



CSIR-NEIST IN MANIPUR





**CSIR-NORTH EAST INSTITUTE OF SCIENCE & TECHNOLOGY
in the state of
MANIPUR**



CSIR-NORTH EAST INSTITUTE OF SCIENCE & TECHNOLOGY : JORHAT
(Council of Scientific & Industrial Research)



CSIR-NEIST Jorhat

“There were special problems of industry and raw materials in Assam which required investigation. The inadequacy of communication between Assam and other parts of India made it necessary to put a separate laboratory in Assam.”

This was recorded by the special committee of the Governing Body of Council of Scientific & Industrial Research, New Delhi on September 1, 1954 and consequently the committee discussed on a proposal for setting up of the third RRL in the country and the first in Assam.

On March 18, 1961, Prof. Humayun Kabir, Minister of Scientific Research & Cultural Affairs, Govt. of India laid the foundation Stone of Regional Research Laboratory at Jorhat, Assam.



Prof. Humayun Kabir, laid the Foundation Stone of RRL Jorhat

CHARTER

- Put to effective use the immense material resources of the North Eastern Region (NER) of India.
- To Provide R&D inputs and to develop the economy of the NER in particular and the country in general.
- To function as a link between the state organizations and other national laboratories on problems requiring specialized attention.



CSIR-NEIST Sub-station, Lamphelpat, Imphal

The CSIR-NEIST Sub-station (Erstwhile RRL Substation) was established in Manipur in 1973 as a Field Station within a small plot of 2 acres on lease basis at Mantripukhri, Imphal with the main objectives of R&D on oil yielding plants. In 1975, the Substation was shifted to the present location, Lamphelpat having a total prime land area of 30 acres with the main objectives of R&D on economic bioresources.

The Substation is working actively on development of agro-practice/agro-technology of potential wild economic plants. Since 2005, research activities on entomology have been started.

Very recently the Substation expanded the scope of its work with activities like establishing Footwear Training & R&D and Resource Hub Centre for ethnic designs having advance CAD/CAM facilities. The Substation is looking forward for expansion of its activities in new areas.

Manipur state falls within Indo-Burma Centre of Biodiversity Hotspot of global significance. The state lies between 23°50' and 25°04' N latitude and 93°06' and 94°07' E longitude. The state has common boundaries in the North by Nagaland, in the South by Mizoram and Chin Hills of Myanmar, in the East by Chindwin districts of Myanmar and in the West by Cachar and North Cachar districts of Assam. It has a geographical area of 22,327 sq. km. It is basically a hilly state. At the centre lies the valley (Imphal Valley) which is 48.3 km in length and 32.2 km in breadth covering a geographical area of 1545 sq. km. The elevation of the state is ranging from 550-3600 m asl. The Loktak Lake, one of the Ramsar sites of global significance is located



Map of Manipur

towards the southern part of the Valley. Administratively, the state has been divided into nine districts namely, Imphal West, Imphal East, Thoubal, Bishnupur (valley districts); Senapati, Ukhrul, Chandel, Churachandpur and Tamenglong (hill districts). The state is inhabited by various ethnic communities. The Meitei, Naga and Kuki are the major tribal communities.

Research & Development Activities

Work Assignment by Hon'ble CM, Manipur

Shri O Ibobi Singh, Hon'ble Chief Minister, Manipur was pleased to assign a piece of land inside the Kangla Fort, Imphal to NEIST Substation, Lamphelpat for establishment of a herbal garden for economic plants specially medicinal, aromatic, dye yielding, edible and religious plants. Now, 197 economic plants mainly *Aquilaria agallocha*, *Emblica officinalis*, *Phyllanthus acidus*, *Azadirachta indica*, *Bombax malabathricum*, *Sapindus mucronatus*, *Mimusops elengi*, etc. are cultivated inside the herbal garden.



Yummy Queen (Veg) & Yummy Queen (Non-veg)

Herbal Spices formulated

Two products of spices mixtures namely, (i) Yummy Queen (Veg) for vegetables cuisines and (ii) Yummy Queen (Non-veg) for fish and other meat cuisines are formulated based on varieties of local spice plants of Manipur. These two products are ready for transfer of its know-how.

