

Sub-theme 1.3. Environment, Natural Resources, and Climate Change

Rationale

Over the coming decades, Ethiopia needs to respond to the impact of a changing climate and other environmental changes. Research in this sub-theme is intended to focus on developing capabilities that can support the development of innovations in social systems and sectors of society enabling socio-ecological resilience to global change impacts.

Environment is an essential component of human wellbeing and contributes positively to human security, provides basic materials for good life, health and social relations. Nevertheless, 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. The major causes for these calamities are different processes of land degradation such as soil erosion, deforestation, overstocking and overgrazing, mismanagement of agricultural lands, improper industrial and municipal waste management, and lack of awareness in natural resources management.

The consequences of the above processes can be evidenced by declining environmental viability, dwindling natural resources (especially soil and its organisms, water, vegetation, wildlife) and unsustainable agriculture that weaken social resilience. To tackle the problems, there is a need for intervention through participatory research on natural resources and climate change.

Ethiopia is vulnerable to hazards caused by one of the major environmental problems, climate change. Climate change presents an immediate and unprecedented threat to the food security and incomes of millions of Ethiopians who depend on small-scale agriculture for their

livelihoods. Most areas in Ethiopia are vulnerable to severe environmental problems related mainly to natural resources degradation. The problems are multifaceted and are the results of intricate nexus of factors. Therefore, the environment, natural resources and climate change related issues need to be treated as an integrated whole to address challenges.

Aim

The aim of this sub-theme is to sustainably improve livelihoods, reduce poverty, and ensure food security using research-based solutions to environmental problems, land degradation, and ecosystem services.

Description

The sub-theme focuses on researching and developing sound management practices and technologies for high priority environmental challenges such as pollution (water, soil, air), climate change, disasters (drought, flood, landslide), and trade-offs between environmental laws and investment and seeking solutions for problems related to major natural resource use and management (soil, forest, land, biodiversity, ecosystems).

Potential Collaborators

Local government and private colleges and universities, environmental protection authorities, overseas universities and research institutes, federal and regional research institutes, federal and regional ministries (such as Ministry of Water Resources, Ministry of Agriculture, Ministry of Environment and Forest Resources, Ministry of Mines and Energy), National Meteorological Agency, Municipalities.

Expected Output

- Database on environmental problems and natural resources
- Biophysical knowledge that leads to new approaches to enhance productivity and profitability of the environment in general and the soil, water, forest, biodiversity and other resources in particular
- Improved technologies/knowledge dissemination and understanding of barriers to increasing rural incomes from the environment and natural resources
- Knowledge for ensuring gender equity and involvement in environmental protection and natural resources management
- Improved technologies that enable the building of climate change resilient natural resources and societies

Research Areas

1.3.1. Environmental research, development, and management

This research area addresses major and high priority environmental problems such as water, air, soil pollution, persistent organic pollutants (POPs), solid and liquid wastes (particularly of urban), and agricultural chemicals (fertilizers, pesticides, herbicides etc), landslide, earth quake, drought, flood; their assessment, mapping and developing integrated management scenarios. Possible research projects include: assessing environmental disaster risks and developing management scenarios; assessment of impacts of major environmental pollution (water, air, and soil pollution) and developing management options; assessing and developing management scenarios for persistent organic pollutants and non-biodegradable plastic wastes mainly used as bags; assessing the impacts of agricultural chemicals on the environment; developing technologies for productive use of solid and liquid urban wastes; handling and disposal of used and expired chemicals; developing early warning systems and public information and means of disaster risk reduction; reducing environmental health risks and

ensuring safety; promoting gender-sensitive work on environmental protection; developing environmental laws and policies and studying their effects on the environment.

1.3.2. Natural resources analysis, use, and management

This research area addresses problems related to conservation and characterisation of major natural resources such as soils, forests, biodiversity and others. It also deals with use and management of natural resources. Research topics may include soil resources protection and analysis (soil characterisation, classification and mapping, problematic soil management, soil erosion control, soil conservation); forest resources analysis, use, and management for environmental protection and soil and water conservation as well as carbon sequestration; wildlife management and conservation; biodiversity conservation and management (including microbial resources) and ecosystems conservation and utilisation for sustainable development; integrated watershed development and management for improving ecosystem functioning; land administration for sustainable land use and management; gender and natural resources management.

1.3.3. Water resources assessment, development, utilisation, and management

This research area addresses issues related to water resources, mainly those related to their spatial and temporal distribution, their development for economic and sustainable exploitation for different purposes, and their integrated management to ensure sustainable use. Possible projects include: water resources assessment, mapping and development; water resources utilisation and management (irrigation and drainage, water harvesting, household consumption, industrial use, and the like); water resources engineering; water use policies.

1.3.4. Climate change and its management

This research area addresses issues related to impacts of climate change hazards on livelihood assets and society; assessment of vulnerability of communities and their assets to climate change hazards and adaptation, mitigation, and coping strategies to hazards. Possible projects include characterisation, classification and mapping of climate; assessing climate change

impacts on livelihood assets, resources and society; development and implementation of diagnosis and vulnerability assessments as a basis for deciding on adaptation and mitigation strategies; development of adaptation technologies, practices, and policies for confronting near-term and progressive climate variability; developing mitigation technologies, practices and policies for reducing greenhouse gas (GHG) emissions and enhancing carbon sequestration; managing weather and climate risks in agriculture. Focusing on natural resources management and conservation especially soil, forest, other vegetation, and water in adapting to and mitigating climate change.

1.3.5. Non-renewable resources

This research area focuses on analysis, exploration, mapping and developing technologies for economic and sustainable utilisation of natural resources that do not renew themselves at a sufficient rate for sustainable economic extraction in meaningful human time frames. These resources include, but are not limited to fossil fuels (such as coal, petroleum, and natural gas), metal ores (such as iron, copper, aluminium ores etc), noble metals (gold, silver, diamond etc), radioactive fuels (e.g. uranium ore), certain aquifers, rocks and minerals that have high economic value.

Beneficiaries

The scientific community, industries, policy makers, and the wider public