plant, Dairy Development Enterprise, Addis Ababa.

3. **Institutional Governance Leadership Positions**

2008 - present Chairman, Scientific Equipment Centre Board.
2001 - 2009 Board Member, Fafa Food Share Company.
2001 - 2006 Board Member, Repi Soap Factory.
1998 - 2001 Board Member, Productivity Improvement Centre.

4. **Professional Career**

2006-2008 National coordinator, Biotechnology and Bio-safety for East African Research Network (BIO-EARN) of the policy Pogramme.
2000-2004 Deputy Director, Ethiopian Cleaner Production Centre.
1994-2007 Secretary of the National Industrial Science & Technology Council

1997	National Project Coordinator, ‘’50 Innovative and Successful Industrial Enterprises in Africa’’ UNIDO Programme.
1993-1997	Sub-programme coordinator of the ‘’Science & Technology Access and Application’’ of the 5th cycle Human Resource Development & Utilization (HRDU) country programme funded by UNDP.

5. **Participation in Professional Association**
   Member of the Ethiopian Chemical Engineers Society

JANE BISIERI OMARI

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Kenya
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Current Position: Senior Science Secretary in Agriculture and Allied Sciences
Responsibilities: Policy Advise to Government on Scientific and Technological Development in Agriculture & Related Sciences. Organize & Coordinate meetings and workshops for Council activities related to agricultural science.

Co-PI for Project 5 in Phase 3 of BIOEARN Program in charge of project implementation, financial management and report preparation. We offered policy support and successfully established IP offices in BIOEARN member’s institution in Kenyatta, Moi, JKUAT Universities and at Kenya Agricultural Research Institute.

Participated as task force member in formulation of The ‘National Agricultural Research Systems Policy’, National Biotechnology Development Strategy and National Biosafety Bill

Educational Background
Kenyatta University, Nairobi Kenya MSC Zoology (1992)
Kenyatta University, Nairobi Kenya, BED Botany, Zoology, Education (1986)

Recent Selected Short Courses
1. Senior Management Course , Kenya Institute of Administration 18thJanuary -12th February 2010
2. ‘Environmental Biosafety Short Course’. Michigan State University. Institute of International Agriculture, USA. August 9-14th 2009.
3. ‘Financial Management and Reporting Trainings’, organized by the Interuniversity Council for East Africa Entebbe Uganda14th-16th April 2008
4. Corporate Governance’ Five day training Course for Directors’ Mombasa Serena Hotel 2007.
5. Several short courses on ‘Biotechnology and Biosafety Policy Analysis” at Institute of Science and Technology Policy Analysis between 2005-2009

Selected recent policy reports in proceedings

Omari J. 2010. 'Turning Research into Use: The Policy Brief' paper presented at the 5th Annual International Conference, Egerton Njoro September 2010

Brenner, C., J. Komen, R. Kingamkono, J. Ecuru, J. Omari, D. Njubi, H. Opolot, and P. Chuwa. 2010. *Fostering Bioscience Innovation: Lessons from BIO-EARN*. Kampala, Uganda: East Africa Regional Programme and Research Network for Biotechnology, Biosafety and Biotechnology Policy Development.

Omari, J and Njubi D. 2010. 'The Biotechnology Innovation System in Kenya'. The case of BIOEARN. Paper presented at the 3rd Annual Scientific Conference for dissemination of Research Results. Kenyatta International Conference Centre, Nairobi ,Kenya

Omari J. 2009. 'Managing Intellectual Property in Research Collaborations at the Universities and Research Institutions in Eastern Africa'. Paper presented at the Annual Science Week and International Conference. Moi University Eldoret, Kenya

Omari J. 2009. 'Opportunities in BIOEARN Research for Development Projects in Kenya '. Key note presentation at the fourth Research week and International Conference, Egerton University, Njoro, Kenya

Omari J. B., Kingamkono R.R., Ecuru J., Shumu., "Product Development Partnership opportunities in the BIOEARN Research & Development Projects: Paper presented at the BIOEARN/VICRES Scientific Conference at Speke Resort Munyonyo 24th – 26th November 2008

Omari J.B., Ecuru J., Kingamkono R., and Mugiira R.B., 'Building Capacity for Intelectual Property Management in Biotechnology products in East AfricaPaper presented at the 1st All African Congress on Biotechnology at The Grand Regency (now Laico) on 22nd – 26th September 2008.

