

**Proceedings of the
Assam Science Society
Symposium
on**



CO-ORDINATION

**of research activities in the north
eastern region of India with reference
to the mineral, agricultural and forest
resources of the region**



**Assam Science Society
Gauhati**

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Symposium

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FOREWORD

The Assam Science Society generally holds symposia along with its annual sessions. But the need for a separate session devoted specifically to discuss important scientific topics of current interest was keenly felt. This ultimately led to the holding of Mid-Term symposium for the first time in December, 1975.

The symposium on "Co-ordination of research activities of North Eastern Region of India with reference to the mineral, agricultural and forest resources of the region" was organised to bring together scientific workers of various organisations of the region. In the academic institutions, the scientific workers are engaged in study of fundamental and academic aspects, while their counterparts in other research institutions and organisations are mainly concerned with the applied aspects of the problem. Both types of studies are essential for the development of science. In order that research efforts are properly organised and integrated to achieve maximum rational utilization of our resources, co-ordination of research activities is necessary.

The Mid-term symposium was held primarily aiming at (i) finding out and evolving scopes for collaboration (ii) identifying particular projects and problems for joint venture and (iii) sharing of centralised technical facilities by all workers. The key-papers and other research papers presented at the symposium are given in this volume in three separate sections. The Society has also taken up the recommendations of the different groups of the symposium in a follow-up programme.

We shall think that our efforts have not gone in vain if the beginning we made here is continued by the future scientists and researchers working in various institutions and a team-spirit is developed in a congenial atmosphere for the ultimate benefit of the region.

Sd/- J. M. CHOUDHURY
President

ASSAM SCIENCE SOCIETY
1975-76

United Nations Educational Scientific and Cultural Organization
Regional Office of Science and Technology for South and
Central Asia and Office of the Chief of Mission in India.

Dear Dr Goswami,

The Assam Science Society is planning to hold a two-day Symposium on Co-ordination of Research Activities in the North Eastern Region of India with reference to the Mineral, Agricultural and Forest Resources of the Region at Gauhati on the 6th and 7th December, 1975.

I am glad that this Symposium is being organised to find out and develop scopes for collaboration in research activities between scientists and technologists working in the two sectors—one in the industrial and non-teaching research organisations and the other in the academic research organisations—to deal with problems related to the research and development of national resources. It is a very vital problem which concerns not only India but, by and large, the whole world.

Of all the natural materials used in man's productive activity, mineral resources are the most important; they become even more vital with the advancement of science and technology. Mankind will always face the problem of increasing demand for particular minerals and mineral resources in general. Co-operative efforts in science and technology based on the principles of equality and mutual advantage and aiming for a joint solution to such questions as the exploitation of mineral resources, the co-ordination of prospection and surveying programmes will play a very important role in solving this problem. India is one of those countries which are richly endowed with minerals. UNESCO is closely associated with mineral exploration and it has already organised two seminars on 'Geochemical Prospecting Methods and Techniques' first at Bangkok in 1963 and the second at Peradeniya in 1970.

Nearly 70 per cent of the people in India are dependent for their living on agriculture and allied sectors including forest resources. The co-ordination among the neighbouring States will help a long way in bringing an increase in agriculture and the utilization of forest resources.

In order to help scientists and scientific institutions in their research work, UNESCO has published under the series 'National Resources Research' 12 books and publications which also include 'Natural Resources of Humid Tropical Asia, 1974'. Man and the Biosphere (MAB) Programme of UNESCO also deals with problems such as 'Ecological effects of increasing

human activities on tropical and subtropical forest ecosystems' and 'Ecological effects of different land uses and management practices on temperate and mediterranean forest landscapes'.

I hope the deliberations of this symposium will yield very valuable results and the participants will find it useful through the exchange of their ideas and discussions.

I feel pleasure in extending, on behalf of UNESCO, our good wishes for the success of this Symposium.

With best regards.

Sd/- V. G. PODOINITIN
Director and Chief of Mission

Dr. A. K. Goswami
General Secretary,
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Gauhati-781001.

