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Bio-Geo database and ecological modelling for Himalayas

Himalayas is one of the mega biodiversity regions of the world. It is also a major source of water for all the three major rivers (Ganga, Brahmaputra and Indus) of the country. However, due to development and other anthropogenic activities, there is immense erosion and damage to the natural ecology of the region. Over grazing, felling of trees and construction activities are commonly reported in this region. This in due course caused excessive soil erosion, landslides and floods. In this contest, an issue of major concern, in respect of this region, is to achieve balanced development of the region coupled with sustained conservation of the rich biodiversity.

An urgent need has been felt by planners to conserve Himalayan natural resources and the environment, particularly to prevent the damage to fragile and irreplaceable ecosystems. The economic backwardness of the mountain communities is mainly seen as a result of environmental degradation, especially that of land, water and forest resources. Thus, the solution to the economic backwardness of the mountains is seen in the perspective of conservation and protection of the natural environment. In order to address this concern it is imperative to study and analyse the problems in their spatial context. This necessitates the development of a comprehensive resource database in geospatial domain. The database is expected to be useful in the evaluation and monitoring of climate, snow cover, surface and groundwater systems, soils, landuse, forest, flora and fauna of the Himalaya.

Considering the above needs, the Natural Resources Data Management System (NRDMS) programme of the Department of Science and Technology initiated a coordinated programme entitled 'Bio-Geo database and ecological modelling for Himalayas' during 2002. The aim of this programme is to assess the potentiality of various natural resources for selected micro-watersheds of the ecologically vulnerable Himalayan mountain system, and thereafter building up of sustainable strategies for their economic development for the decision makers.

Under this coordinated programme, 25 multi-disciplinary and multi-institutional scientific teams from 21 institutions have worked together to achieve the defined objectives. The programme research-team comprised of several Central and State Government research and academic institutions preferably located within or close to the study sites in NW Himalayas. In this first part of the special section, a few of this coordinated programme's case studies have been discussed. The second part will appear later.

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Guest editors:
Himalayan Bio-Geo Databases–I

Ganges river dolphin

The Ganges river dolphin commonly known as susu is the only freshwater cetacean of India. It was given the status of National Aquatic Animal on 5 October 2009. It is found in the Ganges–Brahmaputra–Meghna, and Sangu–Karnaphuli river systems of India, Nepal and Bangladesh from tidal zone to as far up as the rivers are navigable. It never enters sea. It is a blind dolphin as its eye lacks crystalline lens. But it has a powerful echo-location. It is the only cetacean with caecum in its intestine and has many other primitive characters. It is considered as a living fossil. It is almost impossible to observe their underwater activities as they live in murky water. The Ganges dolphin cannot breathe inside water so it comes to surface for a fraction of second at an interval of 10 seconds to few minutes. Mean dive-time was 120 seconds, however, the highest dive-time was 465 seconds. R. K. Sinha *et al.* (**page 230**) studied surfacing behaviour of the species in natural habitat using focal-animal and *ad libitum* sampling protocols at the confluence of the Ganga and Gandak rivers near Patna, India.

Details of the surfacing and diving behaviour vis-à-vis several covariates in the free-ranging Ganges river dolphin are described. The species shows great diversity in surfacing pattern depending on various environmental factors. The six types of surfacing patterns were dependent on age-class and off-shore distance of the individual. Association of a majority of the diurnal surfacing patterns with underwater activities has been discussed.