

GOVERNMENT OF WEST BENGAL
DEPARTMENT OF HIGHER EDUCATION,
SCIENCE & TECHNOLOGY AND BIOTECHNOLOGY
(SCIENCE & TECHNOLOGY BRANCH AND BIOTECHNOLOGY BRANCH)
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Subjects of R&D Projects being considered for Funding:

Physical Sciences

Physical Science focuses on investigating physical and chemical phenomena through scientific enquiry. It plays an increasingly important role on the scientific knowledge and principles used in the vast engineering and related technology context. It is today's basic research upon which depends the tomorrow's technology. It would have not been possible for us to produce computers of modern age without algorithm and algebra. Similarly, modern technology of transistor, lasers, atomic reactors, etc. could not be developed without the deep understanding of the basic physical processes responsible for their development. Modern technology cannot be developed without a solid base in the basic/fundamental research behind these technologies.

Chemical Sciences

Chemical Science plays a vital role in modern science which is related with almost all disciplines of the science, like, physics, biology, biochemistry, family and nutritional sciences, engineering, physiotherapy, pharmacy, health care etc. With the objective to motivate young researchers to develop cost-effective technologies, composition, structure and changes in new molecules etc., R&D projects have been promoted in different sectors, like, pollution abatement in the areas of industrial development, cost effective filter preparation, rural artisan use, and other related areas. Emphasis is given on those R&D Projects which are beneficial and fruitful for the mankind as a whole. HRD is made through the engagement of the research scholar who works in almost every R&D Projects which helps their career enhancement also.

Engineering and Technology

Engineering and Technology focuses on investigating practical application of the knowledge of science in daily life. Progressive researches in the fields of diverse disciplines of technology through innovation, modification, construction, production and analysis of physical process related to the sustainable development of the state are the prime objective. Through engineering advances it would be easiest to transfer the theoretical knowledge from the books and laboratories to the real field to the people. In present day environment, natural resources, transport, smart city planning, communications, digital technologies, efficient energy management, process and time complexities and commercial concerns all are best addressed through advance researches in engineering and technology.

Medical Sciences including Public Health

Medicine is the science and practice of the diagnosis, treatment, and prevention of disease. Since the advent of modern science, most medicine has become a combination of art and science (both basic and applied, under the umbrella of Medical Science). Public health has evolved as a multi-disciplinary science which deals with the determinants and defence of health at the population level so as to impact upon and improve the health of individuals in that population.

The health research output from India is not commensurate with the magnitude and distribution of disease burden. The research output in public health is particularly meagre, which is a major concern as public health sciences. Several diseases, related conditions contributing substantially to the disease burden and other major areas of public health importance have relatively less represented.

Keeping in view of the above facts, the Department of Higher Education, Science & Technology and Biotechnology, Government of West Bengal from the very beginning is promoting few research projects in public health with its limited resources to address disease burden through epidemiological survey, basic & clinical research on prevention of diseases & improvement of diagnostic tools involving weaker section of the society. The research scholars engaged under

different research projects are also getting opportunities to develop human resources and their career enhancement.

Earth Sciences including Geoinformatics

Areas being considered are various branches of Earth Sciences - Geology, Geophysics, Geography, Natural Resources Management including Land and Water, Disaster Management, Oceanography, Atmospheric Sciences, Geoinformatics - RS & GIS and GPS related topics, etc.

Mathematics

Without the application of mathematics there is hardly any advancement possible in science. Precise mathematical calculations have always guided our research since time unknown. Therefore a serious focus is there to facilitate further researches in the advancement of mathematics. There are so many socio-economic aspects in present day that needs statistical surveys and data analysis to understand the problems. The dynamic and unstable situations in other fields of science these days is best addressed through the study of mathematics in areas like coding theories, different logics, algebra, graphs, artificial intelligence, applied calculus, vectors, determinants & matrices, Big Data Analysis, Computational dynamics, algorithms etc.