THE SYMPOSIUM IN A NUTSHELL

by A. K. GOSWAMI, *General Secretary, Assam Science Society,
and Organising Secretary, Mid-term Symposium, 1975*

and

P DATTA, *Organising Joint Secretary, Mid-term Symposium, 1975*

Introduction

The Assam Science Society organised a two-day symposium on "Co-ordination of Research Activities in North Eastern Region of India with reference to the Mineral, Agricultural and Forest resources of the region" at Gauhati in the Cotton College premises on the 6th and 7th December, 1975. The North-Eastern region of India abounds in a variety of natural resources which, when properly harnessed, can bring about all round development, not only of this region, but also of the country as well. Substantial research activities on these resources, particularly on mineral, agricultural and forest resources, are in progress in a number of research centres and institutions situated within and outside this region. It has been felt by all concerned that there should be intimate co-ordination between the industrial research organisations and government agencies on the one hand, and academic institutions of the region on the other. Such co-ordination will provide scopes for collaborations amongst scientists working in non-academic research organisations and those working in academic institutions towards identifying and solving problems connected with the development and utilisation of these resources. Till now there is hardly any communication between these two groups of research workers. The Assam Science Society organised the symposium with the hope that the deliberations would contribute substantially towards fostering a team spirit among scientific workers engaged in research and development in these two sectors.

The following were the objectives of the Symposium :

(1) To find out and evolve scopes for collaboration of research activities between the two sectors on topics relating to the above mentioned resources.

(2) To identify particular projects and problems which may be pursued as joint ventures, so that the academic institutions may look into certain aspects and the industrial research institution may look into other aspects. The two groups of workers may discuss from time to time various problems that may come up either way.

(3) To suggest establishment of some centralized technical facilities which may be shared between the two groups of researchers. These facilities

may be located at a National Research Laboratory centre and some of these may be placed at university centres.

(4) To identify inter-disciplinary areas related to the above resources and to suggest particular institutions (university/college/non-teaching research establishment) in which work in these areas may be pursued.

(5) To identify and suggest courses of curriculum related to the utilization and development of these resources to be introduced in the graduate and post-graduate levels in the universities.

The Symposium

The deliberations of the symposium were conducted in three sections, viz. Mineral Resources section, Agricultural Resources section and Forest Resources section. Separate technical sessions were held for each section. Besides there were an Inaugural session and a Summary session. The inaugural session was held in the Cotton College Auditorium, while the technical sessions and the summary sessions were held in the Physics department gallery of Cotton College. Dr H. K. Baruah, Vice-Chancellor, Gauhati University, acted as the General Chairman of the entire symposium.

Inaugural Session

The Inaugural Session commenced at 10-30 A.M. on 6th December, 1975 with Shri S. C. Sinha, Chief Minister of Assam as the inaugurator. Shri Ashraf Ali, Principal, Cotton College, while extending a hearty welcome to the scientists and researchers, expressed his hope that the deliberations of the symposium would help them to thrash out solutions, based on which prospective planning in perspective can be made to harness the resources of this region for productive purposes. Dr A. K. Goswami, General Secretary, Assam Science Society, laid out the specific objectives of the symposium (as enumerated above). He mentioned that the Society had been organising symposia on important scientific subjects every year as a regular activity during the annual conference. However, the annual conferences get crowded with a variety of programmes, like sessions on original paper reading, scientific exhibitions, open session and the like and hence, a long session of symposium on a single topic cannot be accommodated during the conference. The Executive Committee of the Society this year, therefore, decided that a mid-term symposium be held every year exclusively on an important topic with some specific objectives. The topic chosen for this year's mid-term symposium is related to the development and utilization of these most important natural resources of the north-eastern region of India. The Chief Minister, in his inaugural address, stressed upon the fact that the economic condition of the masses could not be improved if the natural resources in the region remained untapped. He hoped that the scientists would come forward to suggest ways and means so that the hidden wealth

could be explored and harnessed for the economic upliftment of the masses in the region. Delivering the keynote address of the inaugural session, Dr G. Thyagarajan, Director of Regional Research Laboratory, Jorhat expressed his hope that the major industries and corporations in the North Eastern Region would take the initiative of instituting research schemes and fellowships in the academic institutions and enable their participation in (a) investigating basic industrial problems of relevance and (b) developmental activities (for example, in respect of raw materials, process technology, equipments, techno-economic studies). He proposed that formal linkages may be created between the research institutions, universities and the industry so that specific areas may be identified, programmed and processed. As for the Regional Research Laboratory, Jorhat, he assured co-operation and participation in such ventures. He invited teachers and students to visit the Laboratory and observe the research methodologies and tools. Dr S. K. Baruah of National Committee on science and technology, Government of India, New Delhi, presenting the guest paper on "Research for industrial progress" observed that the research laboratories, universities and institutions and the user agencies must put their heads together to solve the problems so that the country as a whole can be benefitted by the experience. Presiding over the inaugural session, Dr H. K. Baruah, Vice-Chancellor of Gauhati University, opined that the economic imbalance in the region would have been removed if the vast natural resources available in the area were exploited properly. He said that although the region could boast of a number of universities, technical institutions and the like, yet the impact of scientific research has not been felt by the common people. Dr Baruah emphasized that there should be clear distinction between theoretical and applied aspects of research and appealed the scientists to apply the results of their research in their practical field. It may be worth while to mention here that a souvenir brochure under the editorship of Dr P. Datta was published for the occasion.