Study of Edible Aquatic Biodiversity of the Wetlands of Manipur

The wetlands/lakes (locally known as pat), constitute about 529 km² area of the state of Manipur which is located centrally in the low-lying valley areas. There are a total of 155 wetlands in the state comprising 21 lakes, 2 ox-bows, 2 reservoirs and 130 water-logged sites. Among the lakes, Loktak lake situated in the Bishnupur district is the biggest (24,672 ha area), which is one of the Ramsar sites of global significance.

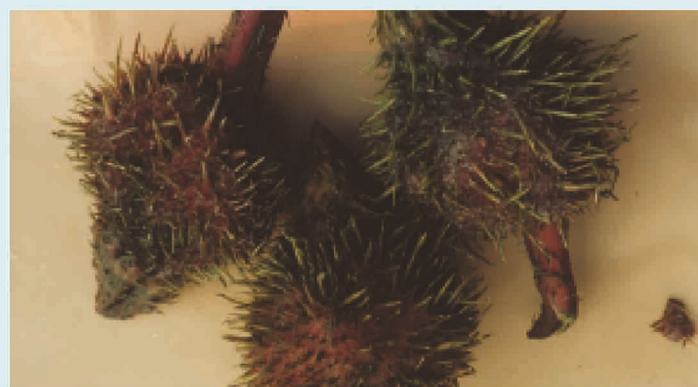
A total of 83 aquatic plant species have been identified from the wetlands of Manipur. Some of these edible aquatic plants have considerable economic potential. *Lemanea australis*, (locally called 'Nungsam') a red alga, grown submerged under flowing water is having characteristic fishy smell and is used by local people as food and in medicinal purposes. The use of *L. australis* was restrictive because of its high cost and less availability as it is grown to small pockets at the confluence of Chakpi River at Sugnu in South Manipur.

The fox nut plant i.e., *Euryale ferox* has been used in Manipur as an important vegetable delicacy since immemorial time. Both fruits and leaf petioles are edible. The plant has high content of carbohydrate and protein. The fruits of foxnut plant are sold in local markets of Manipur and hence the plant has tremendous economic significance.

A total of 32 species of aquatic edible animal biodiversity (excluding fishes) belonging to different groups such as arthropods (23 species), mollusks (7 species) and amphibians (2 species) were identified. A market survey was conducted at Imphal market and it was found that a total quantity of 16,583 kg of these edible animal sold annually.



Lemanea australis (a red alga) costing Rs 1200-1500/kg.



Spiny fruits of *Euryale ferox*



Young shoots of *Neptunia oleracea* - a highly palatable aquatic herb of Manipur



Brodia costula - an edible snail

Genetic Improvement of *Jatropha curcas*

Geographically well isolated, potentially and genetically distinct accessions are collected from the wild native habitats to see the yield parameters.

A total of 24 elite and 161 native accessions of *Jatropha curcas* were grown at the experimental fields of the Sub-station in a randomised block design for further statistical analysis.



Jatropha curcas

Cultivation of *Homalomena aromatica* Schott.

Plant samples of *Homalomena aromatica* (Sugandhmantri, Family – Araceae) are grown at the experimental field of the Substation. The essential oil extracted from the rhizome appears as pale yellow liquid with typically strong aromatic odour and GCMS analysis reveals the presence 30 components, of which linalool was the major component.

Chemical Investigation, trace element analysis and biological activities of some selected medicinal plants of Manipur

Manipur is home to various plants species with medicinal values. A project was undertaken to study the chemical investigation, trace element analysis and biological activities of some of the selected medicinal plants of Manipur namely, *Oroxylum indicum*, *Emblica officinalis*, *Curcuma ceasia*, *Kaempferia galanga* and *Plumbago rosea*. Phytochemical investigations of other medicinal plants are also undertaken.

Diversity of Entomofungal Pathogens in Manipur

Insect pathogenic resources of Manipur, which come under the "Indo-Burma biodiversity hotspot", have remained unexplored to its full potential. The prevailing climatic conditions are conducive for the growth and development of many insect pathogens. Pathogenic microorganisms like fungi and viruses are responsible for epizootics, which often successfully regulate insect pest populations. They are highly host specific, a character deemed to be necessary for a successful biological control agent.



