LEAP-Agri awarded Project Information Form

Please formulate for a broader audience max 2 pages

1. Acronym and Title of the project:

(Possible to include one photo and/or logo)

PASUSI

2. Project consortium and fund

Please identify the project's PI and partner institutes with contacts (Email addresses)

John Sumelius, University of Helsinki, john.sumelius@helsinki.fi
Benjamin Ahiabor, CSIR-Savanna Agricultural Research Institute, bahiabor@yahoo.com
John Baptist Tumuhairwe, Makerere University jbtumuhairwe@gmail.com,
Åsa Frostegård, Norwegian University of Life Sciences, asa.frostegard@nmbu.no,

3. Thematic and geographic area of the project:

Please identify under which of the following thematic areas your project most align with. Shortly indicate your contribution to the indicated areas.

1. Sustainable Intensification		2. Agriculture and Food Systems for Nutrition		3. Expansion and Improvement of Agricultural markets and trade	
1.1. Agroforestry systems	☐	2.1. Nutritious value chain	☐	3.1. Post-harvest innovations	☐
1.2. Sustainable water management	☐	2.2. Food and nutrition assessment	☐	3.2. Food value-chain	☐
1.3. Sustainable food security	x ☐	2.3 Food technology and safety	☐	3.3. Rural development and agricultural economy.	☐
1.4. Soil science and remote sensing	x ☐	2.4. Pest and disease control	☐	3.4. Food systems governance and farmers organizations	☐
1.5. Plant sciences	X				
1.6. Animal sciences	☐				

4. Project's summary/abstract:

Feeding the world's population in an environmentally and socially sustainable way is a major challenge for the future. Farmland should be used productively without compromising the environment. Sustainable intensification can contribute to this goal by mitigating climate change, creating better soil fertility and health and improving resilience, while providing nutritious food to humans and feed to cattle. Legumes have the capacity to fix nitrogen, when inoculated with rhizobia which can be used as biofertilizers. PASUSI will develop ways to integrate this technology in local farming systems, evaluate the economically viability and risks connected with these crops, and support local biofertilizer production. The target crops are cowpea, soybean, groundnut and Bambara groundnut which form an important dietary basis in Ghana and Uganda, and are commonly grown by women. For a lasting impact, farmers need to be actively involved in developing sustainable intensification models. Therefore, we take a participatory approach, involving both farmers and other relevant stakeholders through establishing Innovation Platforms. We aim at a holistic approach to find integrated, lasting solutions for both production, environment and for the rural community. Producing high quality biofertilizers requires knowledge and skills about rhizobium bacteria isolation and characterization, carrier material, quality control, proper storage and distribution. Current rhizobia inoculant production chains in Ghana and Uganda will be developed in collaboration with a skilled Finnish inoculant producer and scientific partners in Norway and Finland. The laboratories in Ghana and Uganda will be equipped for the purposes and scientists trained. The expected impact is improved food security, livelihoods and economic improved income generation for small-scale farmers, increased capacity of scientific and technical staff as well as positive environmental effects and improvements in community resilience.

5. Project's main objective (s):

The overall aim of the project is to improve productivity, livelihoods, nutrition and household wellbeing in Ghana and Uganda, while counteracting environmental degradation and mineral depletion caused by monocultures. The study will address both the individual farm level and the rural community level. Introducing the use of biofertilizers through a participatory process can highlight the potential of location-based resources, and empower the community more widely. This will be achieved by supporting the capacity of local stakeholders to transform their farming systems towards sustainable intensification (SI) and climate-smart agricultural practices