Energy and Allied Sciences

The most highlighted concern in science news all-over the world is Energy. On energy issues, the conferences, treaties, awareness programmes, protocols, laws, regulations that happen over the globe are countless. Further scientific researches therefore need to be boosted to harness the renewable and non-conventional sources of energy such as hydro, solar technologies, tidal, wind, geothermal, bio fuel etc. Beside this, focus should also be on making the existing conventional technologies more and more efficient and on reducing the losses. Allied to this research on the harmful emissions, toxic pollutants, reuse-reduce and recycle technologies are also facilitated.

Biological Sciences including Biotechnology

The project would be supported specifically in the area of Agricultural / Animal / Marine / Plant Biotechnology, Bio-engineering, Bio-informatics, Environmental Biotechnology, Food and Nutritional Biotechnology, Genomics & Genetic Engineering, Proteomics and biomarker discovery, Industrial Biotechnology, Medical Biotechnology, Nano-biotechnology and any other relevant field coming under the purview of Biotechnology.

For rural Biotech projects emphasizing areas are as follows:

1. Agro-climatic zone based development of microbial biofertilizers (nitrogen fixing, phosphate solubilizing, potash solubilizing, zinc solubilizing etc. microbes) and microbial pesticides; deposition of all important germplasms to the national repositories for future access and use.
2. Identification of useful soil microbes, knowledge dissemination and mass propagation.
3. Improvement of quality and quantity of perennial plantation crops through Biotechnological inputs.
4. Utilisation of tissue culture technology for the improvement of horticulture crops and disease-free plant materials.
5. Domestication of wild edible mushrooms commonly found in different agroclimatic zones of West Bengal and/or technology transfer to the rural community for sustainable development.
6. Technology utilisation for animal-feed production using regional bio-resources.
7. Development of feed for pisciculture using phytoplankton, zooplankton, microbes etc.-based biotechnology.
8. Biotechnological intervention for upgradation of traditional technology for quality improvement of processed food and beverages.
9. Biotechnology assisted mass production and utilization of Cyanobacteria & Micro algae, Mushroom, stevia, medicinal herbs etc. for the production of value added food products and other product development.
10. Assessment of genetic disorders – scientific documentation and general awareness.
11. Biotechnology-based household waste management for sustainable utilization.
12. Promotion of biotechnological methods using local natural resources to small scale industries.
13. Community-based genetic epidemiological studies on human health and diseases.

14. Any other tropical relevant to rural biotechnology.

Agriculture, Animal & Fishery Sciences

Emphasizing areas for R & D include Biodiversity Conservation (in situ and ex situ) in natural ecosystems, protecting indigenous agricultural resources; creation of high yielding seeds through cytogenetic research, Restoration of degraded ecosystems, biological interventions in combating pollution, innovative approach towards creation of bio fertilizers, economic improvement of farmers and villagers through scientific interventions in the milieu of gardening, aquaculture, cultivation of cash crops and medicinal plants, value addition to floricultural and other natural products, utilization of agricultural and natural wastes etc.

Environment, Ecology and Climate Change

Changing climatic conditions are the greatest environmental threat faced by planet earth. The key factor responsible for climate change and therefore, the global warming is owing to excessive emission of Carbon Dioxide gas (CO₂). The issue of emission and sequestration of CO₂ and the mitigation of global warming became much crucial and attracted all the developed / developing countries to pay concerted attention. The major volume of CO₂ originates from the fossil fuel energy and more specifically the thermal power generation plants, the source which is the major polluter globally, emit huge quantity of CO₂ into atmosphere, thereby, causing severe environmental threat. Pertinently, the Prime Minister's Council on Climate Change called for adoption of protective measures for reduction of CO₂ emission into atmosphere and accordingly, National Action Plan on Climate Change (NAPCC) was issued by the Government of India.

In view of the above this Department took initiatives in some select areas with a view to mitigating the adverse effects of climate change.

Other Interdisciplinary

The subject areas under consideration are topics interdisciplinary in nature and having application and linkages with S&T along with socio-economic developmental approach but not covered under any of the above mentioned categories.