Dr HB Singh, Scientist-in-Charge, CSIR-NEIST Sub-station collecting Sughandhamantri plantlets from villages



Rhizomes of *Homalomena aromatic*



Spilarctia obliqua infected by *Entomophaga aulicae*



Infected aphid, Neozygites conidia

Preliminary studies have resulted in the identification of several entomopathogenic fungi belonging to the order Entomophthorales. Some of the genera include, *Entomophaga*, *Conidiobolus*, *Neozygites*, *Zoophthora* etc. infecting insects belonging to the order Lepidoptera, Hemiptera, Orthoptera, Diptera etc. Moreover, viral pathogens infecting serious insect pests like cabbage/mint semi-looper, *Thysanoplusia orichalcea* and that of Cabbage butterfly, *Pieris brassicae* have been isolated.



Virus infected cabbage larvae

Further studies with these pathogens will aim at mass production, molecular characterization, isolation of cuticle degrading enzymes from entomopathogenic fungi, isolation of genes responsible for virulence and genetic improvement of baculoviruses to increase their host range and virulence to develop them as potential biopesticides. Because this part of India, has a natural habitat suitable for the occurrence of many insect pathogens and very few being identified so far. There is lot of scope



Highly edible delicacy Belostoma indica from wetlands of Manipur

PROJECTS

completed

1. Assessment and Promotion of economic wetland resources of Manipur : A concern for ethnical, ecological and economical dimensions - funded by GB Pant Institute of Himalayan Environment & Development, Kosi-Katarmal, Almorah (2004-07).
2. Cultivation of non-traditional remunerative plantation crop for development of weaker section of society - funded by DBT, New Delhi (2005-08).
3. Training program on aromatic plants and mushroom at Manipur - funded by Deptt. of Forest, Govt. of Manipur. (2005).
4. Study of Sanapat Lake ecosystem in Manipur Valley - CSIR Senior Research Fellowship (2001-04).
5. Edible aquatic biodiversity from the wetlands of Manipur - CSIR RAship (2004-09).

Ongoing

1. Genetic improvement and yield of *Jatropha curcas* (Bio-diesel). Funded by NMITLI-CSIR Networking.
2. Training-cum-production centre for non-leather footwear. Funded by HRD Mission, New Delhi through CLRI, Chennai still activities are undergoing.
3. Development of novel leather products based on ethnic designs. Sponsored by CSIR, New Delhi through CLRI, Chennai.
4. Model nursery for production of quality planting materials of MAPs. Sponsored by NMPB, New Delhi through NMMP, Manipur.
5. Chemical investigation, trace element analysis & biological activities of some selected medicinal plants of Manipur for its sustainability. Sponsored by NMPB, New Delhi.
6. DNA Club: DBT-TERI mentoring Schools of North-East (57 Schools in Manipur). Sponsored by DBT, New Delhi through TERI
7. Bio-prospecting of wild edible plants for socio-economic development in Manipur state North Eastern India. Sponsored by DST, New Delhi as under Women scientist Scheme.
8. Herbal garden inside Kangla Fort, Imphal, Manipur. Sponsored by Deptt. of Archaeology, Govt. of Manipur.

Expert Services Rendered

Projects Monitored-Evaluated for CAPART, Ministry of Rural Development, Govt. of India.