Curriculum vitae for Marie-Christine Gasingirwa

Date of birth : 12-June-1952
Place of birth: Gahini- Rwanda
Nationality : Rwandan
Marital status : Single
Address : The Ministry of Education
Directorate of Science, Technology and Research,
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KIGALI-RWANDA

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Education and professional information :

A. Education :

Year	Awards
2003- 2009	PhD in Biomedical and Pharmaceutical Sciences: Namur, Belgium
1999- 2001	MSc. In Agricultural Biotechnology, West Texas A&M, USA
1976-1979	BSc. In Zoology and Biochemistry, University of Nairobi, Kenya.
1973- 1976	(SI) Certificate, (Biology-Chemistry), Kenya Science Teachers College, Kenya.
1970- 1971	
1967- 1969	EAACE, Gayaza High School, Kampala, Uganda.
	EAC? Nyakasura School, Fort-Portal, Uganda.

B. Work Experiences:

Year	Locality
1979- 1984	Graduate Teacher at the Kenya Science Teachers College, Nairobi, Kenya
1984- 1992	Graduate teacher at the Kianda High School, Nairobi, Kenya
1992- 1994	Graduate Teacher at the Agha Khan Academy, Nairobi, Kenya
1994- 1995	Civil servant at the Ministry of Education, Kigali, Rwanda
1995- 1999	Assistant Lecturer at the National University (NUR), Butare, Rwanda
May2009-Oct 2009	Senior Lecturer at the NUR, Butare, Rwanda (Medicine lecturing in Cellular and Molecular Biology as well as Biochemistry).
Oct 2009- To date	Director General for Science, technology and Research, ministry of Education

Seminars and Workshops

Since **Mid-October 2009-Date**: Director General for Science, Technology and Research in the Ministry of Education. From where I have attended many conferences and workshops both international and national representing Rwanda:

Organised and participated in the Workshop on Tropical Rift Lake Systems: Integrated Volcanologic, Tectonic, and Biogeochemical, and Geohazard Assessment of Lake Kivu, Rubavu/ Gisenyi, Rwanda, January 13th – 15th , 2010.

- Organized and participated in the 'Unlocking the potential of Science, Technology and Innovation to achieve the MDGs in Rwanda', Serena Hotel, Kigali, 21st – 22 nd January 2010.

- Participated as a Member of the Technical Team that prepared the meeting for ministers in charge of Higher Education for CEPGL Member States, held in Bujumbura, Burundi, on the 25th-30th January 2010.
- Participated and presented a paper in the Conference on 'Food Fortification and Nutrition Solutions for Community Health In Rwanda', organised by the University of Illinois, Serena Hotel , Kigali, on the 3rd-4th, February 2010.
- Participated in the Workshop on Commercialising African Health Research through Life Science innovation Platforms, sponsored by the McLaughlin-Rotman Centre for Global Health, 12th -13th February, 2010.
- Participated in the 4th African Ministerial Conference on Science and Technology (IVth AMCOST), held in Cairo-Egypt, March 6th-10th, 2010.
- Participated in the 2010 Network for the Coordination and Advancement of Sub-Saharan Africa-EU Science and Technology Coordination (CAAST-Net), chairing The Stakeholder meeting session on 'CAAST-Net Thematic Presentations, 16th-18th May 2010, Durban, South Africa.
- As a member of the Assessment Team appointed by the GoR to identify how to develop Rwanda's position in CEPGL, by a study tour to the three Member States, visiting the CEPGL and its Specialized institutions, 26th May-5th June 2010.
- Took part as a Member of Technical Team of Experts that presented findings of the above survey in preparation for the CEPGL Council of Ministers, in Rubavu, on the 26th -30th July 2010.
- Took part in the National Workshop on Biosafety Policies and Guidelines, organized by REMA (Rwanda Environment Management Authority) in partnership with Common Market in Eastern and South Africa (COMESA), the Association for strengthening Agricultural Research in Eastern and Central Africa (ASARECA), the Programme for Biosafety System (PBS), the Alliance for Commodity Trade in Eastern Africa (ECTESA) and the International Service for the Acquisition of the Agri-Biotech Applications (ISAAA) in Kigali, on the 21-22 September, Laico Hotel.
- Organized and participated in the Regional Integration and Human Resources Development in Science and Technology Fields" Conference held on the 8th and 9th December 2010 as collaboration between the International Office of the AAAS

