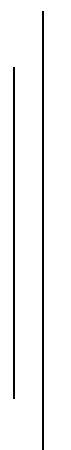


ANNUAL REPORT FOR THE YEAR 2000-2001
OF
MANIPUR SCIENCE & TECHNOLOGY COUNCIL



Submitted to

**State S&T Council Division,
Department of Science & Technology,
Government of India, New Delhi**

Manipur Science & Technology Council (MASTEC)

Background

The Manipur Science & Technology Council (MASTEC) formerly, State Council of Science and Technology and Environment, Manipur was set up in the year 1985 with the initiatives from the Department of Science and Technology, Government of Manipur. The Chief Minister, Manipur and the Minister in charge (S&T), Manipur are the Chairman and the Vice Chairman of the Governing Body of the Council. The Secretary, S&T, Government of Manipur is the Member Secretary of the Council. The Council got registered as an autonomous organisation of the Department of Science & Technology, Government of Manipur in January 1996 under the Manipur Societies Registration Act, 1989 subsequent to a decision of the state cabinet.

The autonomous Council is served by its own Secretariat of 19 manpower supported by the Department of Science & Technology, GOI. The Council Secretariat operates with the grants received from DST, Government of India, DST, Government of Manipur and the funds received from various agencies through projects and programmes. The autonomous Council works in co-ordination with the State Directorate of S&T in various areas of activities.

1.1 OBJECTIVES OF THE COUNCIL:

- To identify areas in which Science, Technology and Environment can be utilised for the achievement of the Socio-economic objectives of the State and in particular, tackling the problems of backwardness and underprivileged sections of Society;
- To advise on policies and measures necessary to promote Science, Technology and Environment and their utilisation for achievement of socio-economic objectives;
- To initiate, support, promote and co-ordinate Research Design and Development projects and programmes, including demonstration projects which are likely to be relevant to the problems, surveys and optimum utilisation of natural resources of the State;
- To promote and undertake activities for the popularisation of Science and Technology and the spread of a Scientific Temper and attitude among the people of the State;

- To supplement and complement the ongoing technical efforts of the State Government;
- To interact with other State, National and International Science and Technology bodies having similar or related objectives;
- To identify priority areas of Science, Technology & Environmental need for long term development of the State;
- To safeguard and promote the ecology and environment in the State of Manipur;
- To utilise Remote Sensing Techniques for planning, implementation and monitoring of development programmes with S&T inputs and to promote and support the activities of the Remote Sensing Centre;
- To promote, support and undertake the application of renewable sources of energy for the benefit of the people;
- To accept donations, raise subscriptions and receive grants, loans and subsidies from Government of India, Government of Manipur and other supportive agencies in India and abroad and to invest the resources towards the achievement of the objectives of the Council.

1.3 Organisational Structure :

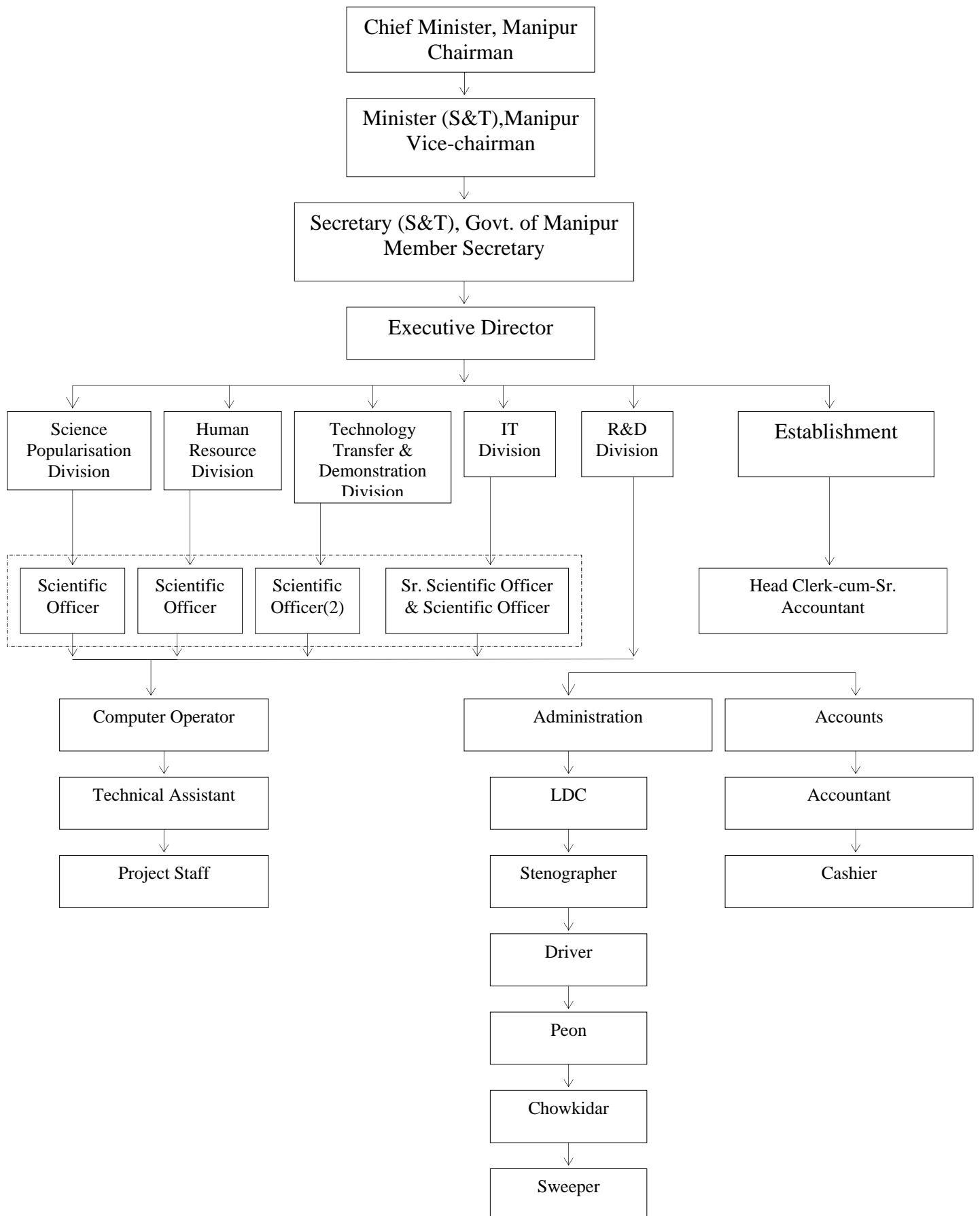
The Council has a Governing Body which consists of a wide distribution of membership having expertise in various fields, with the Chief Minister as the Chairman, and the Minister in charge, S&T, Manipur as the Vice Chairman. At present there are 22 members in the Council. The Council has an Executive Committee to assist the activities towards achieving the objectives of the Council. The Vice-Chairman of the Governing Body of the Council heads the Executive Committee as its Chairman. The Secretary, S&T, Government of Manipur is the Member Secretary of the Council. The Member Secretary is the Chief Executive of the Council Secretariat.