1. Sustainable development and economic growth
2. Integrated pisci-culture development at Samusang village
3. Integrated Development of Kouna (Scirpus lacustris) water rush with fishery
4. Capacitation for rural people through strengthening of SHG for suchroom cultivation
5. Banana cultivation at Purum Khullen Village
6. Bio-brequetting technology for eco-friendly fuel management
7. Dissemination of roof-top rain water harvesting technology (No.
8. Empowering rural women through economic capacitation and strengthening SHGs
9. Makui natural resource development project
10. Income generation project for tribal women
11. Development of integrated fish farming for rural farmers settled in Loktak bordering areas
12. Integrated agricultural development project
13. Mobilizing formulation and strengthening of democratic self-help group for women empowerment
14. Economic upliftment project for poor villagers in Thoubal District
15. Integrated horticultural development project
16. Poverty reduction among rural communitites
17. Integrated farming development project
18. Production of organic ginger
19. Integrated innovative sustainable agro-based horticulture-an alternative to shifting cultivation
20. Cultivation of Jatropha curcas
21. Enterpreneurship Development initiatives for Marginal Rural Women Involved in informal Economy in Rural Areas in Thoubal District, Manipur
22. Innovative community development project
23. Income generation for tribal women & girls through low cost nursery techniques
24. Development of paddy straw mushroom technology
25. Economic upliftment of tribal farmers through ginger cultivation
26. Innovative housing project
27. Women economic empowerment through tailoring & embroidery training with computer
28. Promotion of roof-top rain water harvesting technique
29. Slopeland IT Centre, Manipur
30. Promotion of roof-top rain water harvesting technology
31. Women empowerment through innovatives skill training and production activity (embroidery and knitting)
32. Sustainable economic development through capacity building of women SHGs linked with income generating activities
33. Bamboo cultivation for sustainable development in group process
34. Rain water harvesting from rooftops using Ferro cement tank in Nungba, Tamenglong District
35. Promotion of Oyster mushroom as income source and nutrition among marginalized women in Thoubal Districts of Manipur
36. Computer assembling, repairing and maintenance for rural youth
37. Skill enhancement of impoverished weavers/artisans textiles and apparels for self employment
38. Demonstration and technology for rain water harvesting to the door steps
39. Skill reeling cum-production under rural industries
40. Promotion of nuseries for empowering of rural farmers
41. Sustainable development for rural poor women through the production and promotion of Mapan-Naiba
42. Promotiion of the life skill education through computer and internet application for educated uneployed rural youth belonging to the marginal sections of the Scociety in Thoubal District
43. Empowerment of rural poor women through SHG cooperative back-up of handloom weaving production and sales in remote villages of Thoubal district, Manipur
44. Skill training on application and fixation of agriculture tools and machineries
45. Promotion of organic farming for sustainable agriculture
46. Integrated composite fish farming in 5 villages of Thongjao area of Thoubal district, Manipur
47. A way of self sustaining with diversified farming
48. Food security through integrated passion fruit farming
49. Economic upliftment of rural poors through integrated piggery programme
50. Artificial mushroom cultivation and production project
51. Artificial mushroom cultivation and production project.
52. Integrated agri-horti development project.
for isolation and exploitation of many new insect pathogens in future.

Societal Activities

Establishment of model nursery for production of quality MAPs materials

The use of medicinal plants to cure ailments is as old as the history of civilization and has been in vogue from very ancient days. In the present era of advancement of allopathic medicine, the traditional system of health care and herbal healing system is still largely respectable in Manipur. The local healers collect a large number of herbs from the wild habitat to meet their requirement of raw materials. The collection pressure is increasing day-by-day resulting in depletion of these resources. To minimize the collection pressure, model nursery units are established at the Substation with main objective of providing quality planting materials of medicinal and aromatic plants to



Polyhouse at the Substation

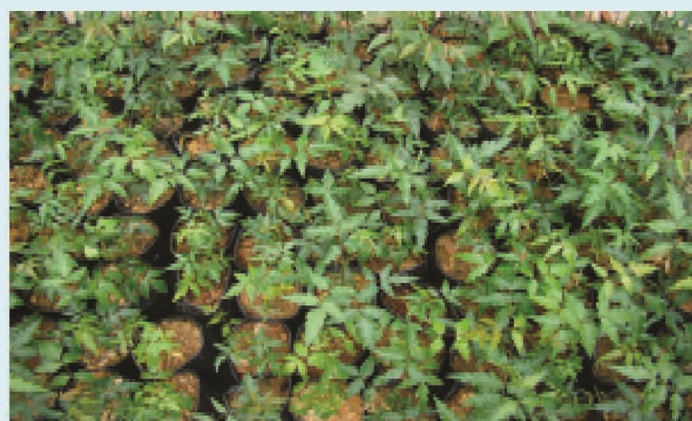
farmers and healers. for isolation and exploitation of many new insect pathogens in future.



Greenhouse for nursery raising at Substation



Nursery maintained at polyhouse of Substation



Nursery of Azadirachta indica at Sub-station



Nursery of Aquilaria agallocha at Sub-station

Social Activities

Celebrated Year of Scientific Awareness 2004

The Substation celebrated "Year of Scientific Awareness : 2004 - Interacting Meet of Scientist & NGOs/SHGs" on September, 2004 at Imphal. Shri Madhu Sudan Singh, Director, Science & Technology Manipur and Shri Surendranath Singh, Executive Director, MASTEC, Imphal were the Chief Guest & Guest of Honour, respectively. The programme was attended by 48 members from NGOs / SHGs of Manipur.



