

# Biodiversity Observation and Data Sharing India



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Indian Institute of Remote Sensing  
Dehradun, India

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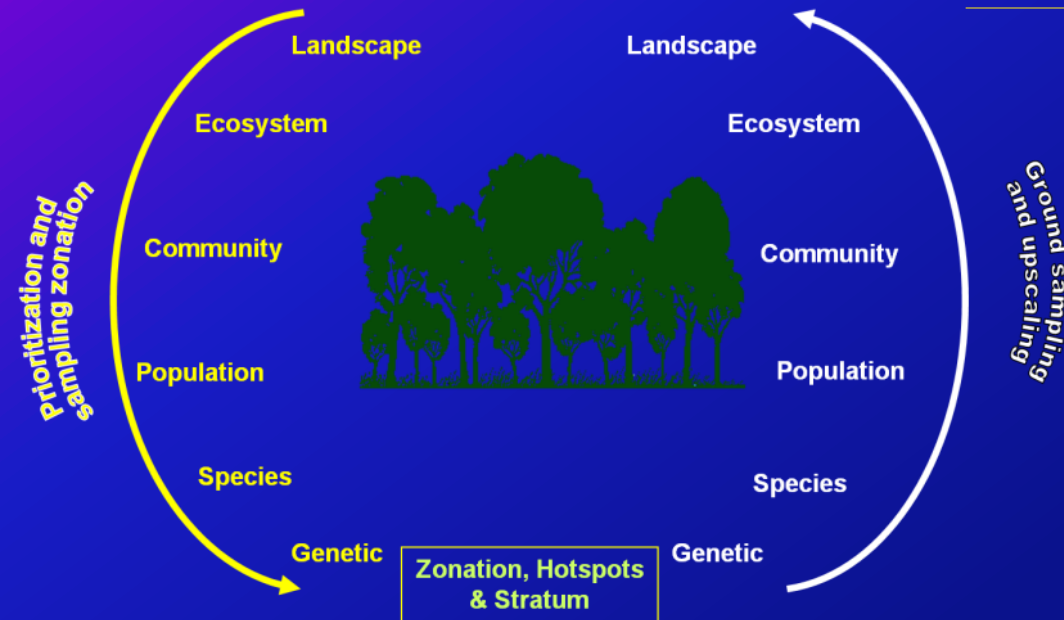
# Contents

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  - Scientific rationale
  - BIS (data, structure, metadata)
  - IBIN (data, structure, services)
5. Sharing of Databases for National Application
6. Future directions

# Biodiversity Characterization at Landscape Level

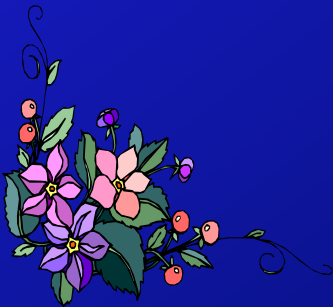
## "Gene to Landscape Mission"

National initiative of Department of Space and  
Department of Biotechnology under National Bio-resources Board



An effort of ..

- 61 Scientists
- 16 National Institutions
- 37 Universities/State level Institutions
- 56 Research Fellows



- **Wall-to-wall mapping of natural habitats** in compliance to several international conventions
- Identifying **ecologically vulnerable areas** and to develop **adaptation/ mitigation inputs** against the possible global and climate change impacts.

# Collaborative effort of 13 Years with 53 Institutions

## Contributors

### National Level Organizations/Institutions

National Remote Sensing Centre (NRSC)  
Indian Institute of Remote Sensing (IIRS-NRSC)  
Regional Remote Sensing Centre- Kharagpur (RRSC-E - NRSC)  
Regional Remote Sensing Centre- Bangalore (RRSC-S - NRSC)  
Regional Remote Sensing Centre- Jodhpur (RRSC-W - NRSC)  
Regional Remote Sensing Centre – Dehradun (RRSC-N - NRSC)  
Space Applications Centre (SAC)  
Advanced Data Processing Research Institute (ADRIN)  
Botanical Survey of India (BSI)  
Wildlife Institute of India (WII)  
Indian Institute of Technology-Kharagpur (IIT-K)  
GB Pant Inst. Himalayan Environment & Development  
World Wildlife Fund- India (WWF)  
Centre for Development of Advanced Computing (C-DAC)