Manipur Science and Technology Council (MASTEC) has at present five divisions viz.

- Research and Development Division(RDD)
- Information Technology Division (ITD)
- Science Popularisation Division (SPD)
- Human. Resource Division (HRD)
- Technology Demonstration and Transfer Division (TDTD)

(Organisational Chart follows)

The flow chart of the organisation is shown below :



1.4 EXISTING STAFF OF THE COUNCIL :

Sl. No.	Name	Qualification	Designation
1.	Dr. R.K. Shyamananda Singh	M.Sc., M.Phil, Ph. D.	Executive Director
2.	Th. Surendranath Singh	M. Sc., PGDCA, LLB	Sr. Scientific Officer
3.	Dr. L. Dinachandra Singh	M.Sc., PGDRS, Ph. D.	Scientific Officer
4.	Dr. L. Minaketan Singh	M.Sc., PGDRS,, Ph.D.	Scientific Officer
5.	Kh. Rakesh	M.Sc.	Scientific Officer
6.	Ch. Sarat Singh	B.Tech.(Civil), M.Tech.	Scientific Officer

Technical Staff :

7.	Ch. Shivaji	M.Sc., PGDCA	Computer Operator
8.	Mrs H. Binodini Devi	B.Sc.	Technical Assistant
9.	Y. Shyamsunder Singh	B.Sc., LLB	Technical Assistant

Ministerial Staff :

10.	Y. Rajen Singh	B.A.	Head Clerk cum Sr. Accountant
11.	K. Nara Singh	B.A.	Accountant
12.	Mrs R.K. Bhanisana Devi	B.Sc.	L.D.C.
13.	H. Thangthianmang	B.A	L.D.C.
14.	A. Tombi Devi	B.A.	Stenographer
15.	L. Boyai Singh	VIII Passed	Driver
16.	L. Open Singh	X Passed	Peon
17.	S. Deven Singh	X Passed	Peon
18.	Jamkhanmuan	VIII Passed	Peon (Dak Runner)
19.	Mrs. Chingthanching	VIII Passed	Chowkidar
20.	Kh. Leidou Maring	VIII Passed	Sweeper

Project Staff

21.	O. Rabi Singh	MCA	Scientific Officer
22.	M. Pradipchandra Singh	M.Sc	J.R.F
23.	Imo Thiyam	B.E.(Mechanical)	Project Asst.
24.	Th. Shyam Singh	B.Sc.(Agri)	Project Supervisor
25.	S. Babuchaoba Singh	M.Sc.(Botany)	Field Co-ordinator

1.5 ACTIVITIES

1.5.1 Workshop/seminars/trainings :

The Manipur Science and Technology Council (MASTEC) organised various centrally sponsored workshops / trainings relevant to the state including science popularisation to fulfill the objectives for establishment of the Council. The Council receives overwhelming response from the people in the state in all the S&T programmes and organised with a big success.

The following are the programmes implemented by MASTEC during the year 2000-2001

1.5.1.1 One day Regional Workshop on Opportunities for Young Scientists for N-E Region sponsored by H.R. Unit, DST, GoI was organised on April 27, 2000 at the Auditorium of Manipur University, Imphal. The workshop was inaugurated by Prof. H. Tombi Singh, Vice Chancellor, Manipur University. Dr. Parveen Farooqui, Advisor, DST,

Govt. of India highlighted about the schemes they have for the young scientists below 35 years of age. Among others who have already got research projects under young scientist scheme of DST, GoI, Dr.(Mrs) Indira Devi of Life Sciences Department, M.U and Dr. Ch. Debojit Singh of Earth Sciences Department, M.U. presented their achievements and advancement of knowledge while working in the young scientist project under H.R. Unit, DST, GoI.. Three scientists (Dr. Sh. Dorendro Singh, Physics Dept, M.U., Dr. O. Mukherjee Singh, Chemistry Dept, M.U. and Dr. N. Homendro Singh, Chemistry Dept, M.U) who had availed of the young scientist fellowship under Joint MASTEC- DST, Fellowship scheme spoke during the interaction session. Under the fellowship, Dr. Dorendro visited Physical Research Laboratory (PRL), Ahmedabad and Bhabha Atomic Research Centre (BARC), Mumbai and Dr. O. Mukherjee visited IIT, Kanpur, Dr. R.K. Bhobon Singh visited Jadavpur University, West Bengal to undergo advanced research in their own specialised fields. They requested both MASTEC & H.R.Unit, DST GoI. to continue the scheme. About 80 participants from various colleges and Universities from the N-E states of India attended the workshop.

1.5.1.2 Science Meet 2000: The Science Meet 2000 was organised by MASTEC in co-ordination with the three leading science NGOs of the State like Manipur Association for the Promotion of Science (MAPS), Manipur Association for Science & Society (MASS) and Manipur Science Communicators' Association (MASCA) at Manipur University Campus during May 11-15, 2000 in commemoration of the National Science Day 2000 and National Technology Day 2000. Science Meet is organised by MASTEC every year as a multi activity state level science festival providing platform to science students of all levels, scientists and general science loving audience.

The SM 2000 was inaugurated by Dr. Khashim Ruivah, Hon'ble Minister of State Science & Technology, Manipur at a function at the Centenary Hall, Manipur University, Canchipur on May 11, 2000. Shri A.R. Khan, Secretary (S&T), Government of Manipur delivered the presidential address. Prof. H. Tombi Singh, Vice Chancellor, Manipur University was the Guest of Honour.

The following were the activities of the five day Science Meet 2000 .

- i. Competition (Science Quiz, Painting and Science Model)
- ii Seminar on Science & Technology.
- iii. Exhibition: Interactives Models, Science Models, Computer World.
- iv Audio Visual shows: Scientific films.
- v Magic shows: Science behind miracles.
- vi Book exhibition.
- vii. Scientific poster exhibition.

