

Theme I- Productivity and Environmental Sustainability for Food Security and Poverty Alleviation

Sub-theme 1: Animal Production and Health

In Ethiopia, animal production and productivity are very low. As a result, the country is not benefiting much from the huge animal population and genetic diversity it possesses. The low animal productivity is attributable to several constraints which include severe feed shortages, lack of appropriate breeds, lack of appropriate technologies that enhance animal productivity, high disease burdens, poor management practices, lack of favorable policies for developing and utilizing animal resources, etc. In addition, undernourishment, increase in disease incidence, emergence of new diseases, and increasing drug resistance disease are challenges which impacted animal productivity. Considering the national research priority and Eastern Ethiopian condition in relation to Haramaya University research mandate area, the following priority research areas are selected to improve the livestock production and productivity of the eastern region for the 2023/24 call for proposals.

1.1. Development and generation of animal feeds and improved practices

- Development of high-quality and climate resilient forage species
- Improved feed treatment technologies and scale up for pastoral/lowland areas
- Improved packages for urban suited feeding strategies,
- Environmental risks and animal feed safety of invasive alien species
- Product development for livestock feed

1.2. Poultry Production and Productivity Improvement

- Improve the existing mobile poultry house to fit into different agro-ecologies
- Large scale automated mobile poultry house
- Improve genetic performances of local chickens for productivity and resilience
- Innovative methods in disease management and prevention
- Development of economically affordable and practically feasible poultry feed

- Product development (e.g. incubator, breed, feed, disease detection, etc)

1.3. Improvement of Apiculture Production and Productivity

- Introduction and demonstrations of innovative technologies and management practices to enhance productivity and resilience
- Business development services for honey products and production (access to market, value addition, etc.)
- Product development

1.4. Cattle Production and Productivity Improvement

- Milk productivity and quality improvement
- Livestock breed improvement and management
- Feed resources and feeding strategies.
- Study on livestock skin disease and its challenge on industrial input supply issues
- Impact of climate on cattle and pastoralist life systems
- Product development

Sub-theme 2: Plant Production and Health

Research on plant production and health has been conducted for several decades and encouraging varietal, agronomical and other packages have been developed and benefited. However, the crop production and productivity are constrained with many problems in eastern Ethiopia. In addition, technology development and information generation is a continuous process and must be done in diligence to increase production and productivity thereby to feed the ever increasing human population. Since all the problems of crop production and productivity in the region may not be addressed in a short period of time, only problems that need urgent solutions have been identified as a priority area for the 2023/24 call for proposals.

2.1. Improvement of sesame productivity

- Development of sesame technologies that increase production and productivity
- Improved agronomic practices for sesame production

2.2 Development of bread wheat technologies to enhance production and productivity

- Development of bread wheat technologies for potential and moisture stress areas

- Development of bread wheat technologies for irrigated lowland areas
- Integrated soil nutrient management to improve bread wheat productivity
- Product development

2.3 Development of maize technologies

- Development of maize varieties for stress and potential environments
- Integrated nutrient management for increased maize production
- Product development

2.4 Genetic and agronomic improvements of lowland pulse Crops

- Development of common bean genotypes for biotic and abiotic stress (evaluation of segregating materials, genomic dissection for drought related traits, etc.)
- Lowland pulses in cropping systems and agricultural intensification
- Introduction of unexploited lowland pulses (mung bean and soybean varieties) for diverse agro-climate of eastern Ethiopia;
- Diseases, bean stem maggot and storage pests of common bean
- Product development

2.5 Evaluation of fruit crops in eastern Ethiopia

- Fruit crops (mango, peach, citrus etc,) production constraints, pest management, and establishment of orchard at Berkele research site in Eastern Ethiopia;
- Product development/value addition

2.6 Generation of technologies for economically important vegetable crops (tomato-open pollinated and hybrid varieties, cabbage, eggplant, etc.)

- Open pollinated and hybrid tomato varieties for high yield and disease resistance, and development of methods for quality seed extraction of open-pollinated varieties in eastern Ethiopia;
- Introduction, evaluation and agronomic recommendation of commercial eggplant varieties for high yield and fruit quality of egg plant varieties;
- Introduction, evaluation and recommendation of commercial cabbage varieties; agronomic packages for high yield and head cabbage quality and
- Product development

2.7. Improvement of Harar Coffee Production and Productivity

- Climate-smart production practices for boosting coffee production and productivity;
- Coffee emerging pest identification and management;
- Coffee chemistry, and biodiversity for productivity improvement
- Product development

2.8. Initiating rice production in eastern Ethiopia

- Evaluation of the adaptability of lowland rice varieties for irrigated agriculture in eastern Ethiopia
- Optimization of agronomic practices of rice varieties in eastern Ethiopia

Sub-theme 3: Environment, Natural Resource and Climate Change

Today the world is confronted, more than ever before, with unprecedented environmental pressures that are posing extraordinary scientific, social, and economic challenges to the society. Most of the challenges are triggered by anthropogenic activities. Climate change has become a global issue due to natural and anthropogenic processes being manifested in environmental incidents including floods, drought, increasing desertification, global warming, water scarcity, unexpected precipitation, and others. Ethiopia is vulnerable to hazards caused by one of the major environmental problems, climate change. To tackle the problems, there is a need for intervention through participatory research on environment, natural resources and climate change. Therefore, the environment, natural resources and climate change related issues need to be treated as an integrated whole to address challenges. Since all the problems may not have addressed in a short period of time the problems that need urgent solution have been identified as priority research area for 2023/24 call.

3.1. Drought risk management for resilient livelihood and ecosystems in drought prone and pastoral areas

- Developing context relevant and sustainable solutions (nature based solution and others)

3.2. Waste management

- Develop innovative methods for solid waste recycling and management in urban centers

of eastern Ethiopia (Babile, Dadar, Meta and Kombolcha)

- Measuring and costing greenhouse gas emissions by local industries
- Product development

3.3. Water/wastewater treatment technologies and pollution control

- Efficient and cost-effective desalination technologies for agricultural water in lowland
- Management options for salt affected soils in lowland areas
- Replacement of imported bleaching powder with locally available materials for industrial wastewater treatments and other food refining processes, such as oil
- Development of efficient and cost-effective water/wastewater treatments technologies

3.4. Rangeland ecosystem productivity enhancement for pastoralists and agro-pastoral areas

- Rangeland grazing and bush management strategies
- Developing innovative strategies for ecological rehabilitation of degraded rangelands

3.5. Water resources and irrigation potential for sustainable agricultural production in lowland areas

- Ground and surface water resources assessment, development, and management
- Salinity management for agriculture use (irrigated wheat production salinity management)
- Agricultural water uses efficiency improvement, productivity, and utilization in lowland irrigated agriculture

3.6. Land use /land cover change and climate change in eastern Ethiopia

- Landscape management practices for climate change adaptation, resilience, and mitigation;
- Identifying climate-smart water resources management practices and their effectiveness;
- Developing technologies for the production of bio-energy and other bio-products from agricultural and forest biomass.
- Environmental Degradation and Changes, and Ways of Maintaining Environmental Sustainability, Food Security and Peace in Hararghe
- Sustainability Dimension of Environmental Protection

- Assessment of the Impact of sustainable land management programs (e.g. green legacy etc.) on livelihood and ecosystem services
- Product development

3.7. Climate change and carbon financing in pastoral areas

- The impact of climate on cattle production and pastoralist life systems
- Opportunities for carbon financing system in pastoral areas