### State Level Organizations/Institutions

Assam Remote Sensing Applications Centre  
Council of Science and Technology, Agartala  
Manipur Remote Sensing Applications Centre  
Maharashtra Remote Sensing Centre, Nagpur  
Regional Remote Sensing Laboratory, Bhubaneshwar (RRL-B)  
Orissa Remote Sensing Applications Centre (ORSAC)  
Environmental Remote Sensing Centre (ERSC) J&K,  
Department of Science & Technology, Imphal  
Department of Science & Technology, Gangtok  
Directorate of Agriculture & Minor Irrigation, Aizwal  
Punjab State Council of Science & Technology, Chandigarh  
Kerala Forest Research Institute (KFRI)

### Universities/ Post Graduate Colleges

Andhra University, Vishakhapatnam  
Annamalai University,  
Chidambaram  
Assam University, Silchar  
Berhampur University, Berhampur  
Calcutta University, Kolkata  
Goa University, Goa  
Dr. HS Gaur Vishwavidyalaya, Sagar  
Jammu University, Jammu

Kakatiya University, Warangal  
Kashmir University, Srinagar  
Sri Krishnadevaraya University, Anantpur  
Kurukshetra University, Haryana  
MGCG Vishwavidyalaya, Chitrakoot  
MDS University, Ajmer  
MLS University, Udaipur  
MS University, Baroda

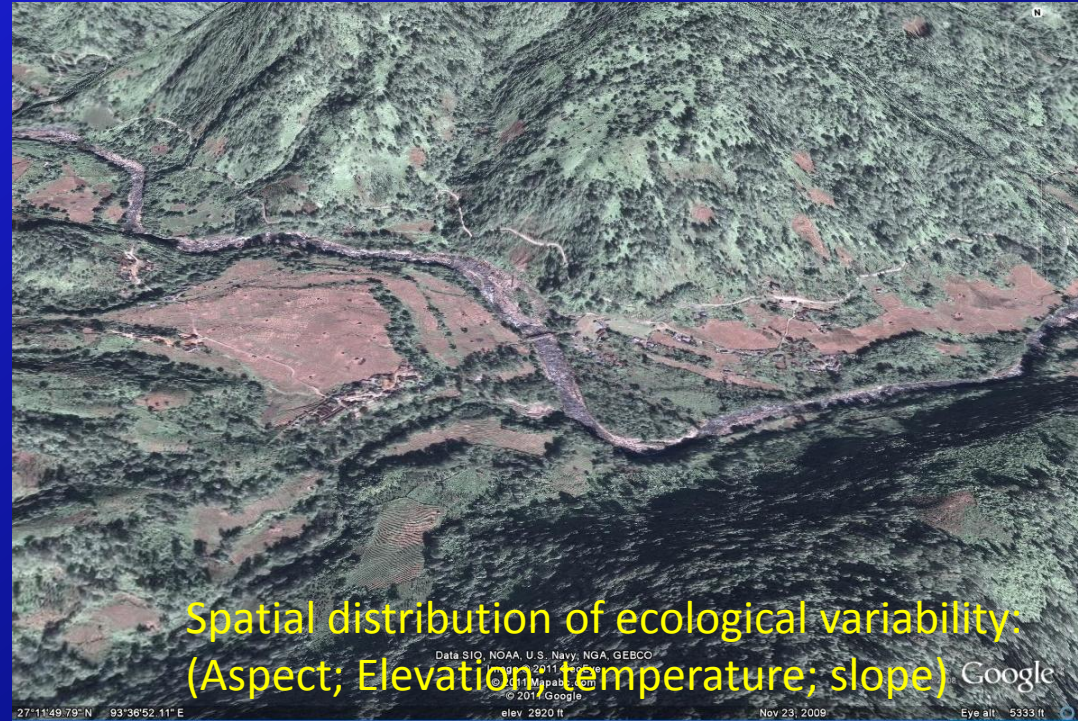
North Orissa University, Baripada  
North Eastern Hill University, Shillong  
Pondicherry University, Pondicherry  
St Joseph College, Trichy  
College of Forestry, Ponnampet  
University of Agricultural Sciences,  
Bangalore  
Utkal University, Bhubaneshwar

### All State/UT Forest Departments

# Landscape

Landscape comprises the visible features of an area of land, including the physical elements of landforms and human elements