Activities of MAPS:

The following activities were organised by MAPS during the SM 2000 in Co-ordination with MASTEC

1. Seminar on Science & Technology.
2. Science Quiz.

Seminar:

A one day seminar on Science & Technology was organised on May 12, 2000 at 10:00 a.m. at the Centenary Hall, Manipur University. Various resource persons gave lectures on the followings topics and about 500 participants from student community and

other organisations gathered in the one-day seminar. The main topics of the seminar presented by various resource persons are stated below

- | | |
|---|-------------------------------|
| 1. Energy & Environment | - Dr. L. Warjit Singh. |
| 2. Human cloning | - Prof. G. Jitendra Sharma. |
| 3. From Golden helix to the Genomics | - Prof. Ch. Manoranjan Singh. |
| 4. Medical Sciences of 21 st Century | - Dr. W. Motilal Singh. |
| 5. Uses of Medicinal plants of Manipur. | - Dr. Th. Brojendro Singh. |
| 6. Our Universe | - Dr. K. Jugindro Singh. |
| 7. Environmental Education. | - Dr. N. Rajmuhon Singh. |

Science Quiz Competition:

The competition was open to students currently reading in Class XI - TDC-III. Preliminary round of the quiz was held on May 13, 2000 at 11:00 a.m. and 15(fifteen) teams from various schools and colleges were participated. Four teams were selected for the final round. The final competition was held on 15th May, 2000 at 11:00 a.m. at the Centenary Hall, Manipur University.

Activities of MASS.

Manipur Association for Science & Society (MASS) in Co-ordination with MASTEC took part in the activities of Interactive Model Exhibition, Audio Visual Scientific film shows, Science Behind Miracles, Science Model Competitions.

Interactive Model Exhibition:

The following Interactive Models were exhibited during the 5 day SM 2000.

1. Koniberg's Bridge,
2. Complete the image,
3. Count your images,
4. Trace your finger,
5. Innumerable Image and
6. Inter lock

Audio Visual Film Show:

Altogether 5(five) scientific films viz Introduction, A mother's prayer. The stone Age till 3500 BC. The Harappan Civilization 3500 BC to 2000 BC. The Iron Age 2000 BC to 500 BC were featured during the SM- 2000.

Science Behind Miracles.

A total number of 10(ten) items of science behind miracles were demonstrated by the experts of MASS during May 12-15, 2000 and scientific backgrounds of the shows were also explained. About 200 students viewed the shows.

Science Model Competition:

The competition was for the students currently reading in class VIII-XII. The model was the work of an individual or a group of individuals not exceeding 2 students. Altogether 34 models were exhibited in the competition.

A panel of judges in various disciplines of Science viz. Physics, Chemistry, Life Sciences examined the models and thoroughly interviewed the students (exhibitors).

Activities of MASCA:

The following activities were organised by MASCA during the SM 2000.

1. Spot painting Competition.
2. Scientific Book Exhibition.

Spot Painting Competition:

The Spot painting Competition was organised on 13th May, 2000 at the Students' Home of the Manipur University, Canchipur. The students competed in three groups viz, Sub-Junior group (Class, III-V), junior group (Class VI-VIII) and senior group (Class IX - X).

The theme of the painting for **Sub-Junior Group** was "ANIMAL WORLD" and 59 students participated in the painting.

Junior Group:

The theme for **Junior Group** was "OUR ENVIRONMENT" and 70 students participated. The theme for **Senior Group** was "TELE COMMUNICATION TECHNOLOGY" and 32 students contested in the senior group.

BOOK EXHIBITION:

The following agencies took part in the Book Exhibition during SM 2000.

1. Sharma Book Agency, Paona Bazar, Imphal.
2. Sangam Book store, Paona Bazar, Imphal.
3. Job Centre, Babupara, Imphal.
4. Educational Guide Centre, Singjamei, Imphal. A library cum information centre run by an NGO.
5. Youths' Club, Brahmapur, Imphal. A library run by NGO.

Activities of MASTEC.

Manipur Science and Technology Council organised the activities of Computer World and poster exhibition:

Computer World:

Various Computer shows related to the scientific encyclopaedia, multimedia shows were demonstrated to the students during the five days programme. About 200 students every day viewed the shows.

Poster Exhibition:

About 64 (Sixty-four) NCSTC, published posters were exhibited during the 5 days programme of Science Meet 2000 .

Plenary Session:

The plenary session of the Science Meet 2000 was presided over by Shri S. Madhusudan Singh, Director(S&T), Govt. of Manipur on 15th May, 2000 at the Centenary Hall, Manipur University Prof. H. Nandakumar Sarma, Dean School of Science, Manipur University was the Chief Guest. Dr. N. Debananda Singh, President MAPS, Dr. B. Manihar Sharma, Member MASS, Dr. T. Meinya Singh, President MASCA were the Guests of Honour. Prof. H.N.K. Sarma during his speech at the closing function stressed the need for patronage of the government of Manipur in making Science Meet every year a grand festival.

Four organisations viz; (i) Babina Diagnostic Centre, RIMS Road, Imphal (ii) Lamjingkhomba Electronics, Singjamei (iii) Mass Rehabilitation Society, Singjamei and (iv) Ibouchou Service Station, Kakwa contributed Rs.3,000, Rs.2,500, Rs.500, Rs.500 respectively to award the cash prizes and thus contributed to the promotion of better scientific knowledge amongst the young school and college students of the state

Prizes/Awards:

The following prizes and awards with certificates were distributed on the last day at the plenary session.

Painting :

The 1st prize of the painting competition in the sub-junior group was given to N. Kubileima Class-V of Kendriya Vidyalaya, Lamphelpat. S. Telent Class-V, Maria Montessori School, Koirengei and T. Milanpat Chanu Class-V Central School, Lamphelpat bagged the 2nd and 3rd prizes. Consolation prizes were given to H. Rajanikanta Sharma Class –III Brighter Academy, New Chekon and A.K. Bryanbud Class-V Pari Imom Khwai Sindamsang, Pangei. The prizes carry cash awards of Rs.1500, Rs.1000, Rs.500, Rs.100 with citations.

In the Junior category of the painting competition, Millan Laishram Class-VI of Catholic School, Canchipur was given the 1st Prize. R.K. Ningthemsana, Class-VIII, Kendriya Vidyalaya Langjing bagged the 2nd prize. The 3rd prize was given to T. Ngaosathe, Class-VII, Maria Montessori School, Koirengei. The consolation prizes were given to N.Nadia Devi Class-VI and Deeparani N Class-VI of Maria Montessori School, Koirengei. The prizes carry cash awards of Rs.1500, Rs.1000, Rs.500 and Rs.100 with citations.

In the senior category of painting competition. Amrita Sougaijam Class-X, Maria Montessori School was given the 1st prize. The 2nd prize was given to Kh. Kumar Singh Class-X, Raja Dumbra High School, Imphal. Kh. Dimpu Singh Class-X Bishnupur Hr. Sec. School, Bishnupur got the 3rd prize. The consolation prizes were bagged by A. Holen Sharma Class-IX and N. Renen Kumar Class-X of Maria Montessori School, Koirengei. The prizes also carry cash awards of Rs1500, Rs.1000, Rs. 500 and Rs. 100 with citations.

