

NEIST, and its role on development in Science & Technology



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Human ingenuity backed by innovativeness, sprung from the fountain of the unique capability and characteristic of the living beings i.e. exercising of the cranial matter—the brain, has carried us forward to this present stage of modern, industrialized civilization. In plain words, Science, Technology and Socio-Politico-Economic developments have brought the human beings to the state of present development-oriented modern civilized society. In particular, Science and Technology have brought the elements of nature under its control, harnessed the elements like wind, water, steam, electricity, geo-thermal energy, tidal energy, atomic energy, fossil fuel energy and so forth, for human use. With the help of developments in the field of Science and Technology our civilization has reached such a stage that we can think, talk and even materialize ‘test-tube-babies’, ‘cloning of human beings’, limitless production of food in laboratories, space-travels, joy-rides in space, colonizing and populating other planets in outer space, and abandon this Earth (as spoken and advised by the famous Astro-Physicist Stephen Hawking) if it gets too much polluted and become unworthy to live. Fortunately for us, our Government and the Indian Society at large have realized the importance of Research and Development in Science & Technology and its role in keeping the Engines of Growth and progress in motion. It has been rightly realized that our multilingual, multicultural, multireligious pluralistic society is beset with multifarious problems which at a first glance looks insurmountable, but at a closer and intense look one can find that if the basic human needs like, food, shelter, health-care, education, employment and so on can be taken care of, one can find an answer to these problems. It has been observed that those deprived segments of the Society who are unreached by the developmental process breed ‘the eyes of storms’ creating socio-political turmoils. So, in

order to reach the unreached, we have to take recourse to Science and Technological activities. Industrial development and the associated progress cannot be kept confined to the privileged, prosperous sections of the society alone. S&T Developmental activities must percolate down to the 'not so wealthy' segments of the Society like the rural and urban poor and remotest corners of the country. One of the founders of modern India, Pandit Jawaharlal Nehru visualized the need of world-class Research & Development Organizations like Council of Scientific & Industrial Research, Indian Council of Agricultural Research, Atomic Energy Commission, Space Research Organization and many others to serve similar purposes. In course of time a chain of National Laboratories were created under the aegis of CSIR in almost all areas of Science, and established all over the country in a decentralized system. The North-East Institute of Science & Technology (NEIST, formerly known as Regional Research Laboratory) was established at Jorhat as a multidisciplinary Institute, the first and foremost R & D Institute of the kind in the North-East India. It has been unambiguously laid down in the charter that the Institute would:

I. Put to effective use the immense material resources of the N.E Region and provide Research & Development inputs for developing the economy of the region in particular and the country as a whole,

II. Help the region in solving such problems of research as are confronting from time to time,

III. Take up long-range problems like solution of which would help the economic development and industrialization of the NER and

IV. To function as a link between the state organizations and other national laboratories on problems requiring specialized attention.

In accordance with the charter, goal and objectives of the Institute, the Institute has sharpened its focus mainly on six broad areas, namely:

1. Agrotechnology
2. Biological Science
3. Chemical Science
4. Engineering Science
5. Earth Science and
6. Materials Science.

The activities of these area are supported by various supporting units like,

- a) Planning
- b) Information & Business Development
- c) Project Monitoring and Evaluation
- d) Human Resource development

- e) Library
- f) Administration
- g) Stores & Purchase and
- h) Finance.

NEIST has a branch at Itanagar in Arunachal Pradesh and a substation at Imphal, Manipur.

NEIST has been the fore-runner and a major S&T player in the NE region. It has performed its assigned task and discharged its responsibilities to the best of its capability. So far the Institute has generated more than 100 technologies, many of which had gone into commercial production. Not only the North-Eastern Region but the entire country has reaped the benefit of the technologies generated at NEIST, Jorhat. The NEIST-generated technologies not only contributed towards productivity, but also ensured better use of local resources, employment generation, upgradation of artisan skills and improvement in the quality of life. The users of these technologies were industrial concerns, first generation entrepreneurs, farmers, artisans, co-operatives, voluntary organizations, rural communities and government agencies. The total annual turn over of the produce made with NEIST technologies and knowledgebase is estimated at Rs. 150 crore. The role played by NEIST in the NE Region during the tenure of its existence is significant in the following areas:

- 1) Basic, exploratory and applied research
- 2) Survey, exploration and utilization of medicinal, aromatic, spice plants, soil microbes, minerals etc.
- 3) Rural development and societal activities.
- 4) Earthquake studies of the North Eastern Region.
- 5) Human resource development and
- 6) Contract research, Consultancy and Technical services to industries and government agencies.