- Different ecosystems make a landscape
- Landscape ecology deals with the **spatial distribution** of the different ecosystems, their **dynamism over time and space** and their **interaction**



**Spatial distribution of ecological variability:  
(Aspect; Elevation; temperature; slope)**

Source: Google earth

**Structural Component:** *Vegetation type/plant community, Biodiversity, distribution*

**Functional Component:** *Nutrient cycling, NPP, succession, influence of human activity*

Shaping of a landscape is influenced by



*dynamic landscape mosaics; resilience and thresholds; biocomplexity; adaptive cycles;*

# Drivers of Biodiversity Losses

At least 40 per cent of the world's economy and 80 per cent of the needs of the poor are derived from biological resources. In addition, the richer the diversity of life, the greater the opportunity for medical discoveries, economic development, and adaptive responses to new challenges as climate change.

## **Land use:**

- *Habitat degradation and depletion.*
- *Habitat fragmentation.*
- *Over-exploitation*

## **Climate Change:**

- *Global warming*
- *Changes in precipitation regimes*

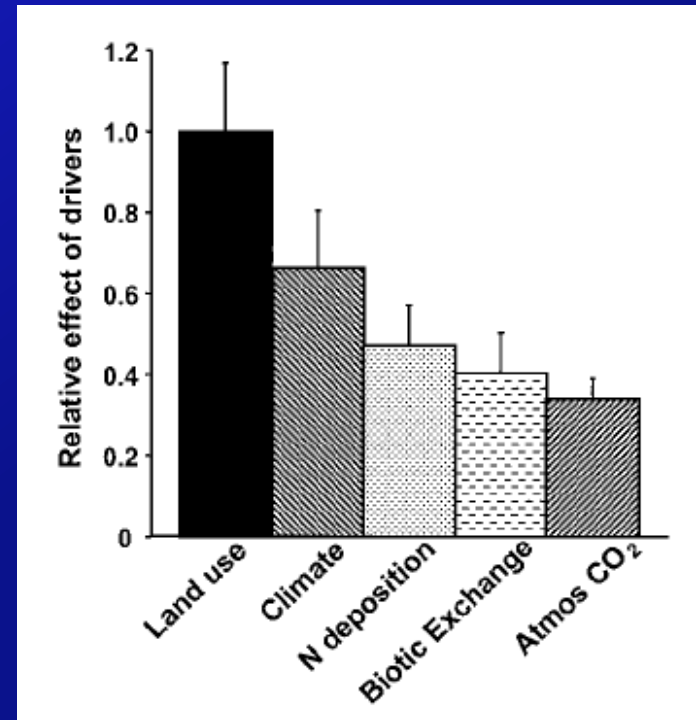
## **N deposition:**

- *Selective growth of species with efficient N-utilization*

## **Biotic exchange:**

- *Introduction of Invasive species*

Sala et al., 2000, *Science*



**Land use is the major driver for biodiversity loss in most regions of India**

# Why Biodiversity Characterization?

"Biodiversity is not simply the number of genes, species, ecosystems, or any other group of things in a defined area...A definition of biodiversity that is altogether simple, comprehensive, and fully operational (i.e. responsive to real-life management and regulatory questions) is unlikely to be found. More useful than a definition, perhaps, would be a **characterization of biodiversity that identifies the major components at several levels of organization.**

Reed Noss, "Indicators for Monitoring Biodiversity: A Hierarchical Approach," *Conservation Biology* 4(4):355-364. 1990:

