

The background of the cover is a photograph of a desert landscape. In the foreground, a river flows through a valley. The middle ground is filled with various types of cacti, including tall, columnar ones and smaller, bushier ones. In the background, there are rugged, rocky mountains under a clear blue sky. The title 'ENVIRONMENT AND CHANGE' is printed in large, bold, yellow letters with a black outline, centered over the top half of the image.

ENVIRONMENT AND CHANGE

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Edited by
Ravindra Pratap Singh

Environment, the sum total of our surroundings, is under constant change mainly due to human actions, reactions, greed for exploitation and lack of desire to replenish it. As such, the life giving elements have turned destructive for the mankind affecting his very survival over the planet.

The volume contains the studies of various scholars and experts analysing environmental problems, ecosystem management, global temperature, deforestation and shifting cultivation, biodiversity conservation, medicinal plants, soil profile, water harvesting, fish fauna, river basin planning, science, technology and community, wetland management, environmental education and impact of population growth on environment, etc. Pertaining to the state of Manipur in particular and rest of the north-eastern region and the country in general.

A must reading for all those interested in the study of environment, ecosystem and ecological planning of the most fascinating tract of India.

Rs. 300.00

RAVINDRA PRATAP SINGH is Professor of Geography in Manipur University, Imphal where he chaired the Department of Earth Sciences during 1984-92 and Department of Geography since then. He also taught at D.M. College, Imphal during 1964-84. A large number of scholars obtained their Ph. D. Degree under his guidance in varied fields ranging from geomorphology to regional development and tourism. Prof. Singh got his Master's degree in Geography from Allahabad University and Doctorate in Geography from Vikram University, and was elected a Fellow of Royal Geographical Society, London. Besides being the Hony. Secretary of the Indian Institute of Public Administration, Manipur Branch, he is closely associated with a large number of learned societies in the country and abroad. His earlier published works include : *Electoral Politics in Manipur*, *Geography of Manipur*, *Geography and Politics in Central India* and *Integrated Area Development Planning* and over 40 papers in leading geographical journals. His forthcoming book is *Geography of North-East India*.

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Ravindra Pratap Singh

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Introduction

Galloping strides in technocentric developmental progress of the human society has brought into sharp focus the dire need to protect and preserve the environment. This has even projected environment and development as antagonistic attributes *albeit* their complementary links. The socio-economic development and resource planners very often stumble at ecological backsliding when they overlook the environment friendly methods of development. But we need changes for development. Acting as agents of change for betterment of mankind, it is the responsibility of the planners and administrators to conceive, plan, advise and implement development projects which may be in harmony with the environment. It is, therefore, necessary to place development-environment issue in proper perspective and assimilate the environmental ethics of development in the socio-economic transformation of our habitat.

These perspectives formed the backdrop of two consecutive seminars on Environment and Development and Science and Community Development organised by the Indian Institute of Public Administration, Manipur Branch in the closing segment of the 20th century. For harmonious and sustainable development of the ecosystem there has to be complementarity between the environment and change. As such, there is need for the protection, preservation and conservation of environment for betterment of all. This book is a collection of papers presented in the two seminars excepting for the three papers contributed subsequently by H.N.K. Sarma, B. Prasad and H. Tombi Singh and L. Arunkumar on the request of the editor.

In his paper "Environmental problems and a viable remedy" L. Achaw Singh has highlighted the differences in the attitudes of the rich and poor nations of the world towards global environmental issues. The rich nations are the main polluters and the cost of the affluence-induced pollution is being borne by the poor third world countries. In light of the meagre physical

achievements in irrigation and power generation sectors he suggested for a cost-benefit analysis of the Loktak Project and a stringent environmental appraisal of the programmes of the Loktak Development Authority and the proposed Tipaimukh Dam.

Arun Kumar Singh in his paper "Environment and development in third world" reported about the main issues at the Earth summit held at Rio-de-janeiro and stressed on the need for a compromise between the developed and developing countries of the world. In his paper "Effect of trace gases in atmosphere on global temperature" P. C. Nigam highlights, the role of various agents of atmospheric pollution resulting in the green house effect and ozone depletion. He also draws the attention to the air pollution of Imphal city by auto-exhaust gases.

How environmental issues go wrong when misplayed with wrong intentions is the major theme of the paper "When environmentalism misgoes" by R.K. Shymananda Singh, who opines that conservation is the best compromise between environment and development. He pleads for the thorough review of the Loktak Development Authority plan for the lake management for improved ecosystem in the lake environs. In his paper "Ecosystem management" R. K. Shukla stresses the need for conservation, protection and preservation of the ecosystem to make the human living on the planet earth fruitful, prosperous and happier.

Asha Gupta in her paper "Rare plant resources of Manipur and their conservation" identifies seven categories of zoologically important plants of the state. She pleads for the protection of the biotic resources as an essential part of the conservation of fragile ecosystem. In their paper "Deforestation and shifting cultivation in Manipur" P.S. Yadava, N. Sanjay and Th. Bhogen outline the scenario of *jhuming* and deforestation in the hills of Manipur and suggest the measures to check the menace of poor land management.

Highlighting the causes and effects of a rapidly drying river over a plain-area N. Ram Singh stresses on the need for an urgent scientific investigation and management of the Wangjing river basin in his paper "Impact of Wangjing river on its surrounding area". In her paper "Environmental Education in

Manipur" M. Shanti Devi stresses on the need for both formal and non-formal system of education and for making the course structure more situation specific and concerned with improved quality of life as well as environment.

Science and technology are intertwined with community to such an extent that the people in absence of scientific temper lead a poor life. R. K. Gartia in his paper "Science, technology and community" highlights the impact of science on energy resources, transport and landuse pattern with stress on bio-processing.