The Institute has over the years rendered various R&D services to a large number of clientele in the N.E Region, like ONGC, Oil India Ltd, Numaligarh refinery, IOCL, Tea gardens , PWD, CPWD, MES, and other NGOs. NEIST maintains good connectivity with these premiere institutions /organization of the region.

Broad areas of current S&T work of NEIST can be described as:

- Seismic hazard-risk evaluation and earthquake precursor related studies.
- Exploration of India's rich microbial diversity.
- Biological and chemical transformation of plant compounds for production of value-added products of therapeutic/aroma value.
- Development of speciality inorganic materials for diverse application.
- Environmental contaminants; Remediation/Eco-restoration.

- Discovery and preclinical studies of new bioactive molecules (Natural and semi-synthetic) and traditional preparations.
- Comprehensive traditional knowledge digital documentation and library.
- National standard of measurement & Apex calibration facilities and creation of high quality network of testing and calibration laboratory.
- Rural development through aromatic plants and mushroom and their processing in North East India.
- Development of novel leather products based on ethnic designs from North East.
- Genetic improvement of *Jatropha curcas* for adaptability and oil yield.
- Exploration, documentation, screening of microbial bioresources of Indo-Burma hot zone and their potential application.
- Development of new analogues of drugs and drug intermediates.
- Nanostructured membrane for Biotechnological application: Development of protocols for post harvest management and value addition of product through modern biotech tools.
- Development of environment friendly technologies for gainful utilization of high sulphur NE coals.
- Development of intercalated compounds and nano materials.
- Studies on geo-environment and hazard management.
- Biodegradable polymer based nanocomposites.
- Industrially important organic compounds from renewable resources.

Besides the above In-House projects, the Institute has also extended activities to Multi-Lab efforts like exploration of India's microbial diversity, transformation of plant compounds to yield value-added products, environmental contaminants and bioremediation, studies on new bioactive molecules, rural development through aromatic plants and mushroom cultivation and processing, development of novel leather products.

The Institute has also launched several work having international bearing and joint international collaboration. The countries with which joint project works have been undertaken are, U.K, China, Italy, Czech Republic, Japan, Russia and some other European countries.

NEIST activities in societal upliftment deserve special mention. Under the societal programme 25,000 tribal families were benefited through citronella and mushroom cultivation, processing and marketing. These families were able to augment their income resources by having an extra income of Rs. 25,000/- to Rs. 30,000/- per family per year. NEIST also procured and installed more than 125 citronella oil distillation units ranging between 200-600 kg / batch capacity in different areas of the North-East. The oil produced by these units were estimated at Rs. 15 crore annually. Some local newspapers termed these developments as *mini green revolution*.

Over the years NEIST conducted 120 training programme-cum-exhibition on medicinal and aromatic plants cultivation at several interior places in the North-East. These

ventures could generate rural employment for more than 20,000 people. NEIST has trained more than 3000 farmers for gainfull farming of edible mushroom. To promote this work in the remotest corners of the NER, NEIST joined hands with several NGOs from Nagaland, Mizoram Arunachal Pradesh, Manipur and Meghalaya. The Institute set-up several spawn laboratories in Assam, Mizoram and Arunachal Pradesh to ensure easy and speedy availability of spawns for the farmers of the regions.

NEIST has made significant contribution in Human Resource Development in the North-Eastern Region. So far it has produced 264 Ph Ds, trained youths to acquire skills in different engineering disciplines like Civil, Mechanical, Electrical, Computer Science, Chemical and Instrumentation. Since 1974 NEIST has been organizing training programe to ITI students and science graduates and undergraduates in various trades like fitter, turner, machinist, welder, electrician, electronics (mechanical) refrigeration, and air-conditioning (mechanical). The institute, so far has trained 524 technicians and 324 Engineering graduates who were gainfully employed in various organizations located in the region.