A RAPID ASSESSMENT OF BIODIVERSITY USING REMOTE SENSING/GIS TECHNIQUES IN MEHAO WILDLIFE SANCTUARY (Mishmi Hills) ARUNACHAL PRADESH

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S. Narendra Prasad
Principal Investigator

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Salim Ali Centre for Ornithology and Natural History
Kalampalayam COIMBATORE 641 010

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EXECUTIVE SUMMARY

A two year study during 1995-96 on a rapid assessment of biodiversity in Mehao Wild Life Sanctuary in eastern Arunachal Pradesh was conducted. The study made extensive use of modern spatial technologies of remote sensing and geographic information system.

An intensive quantitative field data on plant and bird faxa was obtained by sampling at altitudinal gradients of 200 m elevation. The altitude of the sampleing stations in Mehao ranged from a low of 400 to a high of 2600 m. The sampling was done based on a preliminary visual interpretation of 1:50000 scale geocoded IRS-IB false color composites. As the number of vegetation classes was found to be three, sample strata were designated as low, mid and high altitudes of < 1000, 1000-2000, > 2000 - m respectively.

A total of 41 plots of 0.1 ha were sampled for vegetation and 48 plots of 1 ha for avian diversity. In all 29 tree species in 45 families were sampled. In contrast, 134 avian species were recorded. The sampled tree and avian diversity is around 50% of the recorded check lists of species.

The observed field patterns on species diversity indicate higher levels of species diversity at an altitude of 1600-1800 m and low levels at 400-800 m and 2200-2600 m altitudes. The observed avian diversity broadly matches with that of tree species divesity. There are no clear zonation in the distribution of species or species communities except in

the low altitude broad leaved forests and high altitude conifers. The avian diversity was found to be at its peak at 1600-1800 m altitude. However, altitudes below 1000 m harbour higher number of feeding guilds.

A habitat categorisation was done using LANDSAT TM digital data in bands 2, 3, 4 and 5. Standard enhancement, band combinations, principal component analysis and image ratioing was carried out. These operations enabled a better descrimination of habitat categories. Supervised and unsupervised classifications were done to obtain a total of 18 categories. These included shadows, vegetation types, various land use categories etc.

A high fidelity digital terrain model was developed for terrain analysis. The variables of slope, aspect along with elevation formed three important physical variables of interest in predicting hotspots of plant diversity, vegetation succession, pheasant and endangered mammal habitat. GIS overlay analysis was extensively used in predicting these four thermatic features of relevance to biodiversity assessment and monitoring.

For the first time, use of ecological pattern analysis at landscape level was conducted on the classified digital images to gain an understanding on biodiversity issues of Mehao, in particular, and East Himalayas, in general. The issues relate to the patterns in richness, dominance, diversity, fragmentation, and realted indices across the altitudinal gradient. The issues addressed also include whether these indices support the patterns observed in field sampling and whether these indices serve as surrogate mesures to the

field measures. It is concluded that these indices have an important role to play in the assessment and monitoring of biodiversity.

A relatively new class and less used statistical tools that deal with spatial phenomena and regionalized variables viz., the geostatistical techniques were employed to decipher quantitative patterns observed in the landscape analyses. Variogram were constructed for the observed diversity patterns at low, mid and high altitudes. It is suggested tht results of variogram analyses be incorporated into new and as yet little developed and implemented methods of image classification for biodiversity related issues.

In order to monitor the changes in diversity, a simple but powerful index called Q index developed very recently was employed. It is shown that Q index tracks the species richness much better than the Shannon wiener Index H. It is also suggested that the new Q index be incorporated into the suite of ecological pattern analysis of classified digital images.

Finally, the report concludes with a suggestion on a remote sensing/GIS agenda for mapping, assessment and monitoring of biodiversity in Arunachal Pradesh.