(American Association for Advancement of Science) and the Government of Rwanda"

- Dec 13th-16th 2010 took part in the Consultative Workshop on the Centre of Excellence on Biodiversity and Natural Resources Management for Rwanda,
- 7th-9th Feb, 2011, took part and presented a paper on Research Regulation in Rwanda at the Lake Kivu Monitoring Workshop, Serena Hotel-Rubavu.
- 23rd-25th March, 2011, took part in the Development Partners Meeting at Serena Hotel-Rubavu, as a Member of the Government of Rwanda delegation.
- Participated in the Regional Training on Reinforcement of National Capacities in STI and Statistics Indicators of STI in Central Africa organized by UNESCO- Libreville, Gabon on 12th -15th April 2011.
- Participated at the 'Agricultural Biotechnology in Africa: Fostering Innovation'in Addis Ababa, Ethiopia May 13th- 15th 2011, at the United Nations Conference Centre a co-hosted by both the AIA project and the Addis Ababa University.

NB: I took part in many national workshops and seminars in relation to education in general and Science and Technology in Education in particular.

By virtue of my position in the Ministry of Education, I serve as a Member of a number of Committees, such as the Inter-University Council of East Africa, Committee on for the selection of eligible candidates for Cambridge Commonwealth Trust Scholarship Committee (Rwanda Chapter), Committee for the establishment of centres of Excellence in ICT and Biodiversity, etc… Moreover, I often assume interim duties during the absence of the Permanent Secretary.

Poster presentation: (1) at Autumn Meeting 2005 of the BSCDB, Saturday 15th October **2005** Universiteit Hasselt, Campus Diepenbeek, Agoralaan, Bldg. D, BE-3590 Diepenbeek NEUROGLIA. '*Hyal-1 in liver, is it an authentic lysosomal hydrolase?*' Gasingirwa M-C, Thirion J, Mertens-Strijthagen J, Patel N, Triggs-Raine B, Flamion B, and Jadot M.

(2) at the ASBMB Conference in San Fransisco, December **2008**. *Is Hyal-1 an authentic lysosomal protein ?* M. Gasingirwa, J. Thirion, B. Flamion, R. Wattiaux, M. Jadot.

Publications :

- Robert Wattiaux, Simone Wattiaux-De Coninck, Jacqueline Thirion, **Marie-Christine Gasingirwa**, and Michel Jadot (**2007**). Lysosomes and Fas mediated liver cell death. *Biochem J***; 403**: 89–95.
- **Gasingirwa M.C**, Thirion J., Costa C, Flamion F., Lobel P., and Jadot M. (**2008**). A method to assess the lysosomal residence of proteins in cultured cells. *Anal Biochem* **374** *:* 31–40.
- **Thesis**: Is Hyal-1 an Authentic Lysosomal Enzyme? Defended on the 12 May **2009**, for an award of 'Docteur en Sciences Biomedicales et Pharmaceutiques'.
- **Gasingirwa M.C**, Thirion J., Jeannine Mertens Strijthagen, Wattiaux-De Coninck Simone, Flamion B., Wattiaux R.and Jadot M. (**2010**). Endocytosis of Hyaluronidase-1 by the Liver. *Biochem. J.,* **430,** 305-313 .

