6.1. Bioscience Research

Eastern part of Ethiopia is rich in plant, microbe and animal diversity. Biodiversity provides ecosystem services, and forms an integral part of the rural economy, providing subsistence, goods and medicines. However, research on biodiversity, particularly from the point of view of their ecology and conservation status; use to the local people and potentials for pharmaceuticals and industrial purposes; responses to abiotic and biotic stresses are lacking. As a result, biodiversity is being lost together with indigenous knowledge of people around them. The biosciences research sub-theme, therefore, set out a research priority to study 'Plant, Microbial and Animal Biodiversity' from the following specific project components stand point.

- Microbial biodiversity and ecology (identification of local strains) for bioprocessing and disease management
- Ethno-zoological and wildlife ecology
- Integrated aqua farming and aquaculture development and sustainable water quality and waste management
- Indigenous plant biodiversity management, conservation, bioactivity of phytochemicals and development of botanical gardens
- Bioprocesses (Production, formulation and production and delivery of biopesticides and biofertilizers)
- Genetic resource characterization, utilization and conservation for production and sustainable development.

6.2. Chemical Science Research

Synthetic materials have many applications in medicine, pharmaceuticals, food, construction ,manufacturing industries, etc. Ethiopia is rich in resources (biological and non-biological) that can be used as input in material science and synthesis. The rich biological resources we have are opportunities to use natural products in an array of applications provided that efficient scientific methods of extraction, screening and isolation are put in place. With this great potential, a great deal of researches are required to advance knowledge in areas of material science using local resources that would inevitably be used to generate technologies for various applications. The Chemical research sub-theme, therefore, set out a research priority to study 'Material Synthesis and Method Optimization for Natural Product Extraction and Trace Chemical Analysis' from the following specific project components stand point.

- Material synthesis (transition metal-chalcogens, conducting polymers, metal oxides/conducting polymers, metal-organic frameworks , materials in soil chemistry and Nano electro chemistry);
- Developing reaction methodology in synthetic organic chemistry and Nano catalysis;
- Exploration of new phyto-isolates;
- Method development for the extraction and isolation of trace chemical compounds;
- Utilization of locally available low cost materials for environmental remediation.

6.3. Mathematical Research

Mathematics provides the framework for understanding almost any complicated phenomenon. Advanced mathematical techniques are used to model and test products on computers, optimize production techniques and have interplay with various systems. Advancing mathematical research helps to build strong scientific community capable of technology generations and new innovations. Despite its immense role, research in mathematics is not being conducted to its best level. Thus, recognizing the importance of mathematical researches to the building of strong scientific bases for technology generations and innovations, the Mathematical Research Sub-theme set out a research priority to study 'Modern Techniques in Optimization, Mathematical Models in Stochastic Differential Equations and Queuing Theory' from the following specific

project components' stand point.

- Mathematical modeling (in Epidemiology, Mathematical biology, fluid dynamics and other)
- Numerical Analysis (Algorithm development for data mining and analysis, image analysis and feature extraction, Pattern recognition, scientific computing and data science)
- Optimization and Operation Research
- Algebra (group theory, ring theory, near ring theory, coloring theory, module theory, lattice theory and cryptography)

6.4. Biophysics and Computational Physics

Computational physics develops algorithms that are of immense use in industries and medical issues. Research output on material computation can serve as an input to any nanoscale related research to improve the efficiency of the material for energy generation, waste treatment, sensors and so on. Biophysics looks for mathematical laws of nature and makes detailed predictions about the forces that drive idealized systems in living things. In spite of immense industrial and environmental applications research works are scanty so far in Ethiopia. Cognizant of enormous use of Biophysics and Computational physics research in industries, environment and medicine, the Biophysics and Computational Physics Sub-theme prioritized research areas from the following specific project components' stand point.

- Computational physics (Algorism development, simulation and evaluation of its accuracy and computational speed, image processing)
- Environmental and atmospheric physics (atmosphere, climate, water and soil physics)
- Theoretical physics (condensed matter physics, molecular physics, quantum field theory, statistical physics)
- Astronomy and space physics
- Renewable source of energy, energy and nanotechnology
- Radiation and medical physics
- Planetary and earth science