Section I: Mineral Resources

The Technical Session on Mineral Resources commenced at 1-30 P.M. on December, 6, 1975. The session was jointly chaired by Dr P. C. Mahanta, Senior Professor and Head of the Department of Physics, Gauhati University and Shri S. Chaliha, Deputy Technical Manager, Oil India Limited, Duliajan. The section began with the keynote paper presented by Shri B. B. Baruah, Officer-in-charge of the Coal Survey Laboratory of the Central Fuel Research Institute, Jorhat. He dealt with the history of Indian science and emphasized on the present need for co-operation, communication and team work in research activities. He remarked specifically that sharing of informations should be possible between the Geological Survey of India, Departments of Geology and Mining of the region, and the Geology departments of teaching institutes for correlation and compilation purposes. In addition

to the keynote paper, eight other papers were presented which emphasized the need of co-ordination amongst teaching, research and field organization departments in the fields of exploration, exploitation and beneficiation of the mineral resources such as natural gas and oil, coal, limestone, clay and ground water. The papers were very well received by the participants and there were lively discussions which brought out some useful suggestions for future follow up work in different areas. Following the discussions a sub-committee was formed which made the following recommendations as presented by sectional co-chairman, Sri S. Chaliha in the Summary Session.

(1) There should be close relationship between scientific and technical institutes, universities, R & D institutes, industry and government departments dealing with natural resources ;

(2) There should be identification of specific problems where collaboration is possible by mutual discussions amongst the specialists in the respective fields;

(3) The problems selected for such collaborative efforts should have a time bound programme so as to deliver the goods in time;

(4) Depending on the nature of the project, there should be financial involvements on the part of the participating organizations which will help timely completion of the programme;

(5) The universities should consider revision and modification of the courses of studies in subjects related to the natural resources keeping in view of the needs of the region;

(6). The committee felt that collaborative efforts can be initiated in the following fields;

- (a) *Petroleum and natural gas* : ONGC, Oil India Ltd., RRL, Jorhat, AOC, Directorates of Geology and Mining of the States and the university departments.
- (b) *Coal*: Coal India Ltd., GSI, RRL, Jorhat, CFRL, Directorates of Geology and Mining of the states, Geology department of Gauhati University and Physics and Chemistry departments of the universities.
- (c) *Limestone, clay and other minerals* : GSI, DGM, RRL, Jorhat, and the university departments.
- (d) *Ground water* : Central Ground Water Board, DGM, Geology and Chemistry departments of the universities.
- (e) *Geo-Chemistry* : Depending upon the problem, there could be co-operation amongst government departments, industries and field organizations on the one hand and the RRL, CFRI, and the various university departments on the other.
- (f) *Agriculture and forest resources* : The concerned government departments can be benefitted by helps from Biology, Chemistry and Geology departments of the universities, RRL, ICAR and DGM of different states.

Section II : Agricultural Resources

The Technical Session on Agricultural Resources began at 4-30 P.M. on 6th December and was carried over to the morning of 7th December, 1975. Dr. R. P. Choudhuri, Professor and Head of the Department of Zoology, Gauhati University and Shri S. Bhowmik, Adviser (Agriculture), North Eastern Council acted as Chairmen for this session. Shri A. K. Sarma, Director of Agriculture of Meghalaya presented the keynote paper in the session. In this paper Shri Sarma explained some of the burning agricultural problems of N. E. India and emphasized the need of co-ordinated research by workers of various disciplines. Altogether 15 papers were presented on a number of aspects of agriculture, animal husbandry and sericulture. Among the participants were two Japanese agricultural scientists viz. Dr T. Watanabe and Dr Y. Torigoe. From the deliberations it became quite clear that there is a great scope for collaboration in research activities between researchers in academic institutions like Gauhati University, Dibrugarh University, North Eastern Hill University, Assam Agricultural University and those in Government departments of Fishery, Sericulture and the Central Government research organizations located in the North Eastern region of India. The important areas and the projects in which such collaborative research should be conducted are :

(1) *Pests and disease managements in crops* : Departments of Chemistry, Zoology, Agri-Botany of Gauhati University, Assam Agricultural University and RRL, Jorhat.

(2) *Agro-ecological studies* : Departments of Geography, Physics, Zoology and Botany of Gauhati University and Cotton College, Assam Agricultural University, Agricultural Complex of ICAR at Shillong.

(3) *Tuber crops-(Potato, sweet potato, tapioca)* : Assam Agricultural University, ICAR Complex, Agri-Botany Department of Gauhati University, RRL, Jorhat.

