The Conceptual Context of the Present Study

The conceptual context of the present study is rooted in the ever-increasing concern felt throughout the world over the deteriorating quality of the environment and the resultant imbalance and disruption in the natural ecosystems and destruction of valuable natural resources. There is a growing awareness that scientific and rational management of the ecosystem is essential for the preservation of the biosphere so that posterity may not point an accusing finger towards the present generation for depriving them the means of enjoying the gifts of nature. Scientific management of the environment is, therefore, much more than merely a matter of purely academic interest.

The environmental problem in India, with special reference to developmental issues, is becoming more and more serious with the passage of time. This is largely the result of unplanned and excessive exploitation of renewable and non-renewable resources. Such exploitation and development has naturally led to environmental problem in the form of environmental degradation. As a result of tremendous increase in population there has been a corresponding increase in
the scale of human interference in the ecosystem. The consequence of this can be quite serious. It is imperative that man's interference in the ecological balance of nature must be kept within the tolerance limit of the ecosystem so that a healthy environmental life support system can be maintained. The environmental problem in India stems from the contradiction inherent in the twin processes of 'development' and poverty. There is a need for an imaginative, enlightened and coordinated approach to these problems so that the removal of underdevelopment and poverty does not adversely affect the environment and the ecosystem. The development practices and policies will have to be reoriented in such a way that the quality of the environment is maintained for the well being of the society. Development should be "operation-alized through a triangle of forces where in nature/environment lays down the limits of freedom and indicates direction of optimal advances where in technology extends the area of freedom within the general orbit of necessity and wherein institutions are conducive for or restrictive of man's interaction with nature through technology. In every country, therefore, it is essential to adopt measures for the preservation and protection of the natural environment and their planned and rational exploitation. In this context the study of anthropogenic impact and its monitoring is very necessary.
The environmental impact of the proposed developmental plan of action must be assessed in terms of: a) whether the commitment of resources involved is irreversible or irretrievable, b) whether the local and short-term use of the environment is compatible with the long-term productivity and stability of the ecosystem and c) is there a more rational alternative plan of action available.

Environmental management and planning obviously calls for a multidisciplinary approach as the environmental development research covers a wide range of problems involving interaction between society and environment. This necessitates an integrated approach in which geographers have a legitimate role to play. Geographers have a long tradition of conducting research into environment and resource related problems and the role of anthropogenic factors there in at different levels of interaction: local, regional and global. Although the environment is the core of geography it is surprising that Indian geographers, barring a few exceptions, have not interested themselves in the specific problem of environmental management. It is, therefore, high time that Indian geographers engage themselves in this challenging task. The present study is an humble attempt in that direction.
Statement of the Problem

The present study aims at analysing the problem of environmental degradation under the impact of anthropogenic forces at a micro-regional scale. The unit of study is the Dal lake, situated in the heart of the Valley of Kashmir, in the State of Jammu and Kashmir. Though the lake is a very small one it plays an extremely important role in the socio-economic life of the valley and has traditionally been the centre of Kashmir civilization since times immemorial. It has always played and will continue to play an increasingly major role in the economy of Kashmir through tourism and agricultural activities.

This once beautiful lake, the life blood of Kashmir's economy and way of life is now threatened with total eutrophication. Already the lake has shrunk by half during the last 50 years and the present open water area does not exceed 12 sq. km which is but a remnant of the once extensive lake. This sorry state of affairs has been brought about by man's unwise interference in the lake's fragile ecosystem and irrational and excessive exploitation of it's resources. Deforestation of the catchment hillsides and irrational land use practices, increasing agricultural activities on the floating gardens and the resultant heavy intake of nutrient rich run-off, extensive soil erosion in the surrounding hillsides leading to siltation of the lake basin, increasing
pressure of population and settlements requiring reclamation of more and more area of the lake, hectic urbanization of the foreshore area and direct discharge of raw sewage from the lake side hotels and houseboats into the lake, luxuriant and rapid weed growth and increasing bacterial activities are some of the contributory causes responsible for the present ill-health of the lake. The problem of the lake's eutrophication is so serious that if corrective therapy is not undertaken without further delay the lake may disappear in about seventy to eighty years, leaving in its place stretches of swampy lands and pools of stagnant water.

In the above context the specific aim of the present study is to analyse the state of eutrophication of the Dal lake in terms of its physical, chemical, biological and human parameters. The indicators selected are: a) morphometry, b) water quality as reflected in temperature, dissolved oxygen, transparency, pH, nitrogen, phosphorus and hardness as calcium carbonate; c) sedimentation and d) biology as reflected in bacteria, phytoplankton and zooplankton, macrophytes and fishes. An attempt has been made to determine the present state of pollution and degradation in terms of each of the selected indicators. After doing this the study attempts to present a broad framework of corrective and ameliorative therapy and recommends a plan of action which if implemented, the author believes, will go a long way in
arresting the present rot and in restoring some of the pristine glory of the lake.

Methodology

The methodology of the study is rooted in the ecosystem approach. Every lake is an unmistakable and unique entity, assuming its character according to the geology, morphometry, climate, animal life in and around it and plants. Each, therefore, has its own life, its own destiny depending upon the interaction between the living community and its environment. The components of a lake ecosystem, for that matter any ecosystem, are so finely balanced in nature that any change anywhere leads to disproportionate cumulative changes, which if not checked and reversed in time may lead to the collapse of the ecosystem. The empirical data used in the study has been collected by the author during extensive field work spread over many seasons. The analysis of the data has been done in terms of the ecosystem concepts. The study has also had the advantage of drawing extensively from a large number of previous studies which have all been duly acknowledged at appropriate places.
Design and Organizational Framework of the Study

The study comprises six chapters with a supporting appendix and a bibliography.

Chapter I is in the nature of a general backgrounder, giving the regional setting of the lake. It presents the salient features of geography of the Kashmir Valley in which the Dal lake is situated. Chapter II deals with the principal components of the lake's ecosystem: morphometry, climate, chemical and biological limnology and the characteristics of the various catchments of the lake.

The III chapter analyses the problem of environmental and ecological degradation in the lake's ecosystem with particular emphasis on the pollution stresses.

Chapter IV and V deal with the human element in the lake's ecosystem. They analyse the impact of man on the ecology of the lake. The aspects discussed are: population and economic organization. In view of the great importance of tourism and recreation and their growing adverse impact on the lake's ecology an entire chapter(V) has been devoted to these activities.

The epilogue, which constitutes the sixth and the last chapter, contains the authors conclusions and suggestions for the maintenance and preservation of the lake as a viable ecosystem.