## Attributes (proxies) of Biological Richness

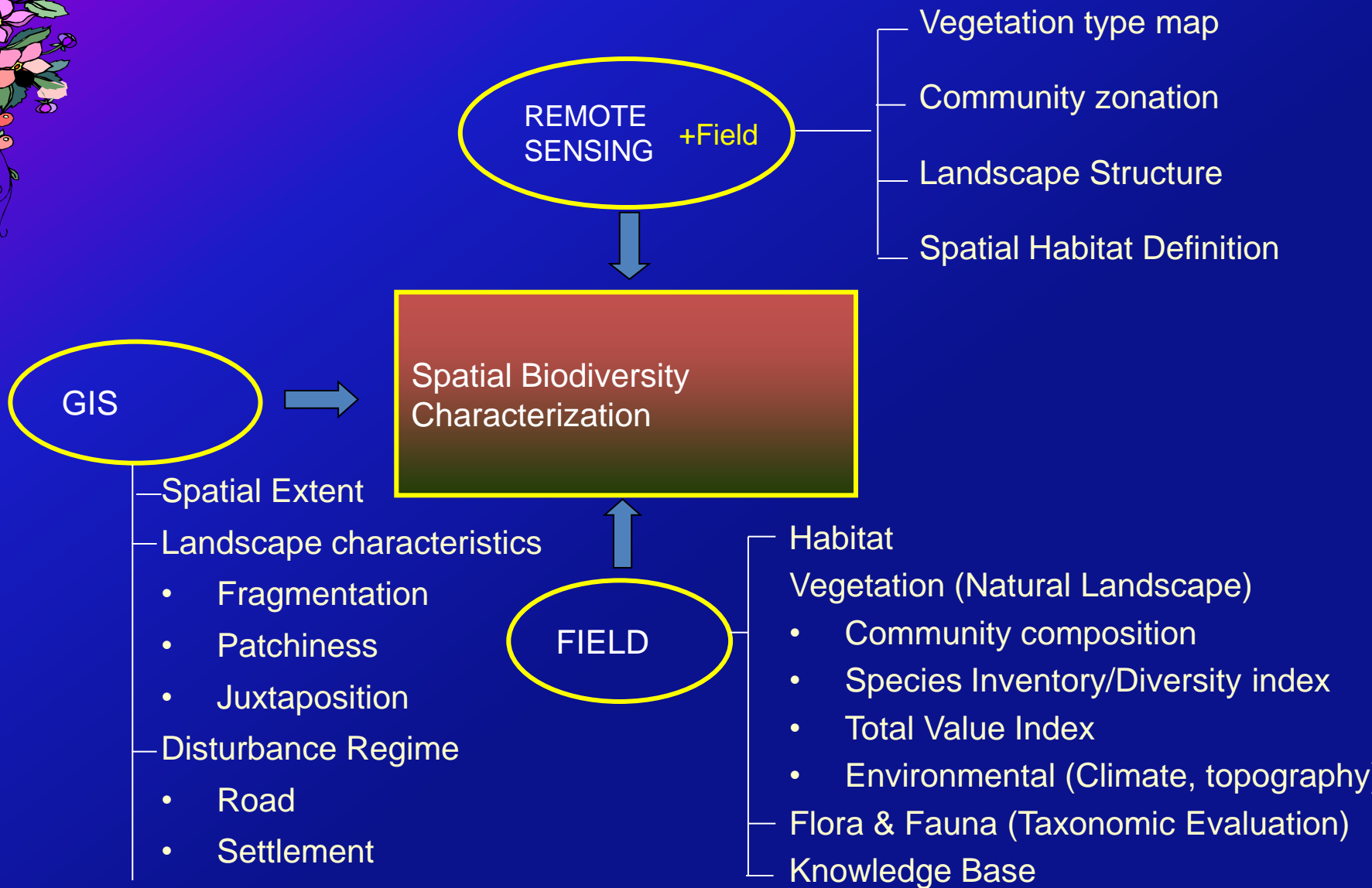
Climate; Terrain Complexity and Geomorphology

- Moisture availability
- Altitude
- Slope
- Aspect
- **landscape**

Studies have reported that if Altitude, slope, aspect do not vary much in a landscape then landscape variations like soil moisture account for more than 70% the vascular plant diversity

