



## Spatial modeling and preparation of decision support system for conservation of biological diversity in Orang National Park, Assam, India

ARP recently committed \$7,000USD to funding this important project. The following information comes from snippets from Pranjit Kumar Sarma, M.Sc of Aaranyak's proposal.

Computer-based Decision Support System (DSS) plays a very important role in making most decisions, whether it be in national defense, hazards management, risk assessment, urban planning, industrial set-up or socio-economic improvements. There is also tremendous application of information technology in biodiversity conservation planning. Conservationists and decision makers have been involved in gathering huge databases from species level to ecosystem level with the help of satellite Remote Sensing and Geographic Information System (GIS). Such alphanumeric information gives a scientific basis for decision-making. Remote sensing data can be interpreted in many ways and provides lots of input for biodiversity conservation. Information that can be directly interpreted from satellite images includes forest cover mapping, forest type mapping, ecosystem mapping (such as wetlands), watercourse mapping, settlement mapping, agricultural area mapping etc.

Most of the data related to biodiversity conservation are synthesized from different sources, compiled at different times, by different methods, and with different reliability. For rapid assessments of the status of biodiversity, researchers, conservationists and

policy makers must utilise these existing sources, but the problem remains of how to best utilise each of them for its strengths and to track areas of uncertainty or ignorance. In this proposed project an attempt has been made to identify the different habitat types of Orang National Park using geo-spatial tools and create a complete decision support system for the entire park, which will help the concerned park managers protect and manage the park in a more scientific way.

### Project background

Orang National Park, with an area of 78.8 km<sup>2</sup>, is situated in the Brahmaputra flood plain of the Darrang District of Assam, India. Orang National Park is an integral part of the Brahmaputra flood plain of Indo-Burma biodiversity hotspot. Orang National Park is rich in biodiversity. The key mammals in the park are Greater Indian One-horned Rhino, the Royal Bengal Tiger, Pigmy Hog, and Barking Deer. Orang National Park is one of the last strongholds of the Indian Rhino with a total population of 68 rhinos, as estimated by the state forest department of Assam in 2006. It is also potential habitat for Royal Bengal Tiger. Both migratory and local birds (Peacocks, Bengal Florican, Hornbills, King Fisher, Woodpecker, etc) are common in the national park.

So the importance of Orang National Park in respect of biodiversity conservation is quite high. Hence, a proper scientific approach to conserve and properly manage this area is of the utmost necessity.

But to date, comprehensive scientific research has not been used to manage the wildlife habitat as well as the resources available within the park. Similarly a systematic database on the resources available, habitat pattern and habitat utilisation by different species within the park is not available for proper park management. Considering all these factors the proposed project intends to study the habitat patterns and their utilisation by different species, niche overlap of habitat by herbivores and carnivores, and create a comprehensive geo-spatial technology based database for the entire park area to assist managers to manage the national park using sound information and applied science.

The habitat patterns and their utilisation by different species in the Orang National Park will be estimated using recent high resolution remotely sensed data (satellite imageries) as well as ground based data that will be collected from the study area during ground data collection period. At the same time a systematic database (infrastructure, habitat patterns, available resources, etc) will be created for the entire national park using GIS and GPS technology which will act as a decision support system in the near future to conserve the biodiversity of this important Indian national park.

### Project objectives

There are three major aims of the proposed project –

1. collect spatial and non-spatial information of the study area i.e. Orang National Park of Assam. The sources for this information will mainly use multi date remotely sensed data (satellite imageries), maps available from the Assam state forest department and other organisations, and field survey data as well as the information that will be gathered from people of the nearby villages of the national park.
2. createspatialmodelsusingGeographicInformation System, showing habitat characteristics and utilisation patterns by different species within the national park.
3. develop a Spatial Decision Support System (SDSS) for the entire national park, where all information,

like habitat types, habitat utilisation patterns of different species, sensitive zones for wild animals, risk zones for wild animal, etc, will be fed into GIS domain, which will help authorities make further plans to conserve and manage the biological diversity within the park in the near future.

### Project outputs

1. Habitat pattern map of Orang National Park will be prepared using remote sensing, GIS and GPS tools at 1: 25,000 scale.
2. Spatial distribution models for different species and their habitat pattern will be prepared using GIS tool.
3. Infrastructure map of Orang National Park will be prepared with road networks, forest camp locations and other important establishments well defined with proper geographical coordinate system.
4. A complete GIS-based spatial decision support system (SDSS) will be prepared using commercial GIS and image processing software ARC GIS 9.0 and ERDAS Imagine 9.0.
5. Four research papers will be published in national and international journals.
6. A comprehensive report of the work will be prepared and published and will make it available in public domain ([www.aaranyak.org](http://www.aaranyak.org)).

### Conservation outcomes

1. The final outputs of the proposed project will be shared with the Assam state forest department for further conservation, planning and management of wildlife habitat and resources of the park and this will also help the park managers to manage the park in a more scientific manner.
2. The project will be of immense importance for greater interest of the rhino conservation initiatives by the State Govt. of Assam, whereby rhino translocation and their subsequent restocking in Orang National Park from Kaziranga National Park and Pabitora Wildlife Sanctuary has gained tremendous momentum as a successful phase of rhino rehabilitation.
3. This project will provide baseline information of the different habitat patterns and their utilisation patterns by different species within the park and it will help to do further research at species level and their response to their habitat in future.

*Main photo: Greater One-horned Rhino in Orang National Park. Inset: Orang National Park. Photos: Pranjit Kumar Sarma*