Science Model : In the Science Model competition for the students of Class VII-XII standard, the prize of Rs.2500 with citation was given to the team of two students of Little Rose Hr. Sec. School, Canchipur represented by A. Ashwini Kumar Singh and Th. Chitaranjan Singh. Kh. Giteshor Singh of A. Jalil High School bagged the 2nd prize of Rs.2000 with citation . The 3rd prize of Rs.1500 with citation was given to the team of R.K.Ranadeva and T. Bobo of Sainik school Imphal. The consolations prizes of Rs. 500 each were bagged by the teams of Maria Montessori School and Sainik School, Imphal represented by Koko Wangjam and Seema Laimayum and Romesh M, Devkumar L and T. Ramesh.

Science Quiz: The team of D.M. College of Science represented by I. Jayenta Kumar Singh and S. Surjit Kumar Singh bagged the 1st prize of Quiz competition of Rs.5000 with citation. The 2nd Prize of Rs.3000 with citation was given to the team of C.C. Hr. Sec. School represented by Kenish Ningthoujam and Ph. Surchandra. Th. Santosh Singh and R.K. Uttam representing M.B.C. Hr. Sec. School bagged the 3rd prize of Rs.2000 with citation. The consolation prizes of Rs.500 with citation was given to the team of Brighter Academy represented by Vishak Salam and R.S. Gartia.

SM-2000 Best Appreciation Award : The Best Appreciation Award of the Science Meet 2000 was given to A. Stacy of Maria Montessori School,. The award carries a certificate of merit with a cash prize of Rs.1400. The award was introduced by MASTEC to be given to the individual who proves to have gained the maximum knowledge of Science through the Meet as judged by questionnaire response and personal interview.

1.5.1.3 Workshop on Energy Efficient Buildings for North Eastern Region: The workshop was organised during May 29-31, 2000 at Hotel Imphal Imphal. with Dr. Khashim Ruivah, Minister of State, Science & Technology, Manipur as the Chief Guest and Shri A. R. Khan, Secretary, Science & Technology, Govt. of Manipur as the president of the Inaugural function. Twenty participants from different disciplines of architecture, engineering, physical sciences etc. attended the three day programme. The workshop was sponsored by the Ministry of Non-Conventional Energy Sources, Govt. of India, New Delhi The workshop was aimed at creating awareness:

- a) about Passive Solar Technologies (orientation, shading, earth berming, intelligent seasonal control of solar gain and losses by building form, use of appropriate building materials, micro climate modification, day lighting etc.) to reduce thermal loads and to increase the levels of comfort
- b) about design and systems integration of RETs (solar air and water heating, solar electricity, solar cooking etc.) in operational costs
- c) about the concept of green building and importance of planning and design analysis prior to actual construction of a green building.

In the Inaugural address, Dr. Khashim Ruivah appealed to the local architects and engineers to form a syndicate for popularisation of the technology where MASTEC will be the co-ordinator of the syndicate. The presidential remarks by Shri A. R. Khan, Secretary (S&T), Govt. of Manipur reported that the first demonstration building with Passive Solar Technology, sponsored by Dept. of Science & Technology, Govt. of India had been given to MASTEC and expressed his hope that more buildings would come up in Manipur with Passive Solar designs to cater to the climatic requirements of both the hill and plain topographies in Manipur.

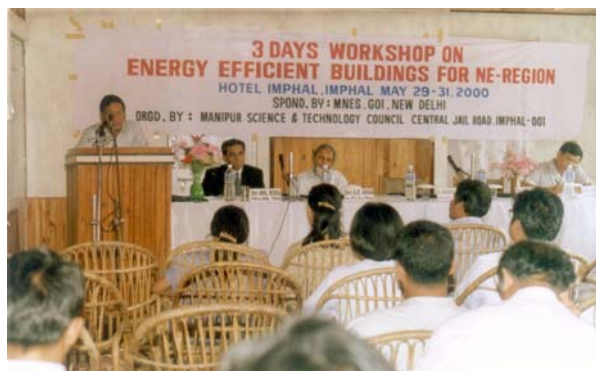
Three resource persons namely

1. Prof. Sujay Basu, Director, School of Energy Studies, Jadavpur University, Calcutta.
2. Shri Anil Misra, Fellow, TERI, New Delhi.
3. Shri M. Bhavananda Singh, Architect, Imphal West Building Centre. presented the lectures with the help of video, slides, transparencies and multimedia kits.

The following topics were covered in the workshop :

Energy efficiency building design, Thermal and visual comfort, Energy efficient lighting and day lighting, Day lighting in buildings (video presentation), Solar radiation and solar resource, Case studies of 2 (two) buildings, Bio- climatic architecture (video presentation), Passive solar architecture, Slide presentation of various buildings, Multimedia presentation

- (a) Setting up of a group of experts and local architects and engineers, which would provide advice/consultancy on each new state building in order to enhance its efficiency.
- (b) To develop general guidelines for testing energy efficiency of new building designs.



Inaugural Speech by Dr. Khashim Ruivah, Hon'ble Minister of State (S&T), Manipur

- (c) Other action group would develop general guidelines for testing the energy efficiency of new building designs.
- (d) To promote the use of local materials in the construction of energy efficiency buildings in the region.
- (e) To survey energy supply and use patterns in different types of buildings and to prepare a comprehensive data base of the building construction materials available in the region.
- (f) To organise specialized training programmes for engineers and architects from various departments in Passive Solar Building Technologies..
- (g) To cause construction of more demonstration buildings in all NE States.
- (h) To organise programmes for general public, school/ college children and teachers to enhance awareness about efficient buildings.
- (i) To develop energy education park.
- (j) To encourage energy audits for old buildings, and to retrofit them with suitable options to reduce their energy consumption, and increase the occupants comfort.

1.5.1.4 The first State Level Training Workshop on Puppetry for Science & Technology Communication: The workshop was organised during June 19-24, 2000 at Panchayat Bhavan, Porompat, Imphal. Shri A.R. Khan, Secretary (S&T), Govt. of Manipur inaugurated the programme. Mr. B. Pattanayak, MANVIK, Bhubaneswar, Mr. K.M. Rafi, Science Aur Kainat Society of India, New Delhi, and Mr. V. Sudarsan, SEARCH, Gaziabad imparted in depth training to the participants. The workshop was sponsored by NCSTC, DST, Govt. of India.

In the inaugural address, Shri A.R. Khan emphasized on the need for promoting the art of Puppetry for S & T communication in the State. He further expressed his desire of developing a strong team of Science communicators who will be responsible to spread about puppetry and its importance in science communication to the general public in the State.