Chief Guest delivered his lecture

International Year of Mountains

The Substation in collaboration with GBPIHED, North-East Unit, Itanagar organized a workshop on "Integrating culture and sustainable natural resource management challenges" under the auspices of International Year of the Mountains-2002 on January 2, 2003 sponsored by FAO, Italy. Prof H Tombi Singh, VC, Manipur University, Dr RC Sundriyal, Scientist-in-Charge, GBPIHED, Itanagar & Dr HB Singh, Scientist-in-Charge, CSIR-NEIST Substation, Imphal were Chief Guest, Guest of Honour & President, respectively.



Shri L Gon Mei, IAS, Principal Secy., Govt. of Manipur giving speech on DNA Clubs programme.

Human Resource Development

Contribution for Schools in Manipur for development of Science & Scientific Culture

The Substation has created laboratory facilities to 57 Schools of Manipur under the financial support of DBT, New Delhi. Equipments like compound microscope, simple microscope, herbarium press, herbarium cabinet, balance, dissection box, binoculars, digital cameras and computers with UPS & laser printer etc., were distributed to 57 schools by Hon'ble Chief Minister Manipur (Shri O Ibobi Singh) on July 22, 2011.



Equipments distributed to DNA Club School



The Hon'ble Chief Minister distributing laboratory Equipments to DNA Schools



Participated students in DNA Club

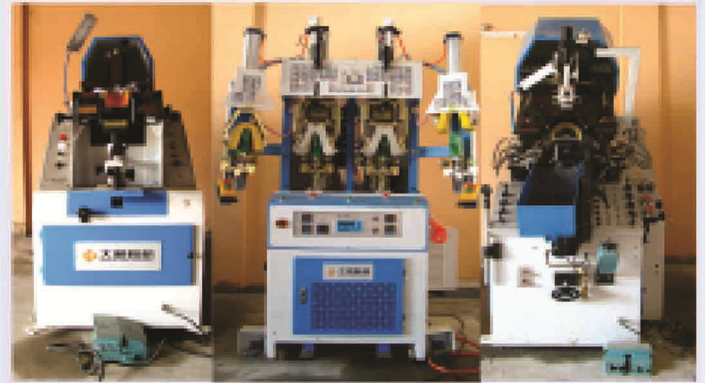
Entrepreneurship Development

Training-cum- Production centre of non-leather footwear at Imphal

Footwear Training-cum-Production centre is established at the Substation in collaboration with CLRI, Chennai under HRD Ministry funding. The Centre is equipped with sophisticated equipments for shoe manufacturing.



Trainees at practical session



Equipments for shoe manufacturing.



Hydraulic clicking and pneumatic sole attaching machines at the Substation

Resource Hub Centre for Ethnic Designs

Various culturally rich tribal communities inhabit the entire North-Eastern States of India. Each tribe has its own unique culture which is under the verge of extinction due to the influence of western culture. It is high time to preserve the ethnic designs and to create innovative ideas. Development of the value added novel leather products to this existing ethnic design is highly emphasized. A Resource Hub Centre for the ethnic designs having advance CAD/CAM are established at the Substation in collaboration with CSIR-Central Leather Research Institute, Chennai under the CSIR Rural Development Program of the Eleventh Five Year Plan which focuses on documentation of ethnic designs of northeast and development of novel products based on ethnic designs and fabrics.



Dr PG Rao, Director, CSIR-NEIST Jorhat inaugurating the Resource Hub Centre for Ethnic Designs

Training on Herbal Practice

The Substation in collaboration with Kanglei Nat Neina Lup Ayurvedic Oushadhalaya, Yumnam Huidrom, Manipur organized One-day Training-cum-workshop on "Traditional herbal practice in Manipur" on April 1, 2003. The programme was attended by 68 herbal practitioners of Manipur. Four resource persons delivered talks on herbal medicines.