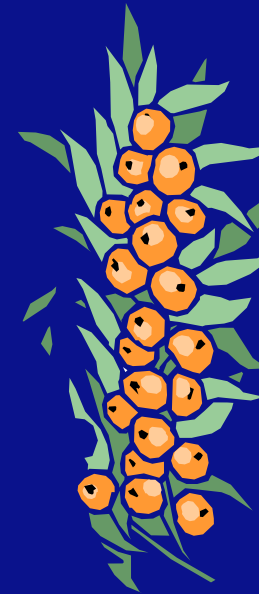
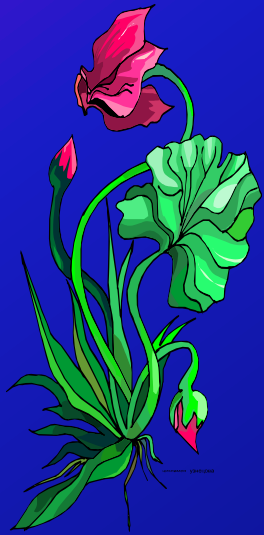
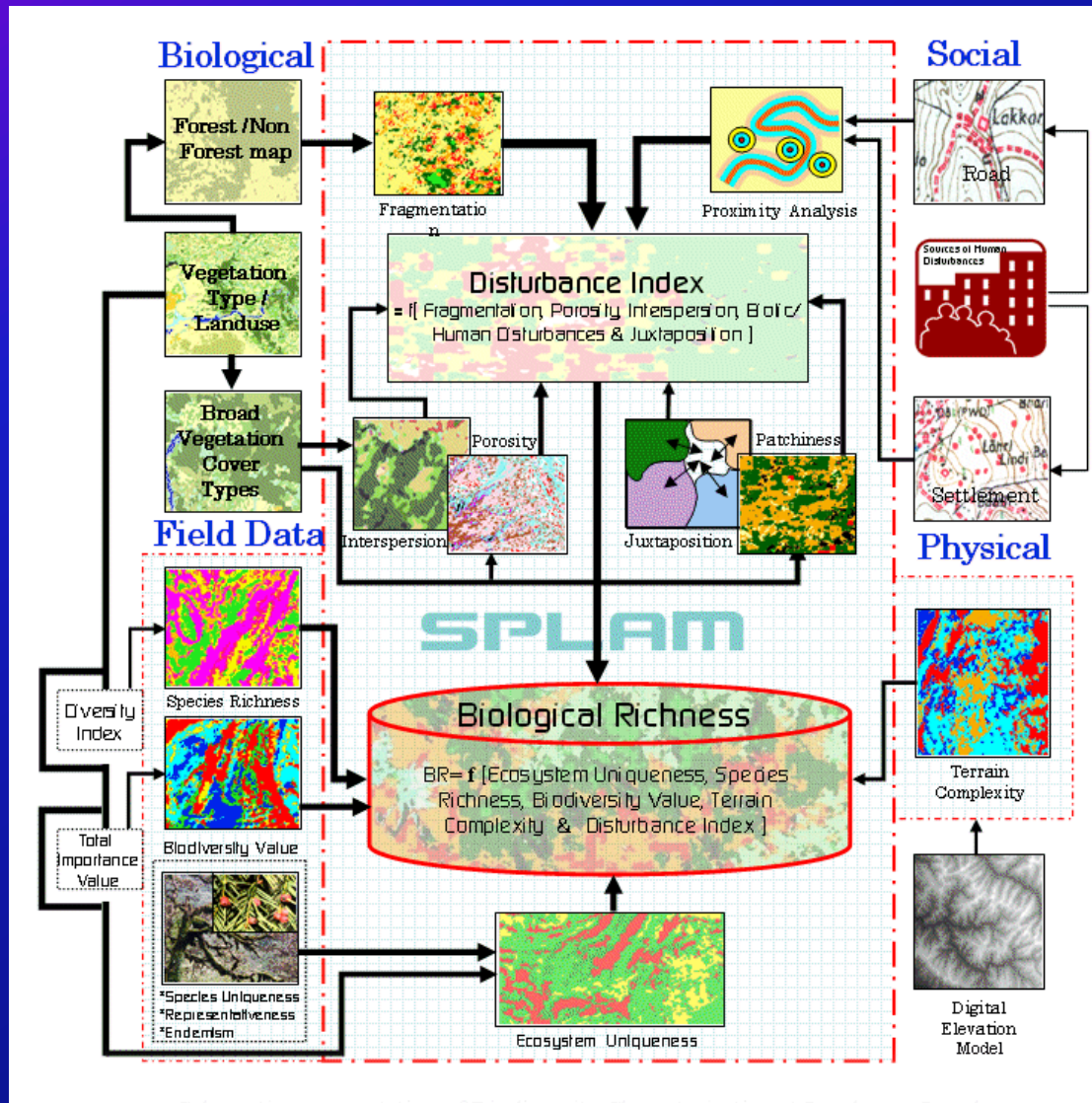
Nicholas et al (1998), *Conservation biology*, 12 (2), 371–379