6. Theory of Change and Impact Pathway

6.1.Summary ToC with assumptions

The expected impact is improved food security, nutritional capacity of women and households, economic outcome and livelihoods for small-scale farmers and for the rural community This will be achieved through capacity building of different stakeholder groups, from scientific and technical capacity in producing quality biofertilizers, to supporting the actors of the Innovation System to integrate the technology in a sustainable way. Participatory methods, will include IPs, trainings, seminars and ongoing dialogue with stakeholders, including local agricultural extension offices and policy makers, as well as farmers, women's groups, local youth in agribusiness, agro-input dealers, FBOs and agri-based NGOs.
The use of nitrogen-fixing rhizobium bacteria has positive environmental impact in the long-term, through improved soil structure, increased soil organic matter and nutrient content and sequestration of carbon dioxide, which increases productivity and contributes to soil and plant health. These positive impacts and related cost will be evaluated in the cost-benefit analysis to obtain estimates of the net value on societal level. The expected impact will be that decision-makers on household, community, FBO and Ministry level will understand the social, environmental, nutritional benefits and costs related to intercropping, use of inoculants and new cultivation and nutritional activities.
Farm level technical efficiency and gross margin calculations will show economic outcomes for stakeholder groups on how to improve economic outcomes. Small- scale farmers and women-farmers will be able to assess and improve economic outcomes of alternative crops and crop rotations as well as use of rhizobium bacteria. Cost-benefit analysis will give an overall estimate of the net social benefits for following up actions.
The expected outcome of nutrition educational activities will be improved household and community capacity to preserve and process legumes and cereal, better postharvest handling, food diversification, infant and young child feeding and better capabilities of women and youth to address nutrition, processing and trading.
The expected outcome is increased capacity of farmers as well as local models and solutions for integrating the technology in a sustainable way. Especially for women farmers, who are the main producers of legumes, PASUSI is expected to improve

income, livelihoods and economic independence. In addition, PASUSI will strengthen the resilience of the whole rural community by addressing its own resources in their fields and among the people.
Through training of FBOs R&I impacts will be scaled up on regional level to hundreds of farmers. This implies engaging FBOs from the beginning, in cooperation with Ministries of Agriculture. The expected impact will contribute to nine of the Sustainable Development Goals (no. 1, 2, 3, 4, 5, 12, 13, 15 and 17).
The expected outcome of the laboratory trainings is high level skills in pure-culture technique, strain identification and classification using molecular and bioinformatics tools, phenotypic testing (effectiveness, denitrification), strain preservation, inoculant production and quality control, which is the prerequisite for quality local production.
In addition to the IP and training activity, a larger group of stakeholders will be reached through extension material (communication strategy). The materials will target extension agents, agro-dealers, farmers, technicians and scientists. Printed materials include handbooks, leaflets, posters, one-page instructions, policy-briefs and production guides for the legumes and inoculants use. Results will be published in high-impact scientific journals. Local and international conferences, workshops, symposia will disseminate knowledge and information to both the local and international communities.

6.2 Expected outcomes and impact:

Please mention the most expected outcomes of the project (e.g., the changes in behaviour, relationships, actions and activities of stakeholders as a result of the sharing and uptake of research.) and the contribution to impact the project aims at (change in economic, environmental or social conditions)

The expected impact of the project is improved food security and livelihoods for small-scale farmers. This will be achieved through capacity building of different stakeholder groups, from scientific and technical capacity in producing quality biofertilizers, to supporting the actors of the Innovation System to integrate the technology in a sustainable way. Participatory methods, trainings and communication will play key roles in achieving this. The methods will include IPs, trainings, seminars and ongoing dialogue with stakeholders, including local agricultural extension offices and policy makers, as well as farmers, women's groups, local youth in agribusiness, agro-input dealers, farmer-based organizations and agri-based NGOs.
The use of nitrogen-fixing rhizobium bacteria has positive environmental impact in the long-term, through improved soil structure, increased soil organic matter and nutrient content and sequestration of carbon dioxide, which increases productivity and contributes to soil and plant health.
The expected outcome of the IPs is increased capacity of farmers as well as local models and solutions for integrating the technology in a sustainable way. Especially for women farmers, who are the main producers of legumes, PASUSI is expected to improve income and livelihood status, as well as economic independence.
Through training of farmer-based organizations (FBOs) R&I impacts will be scaled up on regional level to hundreds of farmers. This implies engaging FBOs from the beginning, in cooperation with the Ministry of Agriculture. The expected impact will contribute to nine of the Sustainable Development Goals (no. 1, 2, 3, 4, 5, 12, 13, 15 and 17).
The expected outcome of the laboratory trainings is high level skills in pure-culture technique, DNA extraction, strain identification and classification using molecular and bioinformatics tools, phenotypic testing (effectiveness, denitrification), strain preservation, inoculant production and quality control, which is the prerequisite for quality local production.
In addition to the IP and training activity, a larger group of stakeholders will be reached through extension material (communication strategy). The materials will target extension agents, agro-dealers, farmers, technicians and scientists. Printed materials include, handbooks, leaflets, posters, one-page instructions, policy-briefs and production guides for the legumes and inoculants use. Results from scientific results achieved in the project will be published in high-impact scientific journals and academic theses by post-graduate students. Local and international conferences, workshops, symposia will disseminate knowledge and information to both the local and international communities. Scientific articles in international journals will be published