Other awards include :

1. 2nd August 1976, Diplôme de la Langue Française- Alliance Française- Nairobi, Kenya.
2. June 26th-July 1994: Certificate on Conservation Education by Elsamere Conservation Trust- Naivasha- Kenya.
3. March 30th-3rd April 1998 : First Regional Training Workshop on Development and Negotiation of Partnership Proposals in Kampala-Uganda (African Science & Technology Exchange - ASTEX).
4. Holder of a certificate on General Radiation Safety Training presented by the Environmental Health and Safety Department of Texas A&M University. (27th March, 2001), USA.
5. 'Certificat Universitaire Complémentaire en Science des Animaux de Laboratoire' (Université Libre de Bruxelles –ULB, 2005-2006- Belgium).
6. Participated in the annual 'Biosecurité, Radioprotection et Gestion des risques chimiques', 2005, 2006, 2007, 2008 and 2009 at the FUNDP (Facultés Universitaires Notre Dame de la Paix, Namur-Belgium

Language knowledge:

1. Kinyarwanda- written and spoken (fluently)
2. English - written and spoken (fluently)

3. French - written and spoken (fairly well)
4. Kiswahili - spoken (fluently)

Done in Kigali, 19th May 2011.

Gasingirwa Marie-Christine (Ph D)

Curriculum vitae for Pantaleon Casmir Chuwa

Surname: **CHUWA**

Other names: **Pantaleon Casmir**
Gender: Male
Nationality: Tanzanian
Date of Birth: 2nd September 1954
Address: Tanzania Commission for Science and Technology (COSTECH)
P.O. Box 4302 **DAR ES SALAAM – TANZANIA**
Telephone: 255 (0) 783 183080
Email: pchuwa@costech.or.tz pantachuwa@yahoo.co.uk

Employer: Tanzania Commission for Science and Technology (COSTECH), Dar es Salaam.
Designation: Senior Research Officer

Education:

Name, place and Country	Attended from/To	Degree awarded	Main course of study
Lund University, Sweden	Aug. 1999 – June 2000	Master of Science	Ecology (Biosafety)
University of Dar es Salaam, Tanzania	May 1994 – Dec. 1996	Master of Science	Applied Microbiology (Environment Management)
University of Dar es Salaam, Tanzania	Sept. 1989 – May 1993	Bachelor of Science	Applied Microbiology
Livestock Training Institute, Morogoro - Tanzania	Jan1981 – Dec. 1982	Diploma	Pest control
IAEA Seibersdorf Laboratories, Vienna – Austria	March - July. 1989	Certificate	Pest control using radiation

Employment and Experience:
Employed as **Senior Research Officer** by the Tanzania Commission for Science and Technology (COSTECH), Dar es Salaam - Tanzania since November 1997 to date, working as a **Programme Officer-Biosafety and Biotechnology, r**esponsible for the following:

- Servicing the National Biotechnology Advisory Committee (NBAC);

- Reviewing and formulation of national biotechnology and biosafety related policies;
- project/ programme development, monitoring and evaluation activities related to biotechnology;
- organization of workshops for government policy and decision makers on consensus making on matters pertaining to national, regional and international agreements in biotechnology;
- Secretariat to the national, regional and international collaborative initiatives on biosafety and biotechnology programmes; and
- **Team member** during implementation of Project 5 under BIO-EARN programme which ended last year (2010) on "Enhancing Product Development Opportunities and Supportive Policies". All planned activities were implemented successfully and produced reports, proceedings and policy briefs for evidence-informed decisions among policy makers and other stakeholders at national and regional levels.