Shri Banaya Pattanayak, a key resource person from Orissa while giving the keynote address presented the outline of the scenario of science communication through puppetry in the Country. He added that people could be made aware of the problems such as AIDS, environmental Pollution etc. through puppet shows. He further expressed that puppetry can be used as an effective tool for S & T communication.

Altogether 44 participants consisting of representatives from various NGOs, schools, colleges and a few individuals interested in this art took part in the workshop. The training module included voice modulation, procedures for story and script writing, process of puppet making, manipulation of hands for puppet shows, costume designing for the puppets and exercise on puppet shows. The process of making and presenting puppet shows for rod, string and shadow puppets were taught in the workshop.

Using the scientific information given in the lectures, the participants developed 35 scripts for puppet shows. 60 puppets were also made during the course. The overall performance of the participants was good. However out of the 44, only 28 participants turned out as successful trainees.

A discussion was held between the key resource persons and participants for planning of future line of action. In the valedictory function, selected 4 puppet shows were presented to the audience on the theme 1) **Let us know AIDS**, 2) **Air pollution**, 3) **Garbage Pollution and** 4) **A small family is a happy family**.

Remarks of the participants

The following were the feedback received from the participants:

- Organisation of similar programmes in every district of Manipur is highly required for generating more resource persons in the state and also for popularising the art. The resource persons after receiving the training at the district level workshops would conduct programme at the village level. For organising these programmes financial support from NCSTC may be sought.
- Organisation of training workshop on string puppets.
- Formation of an Association of Puppeteers for coordinating future programmes on puppetry under the guidance and supervision of MASTEC.
- Puppetry training may be imparted to the school children during the SUPW period of various schools.
- Subject experts must write the script in an interesting format for presentation by the puppeteers.

1.5.1.5 The first State level training Workshop on Learning Science through hands on Activities was organised during July 27-29, 2000 at Imphal. Dr. Khashim Ruivah, Minister (S&T), Manipur was the Chief Guest and Shri A.R. Khan, Secretary (S&T), Government of Manipur was the president of the Inaugural function. Thirty three delegates (science teachers) including four ladies from different government and private schools and colleges attended the training. The objective of the training was to train science teachers in using the process of learning through hand on activities for teaching students. Shri S.K. Bakchi, Former Director, NCSM, Calcutta with two local resource persons namely L. Somorjit Singh, Selection Grade Lecturer, Modern College, Imphal, and Shri Ch. Rajendro Singh, Selection Grade Lecturere, Imphal College, imparted in-depth training to the participants. The training course (i) experimentation, (ii), methodology of setting up experiments using low cost or no cost equipment, (iii) mathematical problems solving activities and (iv) demonstration of hands on experiments.

The following were the suggestions submitted by the participants during the feed back session:

- a) organisation of similar workshops in all districts of the state to provide an opportunity to the science teachers of the district concerned for immediate application of the process of learning by doing in their teaching.
- b) Experiments and demonstration should cover all disciplines of science
- c) Schools to be equipped with a set of low cost materials for experimentation.

The training was catalysed and supported by NCSTC, DST, GoI, New Delhi.

1.5.1.6 Emergence of Modern Science (1895-1905) : The Manipur Science & Technology Council made a campaign for the Emergence of Modern Science to celebrate the Golden Decade 1895-1905. The campaign included 1) Resource Persons training programme in Imphal. , 2) Written Science Quiz competition for high and higher secondary schools students. 3) Extensive lecture programme and 4) Essay competition for college students. The main objective of the series of activities on EMS was to popularise scientific knowledge among the children with the help of experts, teachers , individuals,, clubs/ organisations etc. for the pursuits of scientific knowledge.

1) Resource Persons Training Programme :

The two days **Resource Persons Training on EMS** was organised during September 4 – 5, 2000 at Hotel Imphal, Imphal. It was inaugurated with Dr. Khahim Ruivah, Hon'ble Minister of State for Science and Technology as the chief guest and Shri A.R.Khan, Commissioner (S&T), Govt. of Manipur as the president of the inaugural function.

The training received a good response from various parts of the state. Altogether, 26 participants comprising of teachers from school/college, representatives from science NGOs took part in the training programme. During the training course, 5 master resource persons who were trained at the Zonal master resource persons training programme at Shillong imparted indepth training to the trainees. Apart from the 5 master resource persons, Prof. H.N.K. Sarma, Dept. of Physics, Manipur University also delivered a lecture.

The training course included the topics such as The Golden Decade (1895-1905) and discovery of X – rays, Quantum Era, Beginning of Biochemistry, All motion is relative, Jagadish Chandra Bose, Marconi and Radio, Discovery of Malarial parasite, Discovery of Electron, Nuclear transmutation and Particle Accelerator, Advances in Technology, Practicals/Demonstrations.

On the 2nd day of the training, many physics experiments related to the above topics were demonstrated in the laboratories of Department of Physics, Manipur University under the guidance of Prof. Ch. Amuba Singh, Head – Department of Physics, M.U. and Prof. H.N.K. Sarma. The participants achieved full satisfaction on the course module and they assured of sharing their knowledge further to the general masses especially among the children through an Extensive Lecture Programme of EMS.

Feedbacks from the participants.

1. Successful trainees to be involved in the extensive lecture programme on EMS
2. Organisation of more science competitions for the children in the future in the state for developing scientific temperaments.

2) Extensive Lecture/demonstration Programme on EMS:

The lecture programme was conducted from September 7 to October 31, 2000. Altogether 72 lectures were delivered in various schools/colleges/communities of the state. Master resource persons trained at Shillong and resource persons trained at Imphal were engaged for this programme. Various aspects on the discoveries and inventions of the decade 1895 – 1905 and the lives of the scientists who made these inventions and discoveries possible were taught and discussed. This programme benefited about 14,000 students of the state.

3) Competition for College Students:

As a part of the EMS campaign, essay competition for the students of college was conducted on November 12, 2001 at G.P.Women's College, Imphal. The topic of the essay was "the landmark changes in human development brought about by scientific inventions and discoveries during the Golden Decade (1895 – 1905)". (Answer Script sample at Annexure - IV). Students from various part of the state participated the competition and on the same day of the competition, essay scripts of the competition were examined and after careful scrutiny of the scripts, the following students were declared the 1st three winners.

1. 1st Prize : Thangjam Gopeshwor Singh, T.D.C. - III year, Imphal College -

2. 2nd Prize : Joshini Laitonjam, T.D.C. – II year, G.P.Women’s College, Imphal
3. 3rd Prize : Keisham Geetarani Devi, T.D.C. – II year, G.P.Women’s College, Imphal

The first three winners were awarded cash prize of Rs.2000/-, Rs.1500/- and Rs.500/- respectively and merit certificates with citation were also presented to the winners.