(4) *Survey of live-stock parasites and development of control measures against them* : Faculty of Veterinary of Assam Agricultural University, Medical Colleges, Botany Department of Gauhati University.

(5) *Diseases of Muga and Endi worms*: Sericulture Research Station at Titabar, RRL, Jorhat, Microbiology Department of the Faculty of Veterinary of Assam Agricultural University and Zoology Department of Gauhati University.

(6) *Zoonosis* : Faculty of Veterinary of Assam Agricultural University, Medical Colleges and Zoology Department of Gauhati University.

Section III : Forest Resources

The Technical Session on Forest Resources commenced at 11 A.M. on 7th December, 1975. Dr (Mrs) P. Baruah, Retired Principal, Cotton College and Shri R. M. Das, Conservator of Forests, Assam acted as Chair-

men for the Session. Shri P. C. Goswami, Director of Soil Conservation, Assam, presenting his keynote paper, indicated that the luxuriant vegetation of the region resulting from favourable combination of soil and climate, needed scientific study in the light of development strategy. According to him, the research so far conducted, on different aspects of forestry is inadequate. Besides the keynote paper, 14 other papers were presented and each of them was followed by objective discussions. A committee was formed to draft suitable recommendations which were presented by the sectional co-chairman Shri R. M. Das at the Summary Session. They are as follows :

(1) The Flora of Assam needs urgent revision in order, not only to incorporate the correct nomenclatures, but also to include species since discovered. The work should be initiated by the Eastern Regional Circle of the Botanical Survey of India in collaboration with the Forest Departments of all the state Governments of the North Eastern region and the Botany Departments of the four universities of the region.

(2) Although considerable good works have been done on finding out industrial use of various parts including seeds etc. of different species with commercial potentialities, much needs to be done yet to bring these researches to their ultimate stages. The Regional Research Laboratory, Jorhat and the appropriate departments of the four universities may collaborate in formulating a suitable research project for this work. The respective Forest Departments may make available the required sample materials.

(3) The Assam Agricultural University should initiate steps in consultation with the Forest Departments of the region to establish a Faculty of Forestry.

(4) In view of the scarcity of raw materials for mechanical pulp, for newsprint production in the country and the abundance of many soft-wood species in North-Eastern India, the Regional Research Laboratory, Jorhat should start testing of potential species for production of mechanical pulp. The concerned Forest Departments should supply sample to the Laboratory.

(5) In order to assess the actual situation with respect to wildlife of the North Eastern Region and to formulate proper technique for their management, it is recommended that a wildlife research project be undertaken with collaboration of the following (i) Forest Departments of State Governments; (ii) Veterinary and Animal Husbandry Departments of State Governments and (iii) Zoology Departments of the universities.

Summary Session

The Summary Session of the symposium was held from 4-30 P.M. to 6 P.M. in which Dr H. K. Baruah, Vice-Chancellor of Gauhati University and the General Chairman of the Symposium presided. Shri Bipin Pal Das, Union Deputy Minister for External Affairs was the Guest of Honour of this

session. In this session, the Chairmen of the three sections of the symposium submitted brief summaries of the deliberations and put forward specific recommendations as mentioned above. In his address Sri Bipin Pal Das called upon the scientists and technologists to work for the development of labour intensive industries with minimum capital to solve the peculiar problems of the country. He maintained that blind imitation of western technology would not solve our problems. He felt that enough work had not been done to explore the natural resources in the region and attention should be directed towards the utilization of available resources. The Union Minister said that raw materials had become a vital question even in the matter of foreign policy of to-day. Decision on various policies in different countries were taken not only on political considerations as generally believed but also with consideration of natural resources for economic development.

The following general resolutions were unanimously adopted and recommended for acceptance :

(1) Resolved that necessary steps be taken by the Assam Science Society for co-ordination of research activities for the development and utilization of mineral, agricultural and forest resources of the N. E. region and for the realization of the objectives and recommendations of the symposium in consultation with the academic institution, industrial organizations, government departments of various State Governments and Central Government, the North Eastern Council and other concerned agencies.

(2) Resolved further that a follow up project be taken up by the Assam Science Society to collect and compile up-to-date information and data on the natural resources of the entire N. E. region for the general information of the academicians, technologists and planners and to survey the potentiality for further utilization and development of these resources.

Dr H. K. Baruah, in his address, put forward some ideas on collaborative research between different organisations. The session as well as the Symposium came to a conclusion with the vote of thanks offered by Dr N. N. Siddhanta, Working President of the Assam Science Society. It is a pleasure to record that a good deal of enthusiasm has been generated by the Symposium and has given encouragement to the Society to go ahead with the follow-up work as suggested in the above two resolutions.