# National Programme Spatial Biodiversity Characterization





# Geospatial Model: Biological, Ecological, Physical and Social

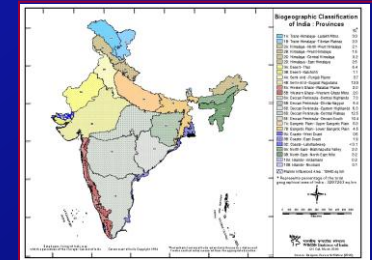
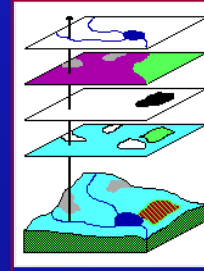
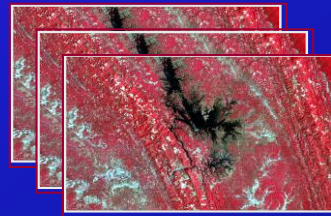


# Vegetation Type Classification

$$\text{Vegetation Type} = (\text{Remote Sensing} + \text{Topography} + \text{Biogeographical Classification})$$



**Spatial Description**

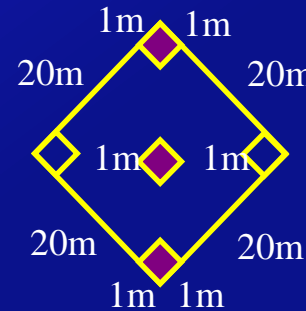
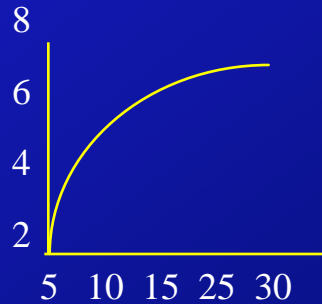


**Satellite Remote Sensing**

**Topography**

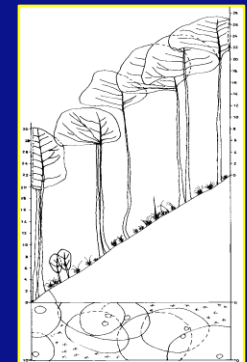
**Biogeographical Zones**

**Non-Spatial Description**



**Species Area Curve**

**Lay Out of Plot**

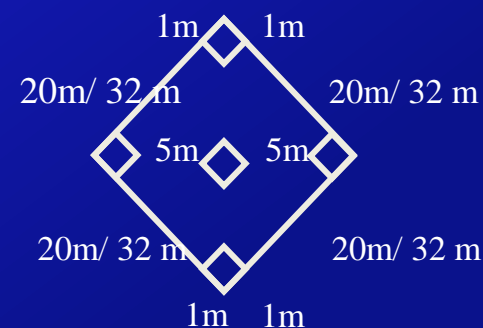
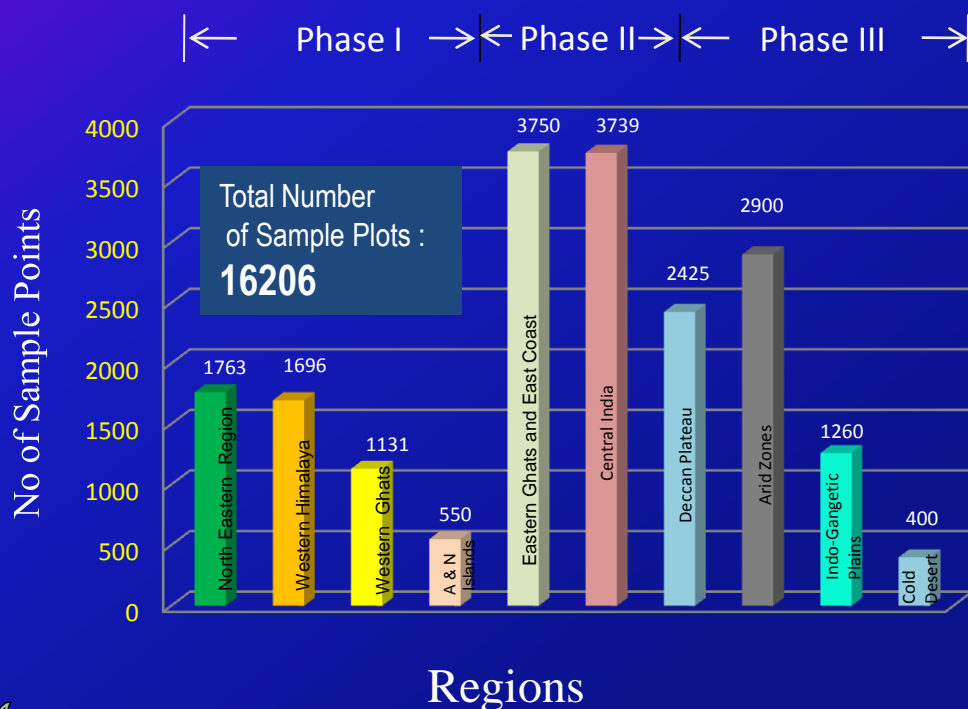