Training on Mushroom Cultivation

- The Substation in collaboration with Integrated Shitake Mushroom Producing and Processing Society of Senapati organized a two days training programme on Cultivation of shiitake mushroom at Senapati, Manipur during August 24-25, 2005. The programme was jointly supported by the Forest Department, Government of Manipur and the Deputy Commissioner of Senapati. The program was attended by 43 trainees.
- A training at the Substation under the sponsorship of DBT, New Delhi was organized on September 6, 2007. The training was attended by 34 trainees.



Training on Mushroom at the Sub-station

Development of Sericulture Sector

Under CSIR Rural Development Program, sericulture training program was held during March 24-26, 2009 in collaboration with CSIR-IICT, Hyderabad. Prof C Amuba, Vice Chancellor, Manipur University, Dr USN Murthy, CSIR-IICT, Hyderabad, Prof M Premjit Singh, Registrar, Central Agricultural University, Imphal, Smt K Thaibema Devi, Director, Sericulture, Manipur, Dr BG Unni, Chief Scientist, CSIR-NEIST, Jorhat and Dr K Chaoba of Regional Tasar Research Station were the Chief Guest, President and Guest of Honors, respectively.



Prof C Amuba, VC, Manipur University as Chief Guest to grace the inaugural function

Two-days Stake-Holders' Meet on Traditional Healing system of Medicinal & Aromatic Plants in Manipur was organized by MSMPB & NEIST Substation, Lamphelpat on February 25-26, 2010 where 55 traditional healers/practitioners participated.



Shri P Parijat Singh, Minister, Health, Manipur & Dr Y Yaima Singh, Director, Health Manipur & Dr HB Singh, Scientist-in-Charge as Chief Guest, Guest of Hon & President, respectively.

Training on Citronella Cultivation

Training on Citronella cultivation was imparted to Sri LB Singh who was sponsored by MD, Manipur Small Industries Corporation limited (MSIC), Imphal during 22 October to 02 November, 1984.

Training on Handmade Paper from Water Hyacinth

- A two weeks training on Handmade Paper from Water Hyacinth was imparted to Sri Pebam Manglam and Sri Heisnam Rajen Singh, entrepreneurs sponsored by District Industries Centre, Bisnupur, Government of Manipur.
- Training on Handmade Paper from Water Hyacinth was imparted to 8 people sponsored by District Industries Centre, Bisnupur, Government of Manipur during 23-27 May, 1988.

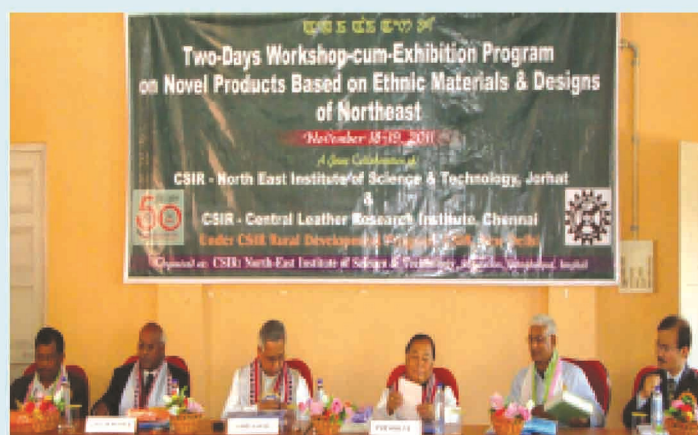
Training on Soil Conservation

Training on soil conservation cum plantation was imparted to 50 entrepreneurs at Substation. The training was organized in collaboration with Agro-Industries Multipurpose Project, Imphal.

Exhibition

Exhibition-cum-Workshop for ethnic designs and products

An Exhibition-cum-Workshop for ethnic designs and products was organized at the Substation during 18-19 November, 2011. Shri T Meinya, Hon'ble MP, inaugurated the exhibition in presence of Shri Radha Binod Koijam, Ex-CM & MLA, Manipur, Dr PG Rao, Director, CSIR-NEIST, Jorhat, Shri D Chandramouli, Chief Scientist, CLRI, Chennai and Dr HB Singh, Scientist-in-Charge, CSIR-NEIST, Substation, Imphal. Officials from various Depts. of Manipur were also invited. More than 55 novel products were exhibited which were opened for public. A team of experts from CLRI, Chennai have imparted basic training to local entrepreneurs



Dignitaries on dais



Exhibition of Ethnic Products

Substation organized CSIR Diamond Jubilee Exhibition

The Substation organized CSIR Diamond Jubilee Exhibition at Imphal during 17-20 June, 2003. Shri Manga Vaiphei the Hon'ble Minister, Science & Technology, Manipur, was the Chief Guest. Dr PG Rao, Director, CSIR-NEIST, Jorhat presided over the Inaugural Function.



