In this issue

Sensing and mapping of biological resources for conservation

We have repeatedly demonstrated our incapability to conserve biological resources and this incapability seems to stem from an incomplete knowledge of *what, where and how* to conserve. We seem to be ungrudgingly living with almost a complete ignorance of *what* biological resources we have and *where* they occur but are acting with a typical arrogance that without these details it is possible to decide *how* to conserve them. Unfortunately the paradox is that we cannot be silent on '*how*' and be inactive till we completely understand '*what and where*' to conserve.

Probably this dilemma is best reflected in the changing emphasis on the spatial scales of conservation. To begin with, the whole forests were aimed to be conserved and hence were taken over under state control. In continuation with this, the concept of protected areas was developed. Of recently however, there are attempts to identify the hot spots at both global and at the national levels. Such shift in our spatial perspective is partly due to a lack of knowledge on the distribution pattern of our biological resources. For example, the concept of conservation parks or protected sanctuaries was proposed with a hope that they would conserve the most important biological resources. But today we are forced to seriously introspect on these decisions and we have begun to question the very basis of demarcating these parks and their efficiency in conserving. While on one hand, there are arguments against the strategy of fencing off the areas as conservation sanctuaries, on the other, there are a number of instances showing that the protected areas exclude certain patches with high conservation value. Thus conservation plans are contingent upon our understanding of the spatial distribution of biological resources; but this obviously is a challenging task demanding a high investment on human resources and other logistics.

Recent developments in the areas of Geographic Information System (GIS) and Remote Sensing (RS) techniques have opened new opportunities to develop and analyse the spatial distribution patterns of biological resources and also to monitor them. These tools have revolutionized the speed, the dexterity and the efficiency with which the biological resources can be mapped and managed. This issue of *Current Science* carries a set of papers demonstrating the use of GIS and RS in mapping, monitoring and management of biological resources.

Our country probably stores one of the best sources of data sets on the occurrence and distribution of biological resources in the form of thousands of theses and reports (with a substantial part probably unpublished), hundreds of herbaria, both private and public, and a number of published flora and fauna. Obviously these are gold mines of data on which we should be able to develop initial patterns of spatial distribution of our biological resources. The potentiality of these data sets in developing the biodiversity maps of the country is demonstrated by Ali and Ganeshaiah (**page 201**), Ved *et al.* (**page 205**), and Narendra Prasad *et al.* (**page 211**). These attempts are only preliminary and suggest the utility of bringing such data into GIS platform. Ganeshaiah and Uma Shaanker (**page 292**) call for a co-operative effort at the national level to share, collate, and utilize such data sets to map the contours of biodiversity for conservation. This process can also be augmented with the RS techniques as shown by Nair and Menon (**page 209**) in mapping the distribution, and estimating the stocks of bamboo resources.

Certain traditional practices, even in science, become so well entrenched that we rarely attempt to analyse the underlying assumptions and implications. For example, forest maps are prepared with distinct boundaries separating the different forest vegetation classes. These maps are propagating the erroneous view that the forest classes are discretely homogeneous patches with distinct boundaries among them. Analysing the vegetation data of a well-known sanctuary, Murali *et al.* (**page 220**) show that the forest classes are far from being spatially homogeneous and discrete. Their study shows that vegetation of one forest class diffuses gradually into another without any distinct boundary. They hence suggest an altogether different way of packaging the forest maps.

Forest cover alterations occurring through time are an important measure of the rate at which our biological resources are being lost. The patterns and consequence of these land cover changes are analysed using RS data and GIS techniques by Narendra Prasad (**page 228**) at the ecosystem level, by Dutt's group (**page 245**) at the forest level, by Ramachandran *et al.* (**page 236**) for the coastal regions and mangroves and by Sharachchandra Lélé (**page 256**) at the interface of forests and agro-ecosystems. While these studies demonstrate the utility of RS techniques to monitor the landscape changes, Harini and Madhav Gadgil (**page 264**) suggest the ways of utilizing the RS data to stratify the entire eco-regions such as the Western Ghats, on the basis of the vegetation indices.

Another use of RS data for drawing conservation plans is illustrated by Krishnamurthy and Kiester (**page 283**). A moderately sized population of lion tailed macaques (LTMs) requires a continuous patch of 131 ha as home range. Considering a 'safety factor' of two times this requirement as their foraging area and habitat size, they identify three patches for a possible reintroduction of LTMs in two sites in Karnataka using satellite data; of course there may be disagreements on the wisdom of reintroducing the LTM populations. Dutt and his group (**page 272**) offer another instance of an efficient use of RS techniques and GIS in Joint Forest Management (JFM). Efficient planning of JFM programmes is contingent upon a clear projection of the demands and supplies of the natural resources for the future. Dutt and his group offer one such analysis in Uttara Kannada using the remote sensing and other socio-economic parameters linked with spatial analysis.

Hopefully with more studies as those reported in the special section of this issue we will have a better spatial perspective of *what, where and how* to conserve. In the meanwhile it is very important to respond to the national need of developing the contours of conservation and biodiversity atlases as called for by Ganeshaiah and Uma Shaanker (**page 292**).

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Alzheimer's disease and cholinesterases

Diseases of old age are acquiring a new importance as the population of the elderly continues to increase the world over. Alzheimer's disease is amongst the most feared of afflictions of old age, with patients progressing from short term memory loss to conditions in which many aspects of intellectual functioning are affected. 'Senility', a broad general term that describes a general deterioration of brain function with age, is often used in pejorative sense, with little understanding of the complexities of the underlying neurochemistry. On **page 196**, Balasubramanian examines the connection between Alzheimer's disease and the activities of cholinesterases which are ubiquitous enzymes in the brain. The breakdown of the neurotransmitter acetylcholine by the enzyme acetylcholinesterase is a common occurrence in the cells of the nervous system. In Alzheimer's disease there appears to be a deficit of acetylcholine, leading to studies of acetylcholinesterase inhibitors as possible therapeutics. These include naturally occurring inhibitors leading the author to make the interesting suggestion that it might be worthwhile to study the anticholinesterase properties of Indian plants that reportedly enhance memory. While much research on Alzheimer's disease focuses on the amyloid peptides and fibril formation, clearly there are many alternative facets of the biochemistry of this disorder which merit exploration.

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