**Profile of Plot**

**Ground Sampling**

**Knowledge Base**

# Distribution of Sample Points in each region



## Lay Out of Plot

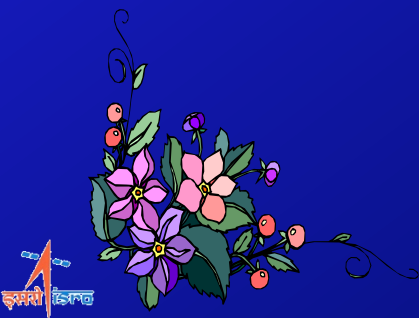
Information Acquired  
First Cycle (1998-2010)

Trees : CBH, Species Name  
Shrubs/Sapling : No., Species Name  
Herbs/seedling : No., Species Name  
Climber/Lianas/Epiphytes: No., Species Name

## Future initiatives

Revisit to ~16000 sample plots  
Microbial Organisms, Fauna (Birds & Amphibians)

With GPS Point Locations



# Biological Richness

Biological richness is computed as a function of

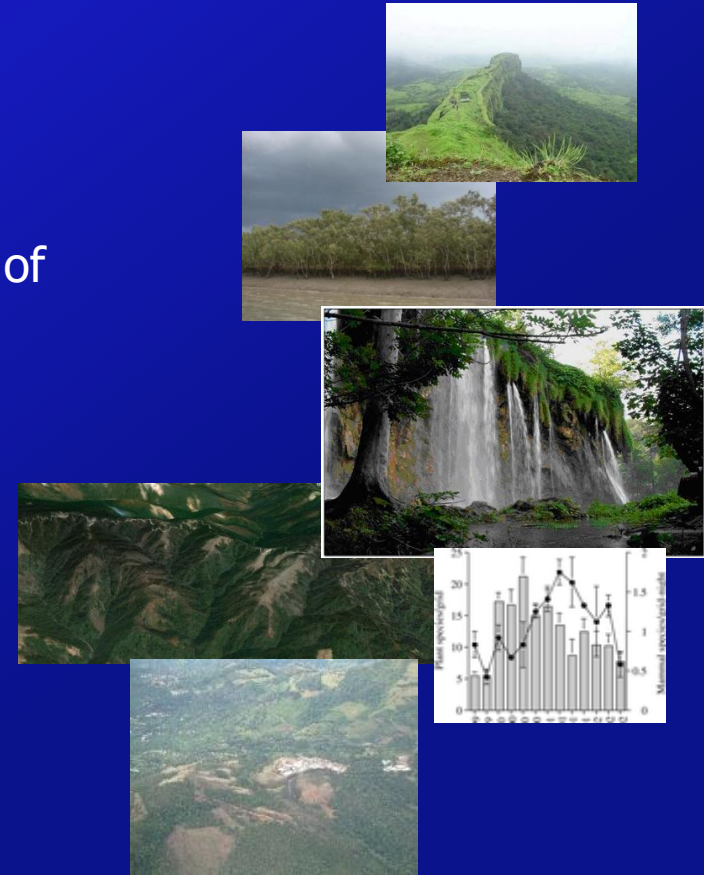
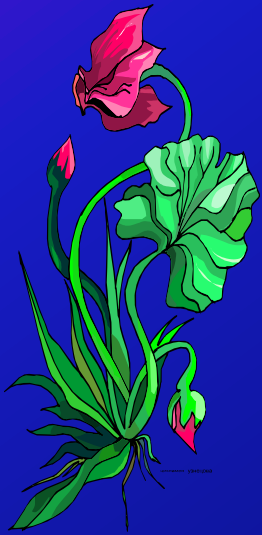
Ecosystem Uniqueness