4) Competition for school Students:

Under the EMS campaign, two written science quiz competition were organised – one at the high school level and another at the higher secondary level. Both the competitions were conducted at G.P.Women’s College, Imphal on 12 November 2000. The theme of the two competitions was “ important discoveries, inventions and lives of the scientists responsible for the various discoveries and inventions during this period 1895 – 1905 and the following students won the respective prizes.

High School Level Competition:

- 1) 1st Prize: Abhisek Sahu, Class – XII, Kendriya Vidyalaya, Langjing.
- 2) 2nd Prize: Ramananda Nongmeikapam, Class –X, Catholic School, Canchipur.

Consolation Prizes

1. M.Anand Singh, Class IX, St.George High School, Wangkhei.
2. Sushma Chabungbam, Class IX, Kendriya Vidyalaya, Langjing.
3. Ningthoujam Radhesana Devi, Class IX, North Eastern English School, Khurai
4. Saklemba Rajkumar, Class VIII, St. Joseph School, Sangaiprou.
5. Huidrom Santosh Singh, Class IX, Anganghal English School, Wangoi.

Higher Secondary Level Competition:

1. 1st Prize:Shoubik Bag, Class XI, Kendriya Vidyalaya, Langjing.
2. 2nd Prize: Ningombam Reagan Singh, Class XI, C.C. Higher Secondary School, Imphal.
3. Usha Devi Thounaojam, Class XII, R.K.Sanatombi Devi Vidyalaya, Pangei.

Consolation Prizes:

1. N.Chandrajit Singh, Class – XII, C.C. Higher Secondary School, Imphal.
2. Sagolsem Dekan Singh, Class – XI, C.C. Higher Secondary School, Imphal.
3. Joshua Nengminthang, Class – XI, C.C. Higher Secondary School, Imphal.
4. Salma Begum, Class – XI, T.G.Hr. Sec. School, Imphal.
5. Yumnam Saratchandra Meitei, Class – XI, C.C. Higher Secondary School, Imphal.

Besides cash awards and certificates of merit, the first two winners at the high school written science competition and the first three winners at the higher secondary competition will be awarded a scholarship of Rs.300/- per month for a period of one year by NCSTC, DST, Government of India. And they would be invited a free trip to the leading laboratories outside the state by NCSTC. In this regard NCSTC has been requested to make necessary arrangements for the scholarship and free trip at the earliest.

1.5.1.7 One week Training programme on “ GIS Applications in R&D for N-E Region” : The training was sponsored by NRDMS, DST, Govt. of India . It was organised in co-ordination with Loktak Development Authority (LDA), Earth Sciences Dept. Manipur University, Manipur Remote Sensing Applications Centre (MARSAC) and Transport GIS Consultants, Imphal during November 13-18, 2000 at Hotel Mass, Imphal..

Prof. Gangmumei Kamei, Minister (Higher & technical education, Forest & Environment), Manipur and Dr. Khashim Ruivah, Minister (S&T), Manipur were the Chief Guest and the President of the inaugural function respectively.

The main objective of the training was

- i) To impart knowledge of GIS and its applications in specific research needs of NE-India
- ii) To impart basic principles of remote sensing and its various applications in different disciplines of engineering, geology, geography, environmental sciences, computer sciences, town planning etc.

There were 10 (ten) outstation participants from Assam, Meghalaya, Arunachal Pradesh, Sikkim, Nagaland, Mizoram and 18 (eighteen) participants from host state Manipur attended the one week training programme.

Altogether 14 (fourteen) resource persons from various organisations including Dr. Y.V.S. Murthy, Scientist SF, NRSA, Hyderabad Shri S.K. Paul, Scientist RRSSC, Kharagpur. imparted in-depth training to the participants. The programme was sponsored by the NRDMS Division, DST, GOI New Delhi.. On the basis of the analysis of feed backs submitted by the participants, 3(three) following recommendations were passed on the closing day interaction

1. Formation of a common forum of all workers in GIS application and related fields in the NE-Region.
2. Organising more trainings in GIS applications and related field with longer duration and modular course with sufficient hands on practical.
3. Appraisal of GIS promotion programmes to all the state government departments, North Eastern Council and Central Government departments. State S&T may take key role in promoting GIS technology in the state.

1.5.1.8 Nature Orientation Camps : As a follow up of the resource persons training camp in Nature Observation previously held in Bishnupur District in Manipur, eight district level Nature Camps have been sanctioned by NCSTC. Out of them, 4 camps were organised one each in Imphal East District, Thoubal District, Ukhrul District and Tamenglong District.

a) **Nature Orientation Camps, Thoubal District** : The camp were organised during Dec 27-30, 2000 at Khangabok in Thoubal district, Manipur . The programme was organised in association with Manipur Science Communicators Association (MASCA).. Shri K.K. Chetry, IAS, Deputy Commissioner, Thoubal District inaugurated the camp. Altogether 50 campers (10 guide teachers and 40 students) attended the camp.

b) **The Nature Camp at Tamenglong District**: The camp was organised during Jan 12-15, 2001. The camp was organised in association with MASCA, Imphal and DEEPS, Dailong. The camp was inaugurated by Col. T.S. Raghava, C.O. 15th Jat Regiment,

Tamenglong. Altogether 50 participants attended the camp. The programme was catalysed and supported by NCSTC, DST, GoI, New Delhi

c) **The Nature Orientation Camp in Ukhrul** : The camp was organised in association with two NGOs namely MASCA (Manipur Science Communicator's Association) and Tangkhul Science Association during Jan 20-23, 2001 at Ukhrul. Shri T. Panmei, IAS, Deputy Commissioner, Ukhrul District, Manipur inaugurated the camp. 50 campers attended the camp

1.5.1.9 Training workshop on Aromatic, Medicinal and Spices plants ; The workshop was organised during march 6-8, 2001. Dr. Khashim Ruivah, Minister (S&T), Manipur opened the training programme. 41 (forty one) participants from various NGOs, Entrepreneurs, and interested individuals attended the training. Reputed scientists from RRL, Bhubaneswar including Dr. V.N. Mishra, Director, RRL delivered lectures which was accompanied by interaction with the participants. The training was sponsored by RRL, Bhubaneswar.

11 A Training Workshop on **Learning Science through Hands on Activities** was organised during March 6-8, 2001 at Imphal. Thirty science teachers from High and Higher Secondary Schools attended the training. The workshop was catalysed and supported by NCSTC, DST, GoI. New Delhi.