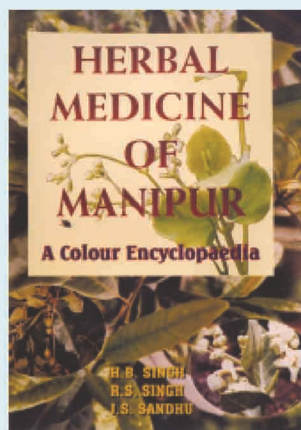
Dr PG Rao, Director, NEIST delivering the Presidential address on the Diamond Jubilee Celebration of CSIR.



Dr PG Rao, Director, NEIST explaining various activities and achievements of CSIR to the Hon'ble Minister of Science & Technology, Manipur.

Science Output

Book Release Function



Book Released By His Excellency the Governor of Manipur
Shri Ved Prakash Maruwa

A book entitled "Herbal Medicine of Manipur : A Colour Encyclopaedia", written by HB Singh, RS Singh & JS Sandhu of CSIR-NEIST was released by Shri Ved Prakash Maruwa, His Excellency, The Governor of Manipur and Shri S Natum Singh Hon'ble Minister, Science & Technology, Manipur on January 3, 2003 at the State Guest House, Imphal. The book was printed at Daya Publishing House, New Delhi.

Chapters in Book

- ✿ Jain A, Roshnibala S, Singh HB, Kanjilal, PB & Sharma RK (2009) Wetland economic plant resources of Manipur: A profile (In Wetland of North East India) (ed L Kosygin). Akansha Publisher, New Delhi.
- ✿ Jain A, & Singh HB (2009) Sacred Khecheopalri Lake Ecosystem in the Sikkim Himalaya : An overview for its management (ed L Kosygin). Akansha Publisher, New Delhi.

Research Papers

Jain A, Singh HB & Kanjilal PB (2010)

Economics of foxnut (*Euryale ferox* Salisb.) cultivation : A case study from Manipur in North Eastern India. *Indian Journal of Natural Product and Resource*, 1(1): 63-67 pp.

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Jain A, Roshnibala S, Kanjilal PB, Singh RS & Singh HB (2007) Aquatic/semi-aquatic plants used in herbal remedies in the wetlands of Manipur, Northeastern India. *Indian J Traditional Knowledge* (CSIR), 6(2): 346-351

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BENEFICIARIES OF CSIR TECHNOLOGIES IN THE STATE OF MANIPUR

Technology	Beneficiary Party	Year
Water filter candle	Member Secretary Community Polytechnic Society Takyelpet, Imphal, Manipur	1990
Handmade paper from water hyacinth	Rural Development Organization Lamsang, Manipur	1998
Low dust chalk pencil	M/s Iril Technologies Centre Nyumpok, P.O. Pangeri, Imphal (East), Manipur	2004
	Green Foundation, Kwakeithal, Thyamleikai P.O. Box 258, Imphal, Manipur	2005
Liquid deodorant cleaner	M/s Aroma Healthcare, Imphal, Manipur	2008
	M/s Thangehing Herbals Enterprises, Newlane, Bungmual Churachandpur, Manipur	2012
Herbal Freshner with mosquito repellent properties	M/s Thangehing Herbals Enterprises, Newlane, Bungmual Churachandpur, Manipur	2012

APPRECIATION



**GREEN
FOUNDATION**

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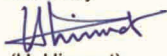
Dated 23/10/07

To
The Director
North-East Institute of Science and Technology
Jorhat – 785006, Assam

Subject: Commercial Production and Customer Satisfaction of Low Dust Chalk Pencil

Sir,
It is my great pleasure to inform you that I am producing Low Dust Chalk Pencil with the technology developed by your institute under the able guidance of your scientists. I have already started commercial production of low dust chalk pencil and the product has gone to the market which is highly appreciated by the consumer. So far, I have not received any complaint from the customer.

With regards,

Sincerely

(U. Himmat)
Secretary General



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