Sciences, Indian Institute of Technology, New Delhi have specifically been mentioned. This Centre has been recently set up in response to the directive from the Planning Commission and the Ministry of Education for the creation of infrastructure in areas of emerging technology during the Sixth Five Year Plan. This Centre is giving special emphasis on Mathematical modelling in Meteorology, Oceanography and related areas in Fluid Dynamics. Some of the achievements of the Centre are as follows.

The general circulation modelling of the atmospheric flows with special emphasis on the Indian Summer Monsoon motivated the scientists of the Centre to develop a global model. The model is named as the Monsoon General Circulation Model (MGCM) and is installed on the CYBER system of the National Informatics Centre, New Delhi. The model can eventually, be used both for climate simulation studies and the medium range weather prediction purposes. Very recently the model has been run successfully on real time basis during the 1985 monsoon onset period. This real time experiment was performed with the help of operational scientists of the India Meteorological Department.

A numerical model has been developed for the prediction of storm surges associated with severe cyclones in the Bay of Bengal and Arabian Sea. The model is presently being used on real time trial basis to examine its feasibility in operational forecasting.

A static model (the so-called Gaussian plume model) has successfully been used to determine the concentration of SO_2 in the city of Agra and Delhi due to domestic sources. The model has also been used for determining the concentration of carbonmonoxide due to varying traffic pattern in Delhi. A mathematical model has also been developed and used successfully in computing the concentration of MIC which leaked out of the Union Carbide Plant in Bhopal.

The research in cardiovascular Fluid Dynamics is motivated by the desire to understand the origin and propagation of the arterial disease – atherosclerosis. The mathematical modelling study suggests that fluid dynamics of the blood flow is responsible for the deposition of fatty particles at some preferred sites on the arterial wall.

Models based on the physical laws for the combination of physiological gases with blood have also been developed for determining the amount of O_2 and CO_2 carried out by haemoglobin.

Chemistry

Aspects of Bio-inorganic and Bio-organic Chemistry related to Environmental Pollution by M. M. Taqui Khan, Central Salt and Marine Chemicals Research Institute, Bhavnagar 364 002

The industrial progress of man in the present century has brought him enormous dividends in terms of comforts of life and other amenities. Thus humanity has seen a spectacular increase in food production, exploitation of various resources on the earth crust and the sea and larger and quicker methods of transportation. The negative implications of industrial growth however has been two factors that have affected the society and the environment. The first factor is the very nature of an industrial product which may be hazardous in nature; like radioactive substances, chlorine or more recently the MIC gas in the Bhopal disaster. Secondly, any major industrial operation is associated with the waste material that has to be disposed off. If this is done without a thought to the capacity of the environment to absorb and disperse safely this material, the result is an ecological disaster and impairment of the quality of life of the community. Uncontrolled disposal of waste has polluted many rivers and destroyed the marine life. The gaseous discharge from large factory complexes pollute the atmosphere and seriously effect the flora, fauna and the health of the inhabitants.

The chemical aspects of environmental pollution mostly deal with the build up of the concentration of toxic compounds in the environment. This causes disturbance in the echo system in terms of an increase in the concentration of toxic metal ions and organic compounds beyond their natural levels in plant and animal life as well as air, water, soil and sediments. There are three general routes by which man has disturbed the natural balance through pollution.

1. The introduction of abnormal amounts of metal ion and metal complexes of toxic elements like mercury, lead and cadmium in one or more parts of the ecosystem referred to as the bio-inorganic aspects of pollution.
2. The introduction of synthetic compounds like pesticides, toxic effluents or abnormal level of natural organic compounds in the system, referred to, as the bio-organic aspects of pollution.
3. The introduction of toxic gases like carbon dioxide, oxides of sulfur and nitrogen in the atmosphere, depletion in the level of ozone and hazardous radiochemical and photochemical changes in the atmosphere.

The remedial measures to be adopted to control pollution depends on the degree of awareness of the society towards these problems and the cost/benefit economic ratio in the treatment of industrial effluents, liquids and gases. Even if this ratio is tilted more on the cost aspects, the programme of a clean environment has to be implemented in order to pass on a better world to live in for our future generations.

Psychology and Educational Sciences

Psychological Dimensions of Environmental Management by Uma Shankar, Psychology and Educational Sciences, Management Development Institute, Jeevan Tara Building, New Delhi 110001.

Primitive man worshipped nature whereas modern man armed with science and technology considered himself as the master of nature. With the growing needs of man today, the pace of interference with the environment increased. This has led to the present-day environmental crisis.

There is need to manage the environment for improving its quality for the benefit of mankind. Since environmental degradation has resulted due to human intervention, man's attitude and behaviour need to be studied by psychologists. Hence environmental psychology emerged as a distinct field of psychology to study man in his natural setting. This requires an interdisciplinary approach. Because of complex nature of physical settings within which human activitiy occurs, our task is to develop research techniques which are sensitive to this complexity. About two decades after the emergence of environmental psychology as a discipline, the results of research are applied to various environmental projects. However, the integration of psychological findings and planning is a slow process.

Maintaining and improvising the quality of the environment which also includes the quality of life have been established as the major aims of public policy at national and international levels. Despite the energy crisis, high inflation, economic recession and increased levels of unemployment, there is growing public concern about conservation of natural resources and the protection of the environment. Besides the environmental hazards of industrial activities such as Bhopal gas tragedy are matters of utmost public concern and require strict implementation of environmental legislations. The solution to environmental problems can be of two kinds; preventive and curative. Environmental management, therefore is a challenging task and involves developing innovative approaches, such as impact of technology on the environment; encouragement of public participation in planning new projects; prediction of future trends in environmental management etc. Social scientists and others should view environmental management from a wider perspective and conduct meaningful studies to arrive at realistic remedial measures in our everchanging and dynamic universe.

Agricultural Sciences

Optimising Soil Environment for Sustained Agricultural Production by N. N. Goswami, Dean and Joint Director (Education), Indian Agricultural Research Institute, New Delhi 110012.

By 2000 A D, India will have to produce 225 million tonnes of foodgrain for feeding the projected population of around 936 millions. This target can be achieved by bringing more area under cultivation and/or increasing the production efficiency per unit area. Out of 328 million hectares of geographical area, 175 million hectares are subjected to serious erosion hazards, shifting cultivation, waterlogging, salinity and alkalinity, etc. Annual losses of arable land through soil erosion alone are estimated at 4 to 7 million hectares with an estimated soil loss of 6000 million tonnes. Salt affected soils, which are unfit for cultivation, account for 7 million hectares and the dangers of fertile soils turning into potential salt affected soils have increased with the developments of net work of canal irrigation system. Thus, area under cultivation is dangerously shrinking as a result of either natural catastrophies or man made calamities like deforestation and inefficient utilization of production inputs. Hence the viable alternative at present is to increase production per unit area.

This will become possible only with the adoption of high production technology, often with enormous stress on soil fertility. Increased production is associated with greater degree of exploitation of the soil and increased use of water, fertilizer and pesticides, all of which unless efficiently and judiciously used can lead to land degradation and environmental pollution.