12 . A five day State level **Training Workshop on Model Rocketry** catalysed and supported by National Council for Science and Technology Communication (NCSTC), Govt. of India, New Delhi was organised by Manipur Science and Technology Council (MASTEC) during March 14-18, 2001 at the Conference and Lecture hall of the State Youth Centre, Khuman Lampak, Imphal. Thirty nine participants comprising of 26 science students and 13 science teachers (two students and one teacher from each school) from 13 High and Higher Secondary Schools in the state successfully attended the training workshop. Sripad Mishra, Managing Secretary, Viswarashmi Space Lab, Cuttack and Er. Jayadev Kar, Senior Engineer, Pathani Samanta Planetarium, Bhubaneswar (Orissa) imparted in-depth training as master resource persons to the participants during the five day programme.

Dr. Khashim Ruivah, Minister (S&T), Manipur and Shri Ram Muivah, Commissioner (S&T), Government of Manipur were the Chief Guest and the President of the inaugural function. Dr. Khashim Ruivah opened the training by launching a specially designed model rocket on March 14, 2001 at 11 a.m. followed by test fire of another model rocket by Shri Ram Muivah.

Delivering lectures, slide shows, interactions accompanied by hands on practicals on development of rockets and test fire etc. were the main activities during the five day programme. Altogether thirteen model rockets were built by the participants developed (one rocket by each group / school). The participants also developed thirty eight static model rockets. Experiments on 1. construction and testing of Balloon Rockets, Pencil rockets, and soft landing of rockets etc were performed during the course of the training. Five model rockets prepared by the participants and one specially designed rocket were successfully test fired on March 16, 2001 at 3.45 p.m. which was witnessed by a team of DDK, Imphal Centre, and media persons followed by . test fire of four model rockets developed by the participants on March 17, 2001. Four model rockets developed by participants and two specially designed rockets developed by the resource persons were

test fired on March 18, 2001. A TV science programme based on the activities of the students and teachers during the training was telecast on March 18, 2001 by Imphal DDK.

On the last day during the feed back interaction, most of the participants suggested that the duration of the training was short and various aspects could not be covered due to shortage of training duration. Participants suggested to MASTEC to organise a **Second workshop on Model Rocketry** for a duration of about 10(ten) days with residential facility

SCHEME OF THE COUNCIL

MASTEC - RSIC Assistance Programme: The Regional Sophisticated Instrumentation Centre (RSIC) , Shillong is one of the seven centres in India where expensive sophisticated analytical instruments are made available to scientists/research scholars under one roof under a nationwide mission of the Department of science and Technology , Govt. of India. Very few scientists/researchers from Manipur have used the facilities at RSIC, Shillong in the past 12 years of its existence.

Realising the importance of precision data in today's research world and with an intention to assist the scientists in the state to get an access to it. MASTEC and RSIC, Shillong have jointly launched a programme under which all the instruments at RSIC, Shillong are made available to the scientists from Manipur free of cost.

FACILITIES :

1. UV-VIS-Spectrophotometer, 2. Infrared Spectrophotometer, 3. FTIR Spectrophotometer (i) DA-3.16, (ii) DA-8, 4. Nuclear Magnetic Resonance (NMR), 5. FTNMR (300) Mhz, 6. Electron Microscope (i) SEM, (ii) TEM, 7. Atomic Absorption Spectrophotometer, 8. Inductively Coupled Plasma (ICP) Emission Spectrophotometer, 9. C-H-N-O-S Analyser, 10. DMRX Universal High Resolution Optical Microscope with image Analyser System

Seven researchers have been benefited by the scheme

Officers attending meetings/seminars/conference/trainings

Sl.No.	Name	Programme attended
1.	Dr. R.K. Shyamananda Singh Executive Director	9 th Regional Meeting of State S&T Councils & Departments of NERegion held during April 3-4, 2000 at Agartala, Tripura
2.	Dr. R.K. Shyamananda Singh Executive Director	11 th All India Meeting of State S&T Councils and Departments held during May 23-24, 2001 at Gangtok (Sikkim)
3.	Dr. R.K. Shyamananda Singh Executive Director	Steering Committee Meeting of NBDB held during June 6-8, 2000 at New Delhi
4.	Dr. R.K. Shyamananda Singh Executive Director	Joint Meeting of RRI and ITRC held on August 4, 2000 at Jorhat (Assam)
5.	Dr. R.K. Shyamananda Singh Executive Director	2 Days Meeting on S&T for NE states held during August 24-25, 2000 at NPL, New Delhi

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|------|--|---|
| 6. . | Dr. R.K. Shyamananda Singh
Executive Director | All India Workshop cum Exhibition on strategy of initiative of Rural Area through S&T |
| 7. | Dr. R.K. Shyamananda Singh
Executive Director | Project Monitoring Meeting held during January 4-8, 2001 at New Delhi |
| 8. | Dr. R.K. Shyamananda Singh
Dr. R.K. Shyamananda Singh | International Workshop on TBI held during January 29-31, 2001 at Bangalore |
| 9. | Th. Surendranath Singh,
Sr. Scientific Officer | Indian Science Congress held during January 3-7, 2001 at Delhi |
| 10. | Dr. L. Dinachandra Singh
Scientific Officer | Training on Medicinal, Aromatic & Spice Plants held during Oct 17-20,2000 at RRL, Bhubaneswar |
| 11 | Dr. L. Minaketan Singh
Scientific Officer | Science Motivation Programme held during January 10-16, 2001 at RRL, Jorhat |
| 12. | Kh Rakesh
Scientific Officer | Shillong |
| 13. | Kh Rakesh
Scientific Officer | Arunachal Pradesh |

PROJECTS :

Research as well as application oriented pilot projects sponsored by various central agencies / departments are being implemented by the Council. **The following are the projects supported by central government agencies/organisations and** being implemented by the professional manpower of the Council

HIGHLIGHTS OF THE PROJECTS :

1. Hydromorphogeological Investigations in and around Jiribam, Manipur sponsored by H.R.Division, DST, Govt. of India:

Salient Findings : On the basis of lithology, structure and degree of denudational processes, the study area has been hydromorphogeologically classified into the units viz. 1. Alluvial Plais 2. Denudational hill (Residual Hill) and 3. Structural hill. The units such as structural hill and residual hill (denudational hill) act as run off. Degraded forest and shifting cultivation practice on the moderately steep slopes of structural hills cause more erosion. Recharge through weathered, jointed rocks are limited. Chances of ground water occurrence in this zone are very poor. Some springs occurring at the foot of these hills can be profitably utilised for limited domestic needs. About 120 lineaments were picked up out of which some lineaments could have geological impact over ground water occurrence for which further study is required.