L. Usharani and Asha Gupta in their paper "Biodiversity conservation and sustaniable agriculture" emphasize the need for exploiting new plant resources with help of biotechnology for enhanced cropping intensity, conservation of genetic resources and improved agricultural practices to save the biological wealth of our planet. The physico-chemical properties of the hill soils in Manipur and their problems form the backdrop of the paper "Soils of Manipur hills : their management for sustainable agriculture" in which Kailash Kumar describes the strategies for sustainable crop production with emphasis on discouraging the shifting cultivation and its possible replacement by an alternate integrated farming system relying heavily on green manuring and a mix of leguminous and non-leguminous crops.

Daisy Angom in her paper "An integrated approach for wet land management" describes the causes, consequences and impacts of altered wetlands and suggests the measures for protecting, conserving and enhancing their biological diversity. She pleads for making the development of wetlands an integral part of watershed manegement for reducing flood losses, enhanced water supply and pollution control.

The scientists, particularly geographers, have an important role in management of the community development programmes. Ch. Shantikumar Singh in his paper "Geography and community development programmes" emphasizes on the vital role of geography in planning for agriculture and animal husbandry, rural industry, communications, health and education, housing and employment and social and cultural development in the process of transformation of the countryside. In his paper "Community services in Manipur hills" Th. Nabakumar Singh describes the tribal

habitat of a fascinating tract with special emphasis on availability of social infrastructure and impact of conversion to Christianity. He also underlines the factors responsible for slow progress of the developmental activities in the hill areas of Manipur.

P. Kumar Singh in his paper "Medicinal plants in Manipur" presents a floristic profile of the state and the phytochemical appraisal of its medicinal plants. According to him the medicinal herbs which were known to the people since olden days, have an important role to play in planning the healthcare programme in the state.

Women constitute about half of our population. As majority of them are rural, poor, illiterate and engaged in agricultural work, they need to develop a scientific temper with better skills to participate actively in the process of socio-economic transformation. This was strongly emphasised by Ksh. Bimola Devi in her paper "Women, science and community development". As many parts of the country face the problem of water scarcity, there is need for proper water management in the critical watersheds. N. Gaganchand Singh in his paper "Water harvesting for community development" deals with the proper conservation and constructive uses of water including waste water for its use for agricultural, domestic and sanitary purposes. He also suggests measures for solving the problems of water scarcity in the state.

In his paper "Environmental degradation and ozone problem" H.N.K. Sarma emphasizes on the major sources of environmental damage like deforestation, land erosion, flood havoc, pollution, acid rain etc. besides destruction to the ozone layer, which are extremely important for human survival. The implications of ozone depletion and its environmental consequences have been highlighted in the paper.

R.K. Ranjan Singh describes the impact of population growth on the environment in Manipur in the backdrop of depleting natural endowments affecting the quality of water, air, flora and fauna, so important for human survival. In his paper "Population growth and environment in Manipur" he refers to the larger issues like degradation of Loktak lake, energy situation, and massive deforestation which can be tackled by adopting an appropriate and suitable forest policy which in turn will rehabilitate the state

ecology and economy.

Y. Imo Singh in his paper "Soil, landuse and conservation" portrays the human modification processes of the landscape in various ecosystems - mountain, hill and valley affecting the environmental balance. He justifies adoption of a rational approach to resource utilisation for achieving sufficiency in food and suggests various measures for controlling soil erosion with better silvi-pastoral programmes on the threatened hill slopes. R. K. Somorjit Singh in his paper "Healthcare planning" describes the geographical factors, both biotic and abiotic, which affect the geocology and help in incidence of diseases and viral spread. He emphasizes the need for proper understanding of the environment, its constituents and their impacts on our life, its survival, fitness and health.

In his paper "River basin planning for sustainable development" R.A.S Kushwaha talks about the process of sedimentation and its management for maintaing the long-term storage of water in the reservoirs through check dams, peripheral bunding, water harvesting, and hydraulic flushing and dredging. He suggests a large number of measures like contour trenching, contour cultivation, construction of water harvesting structures etc. for sustainable development and optimum utilisation of water resources.

B. Prasad in his paper "Biodiversity and ecofriendly insecticides of the future" highlights the impact of biodiversity on the survival of living organisms as it provides all the human requirements like food, shelter, clothing, medicines, etc. He describes the ecofriendly biopesticides and their usefulness in integrated pest mangement for protecting the biodiversity and environment for safe survival of all living organisms and socio-economic well-being of the humankind.

In "Health status of the North-East" Laishram Ladu Singh describes the age pattern of mortality with special emphasis on infant and child mortality, which happens to be a sensitive indicator of overall development. He further talks about the role of science and technology for improving the health status of the people living in the Northeast.

H. Tombi Singh and L. Arunkumar in their paper "The fish

fauna of Manipur" describe the fish collection from the lakes and rivers of the state, which include 173 species belonging to 73 genera, 28 families and 11 orders, of which at least 20 species are endemic to the region and the rest are the upstream migrants through the Chindwin and Barak river systems. The paper is of special interest for those who wish to know more about the varieties of fish found in the waterbodies of Manipur.

The deliberations in the seminars laid emphasis on the renewability of earth resources, control of population growth, scientific management of ecosystem and value-based education to the youths for developing the will to do things good in harmony with the environment. The role of science and technology in developmental aspects, biodiversity conservation, wetland management, medicinal plants, water harvesting, river basin planning and fish fauna of the state etc. were thoroughly deliberated upon by the scholars to bring in an awareness about the exploitation of the natural resources for the betterment of the habitat and inhabitants of the state of Manipur as well as the north-eastern region of the country.



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