Alluvial plains are the prospective zone in the area of study.. These zones consist of unconsolidated deposits comprising of gravel, fine sand, mixed with silt/clay favouring good scope for occurrence of ground water resources. Ground water occurs under unconfined aquifer system. Field Data collected from twenty nine inventoried dug wells reveals that the water table varies in the dug well varies from place to place in the study area. In the plains the water level varies from 1 m to 3m below ground level (b.g.l) where as in the slightly higher plains it varies from 3 to 6.6 m b.g.l. Some wells have direct intergranular link with the River environment i.e. when the level of the Jiri River goes down, the water level in the wells also goes down and vice versa . The fluctuation of water in such well goes upto 8.04 m. Most of the dug wells are shallow. Hence, water in the lean season is dry or lie at the nearest bottom of the well.

Suggestions and recommendations :

- i. The data generated during the two years project period was not sufficient to pin point the target area for tapping of ground water. However, the study could identify the broad prospective zones for ground water exploration. The area has good scope for development and exploration of ground water resources.
- ii. The depth of the wells could be increased provided unconsolidated deposits exist further downwards so that water would always be available in the wells during the lean period. Dug cum bore well can also be encouraged.
- iii From the survey experience of the PI, it was observed that the practice on safe groundwater utilisation in the area was almost nil . Awareness on use of safe drinking water for health was yet to be spread among the people particularly in the areas away from the Jiribam Town.
- iv. Yield of local springs have tremendously decreased as per villagers information. This will be perhaps due to excessive activities along the slopes thereby reducing recharge and increasing erosion. Programmes to conserve spring sanctuary are required.
- v Further research oriented study in the field is required to generate more geoscientific data for future planning of the area.

2. Pedal Operated Rice Mill sponsored by SSD, DST, Govt. of India

Salient Achievements :

Ten numbers of the prototype Pedal Operated Rice Mill have been developed and tested its efficiencies. The Mills were exhibited at the India International Trade Fair in New Delhi in the year 1999. The Patent has been filed for invention of the Mill. The National Invention Award was conferred to the P.I. of the project in honour of the prestigious invention of the Mill and the Award was distributed by MM Joshi, Union Minister, S&T and Human Resources on the observation day of the National Technology Day, May 11, 1999 in New Delhi. The Invention of the Mill has been included in the Limca Book of Records, 2001.(Booklet in printed form on Pedal Operated Rice Mill enclosed

3. Survey, Documentation and Validation of Infra-technologies for fishing crafts and gears in Manipur. sponsored by State Councils Division, DST, Govt. of India :

Salient Achievements :

Manipur is endowed with rich water resources as hill streams, rivers, rivers, lakes and wetlands. The biggest freshwater lake of India, the Loktak Lake (289 sq. km.) is situated in Manipur Valley along with numerous other wetlands covering an area of about 550 sq. Km.

Capture fishery in the hill streams is practiced through many harmful devices like poison and explosives. Both Culture and Capture Fishery in the Valley of Manipur are very active. However, the Capture Fishery in Manipur still remains a subsistence occupation due to unscientific methods. When there is a potential of landing 60,000 tonnes of fish in a year, the present landing is 15,000 tonnes against the demand of the state figuring above 22,000 tonnes.

Suggestions and Recommendations : The main aspects of craft and gears that need scientific attention are :

1. To give more stability and proper size and shape to the existing wooden dugout canoes for working in all weather conditions and with greater efficiency
2. Promotion of plank-canoes and boats to gradually replace the dugout canoes
3. Introduction of crafts of other materials like FRP
4. Causing a fishing gear revolution through changes in the crafts performance so that many of the present harmful methods and gears may be checked

4. Augmentation of productivity and quality of rural pottery and diversification sponsored by SSD, DST. Govt. of India

The project aims at

- bringing about an overall improvement in the productivity and quality of existing rural pottery which are unglazed, porous and fragile.
- diversification of product range especially in the production of Glazed Terracotta for creating new avenues for sustenance of rural pottery
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The project covers identification and mapping of flood prone areas and generation of a data base for use in landuse and flood management in Manipur Valley and suggestion of remedies to the present flood problems in the valley.

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The project aims at saving Ginseng in its natural habitat in Manipur from uprooting by the ignorant tribal folks through introduction of scientific farming in a lab-to-land practice. Micro-propagation of ginseng through tissue culture and intercropping with another medicinal Thalictrum will be involved. The project involves distribution of Ginseng seedlings to groups of tribal farmers for plantation in micro-watersheds on the hills of Manipur.



Panax pseudo-ginseng found in Manipur

6. Solar Passive Demonstration Building sponsored by State Councils Division., DST, Govt. of India.

The project aims at reducing dependence on electrical energy for building to half through systems integration of solar passive architectural designs in public and private buildings. The components of the project include 1. Training workshop for engineers and architects about energy efficient buildings and 2. Construction of a demo building with solar passive architecture at Imphal which will be used later as office by MASTEC.

7. Association of Women in Wasteland development in Taretkhul, Imphal East

District, Manipur sponsored by SSD, DST, Govt. of India:

The objectives of the project are

- to create awareness amongst the villagers about the ecological imbalance due to mass felling of trees for firewood, charcoa and shifting cultivation
- to impart technical knowledge to the villagers and village women about preventing the expansion of wasteland through classroom type teaching, field works, film shows etc.
- to demonstrate the success of afforestation projects operated through peoples participation, particularly women.
- To make the area evergreen and nature friendly through afforestation
- To supplement income through plantation and nursery seedlings
- Utilise of degraded land for plantation of trees over the next 4 years to reclaim the degraded community reserve land.

8. Manual Rice Transplanter sponsored by SSD, DST, Govt. of India :

The main objectives include

- . To introduce a new technology of manual rice transplanter in the state.
- To have a clear weed free environment of plantation.
- To obtain recommended row to row and plant to plant spacing plantation

9. Dialong Micro Hydel Project sponsored by State Councils Division, DST, Govt of India :

The objectives of the project are as follows :

- to demonstrate the use of the cross flow turbine developed by Indian Institute of Science (IIS) under DST, Govt. of India project in micro-hydel generation.
- to seek people's participation in micro-hydel project implementation and management
- to generate people's income through power dependent home scale industries difficult tribal areas.

19. Technology Demonstration and Dissemination System, sponsored jointly by DST, Govt. of India and CSIR, New Delhi

Objectives :

- i) Assessment of technology requirements in all the developmental sectors in Manipur.
- ii) Inventorisation of the existing infra-technologies in various occupations in the state.
- iii) Data referral system for available technologies developed by CSIR, DST and

several other establishment for dissemination to potential technology users in the state.

- iv) Procurement, demonstration and dissemination of appropriate proven technologies, machines etc.
- iv) Generation of Local situation specific technologies in collaboration with capable organisations.

Significant achievements : The project started on the 22nd December, 2000. Collection of data and information from various industrial sectors is progressing. A website is ready to launch shortly.

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