Species Richness

Terrain Complexity

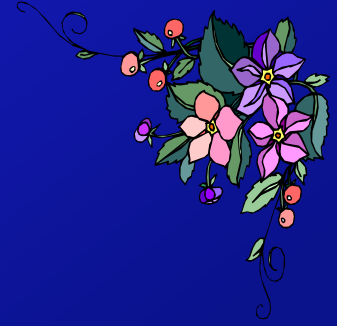
Disturbance Index

Biodiversity Value (TIV)

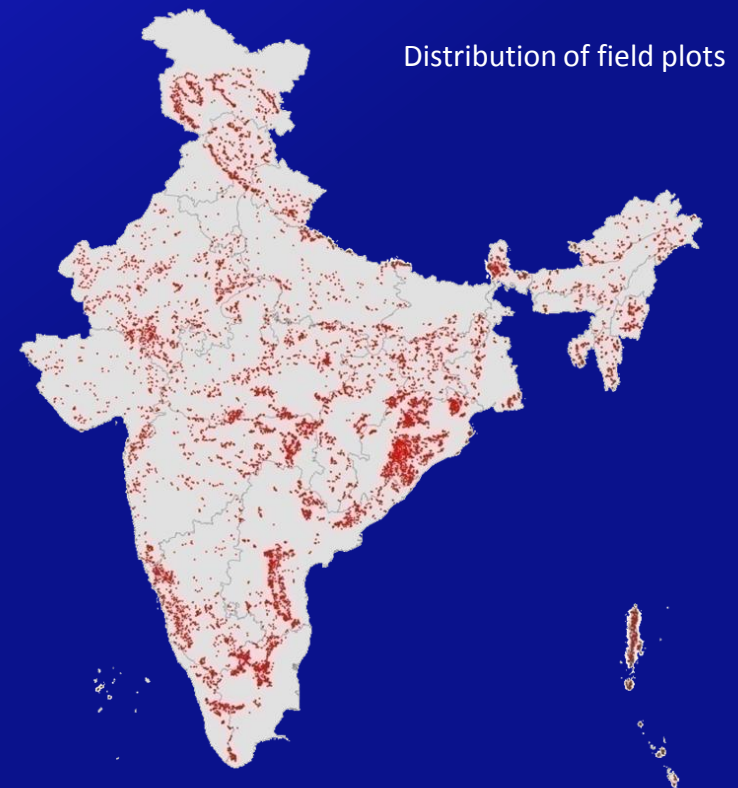
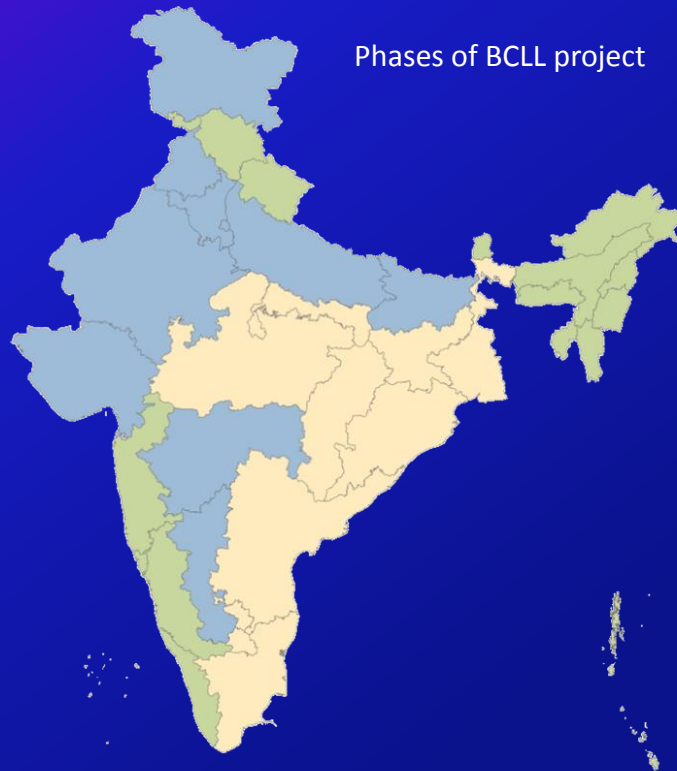


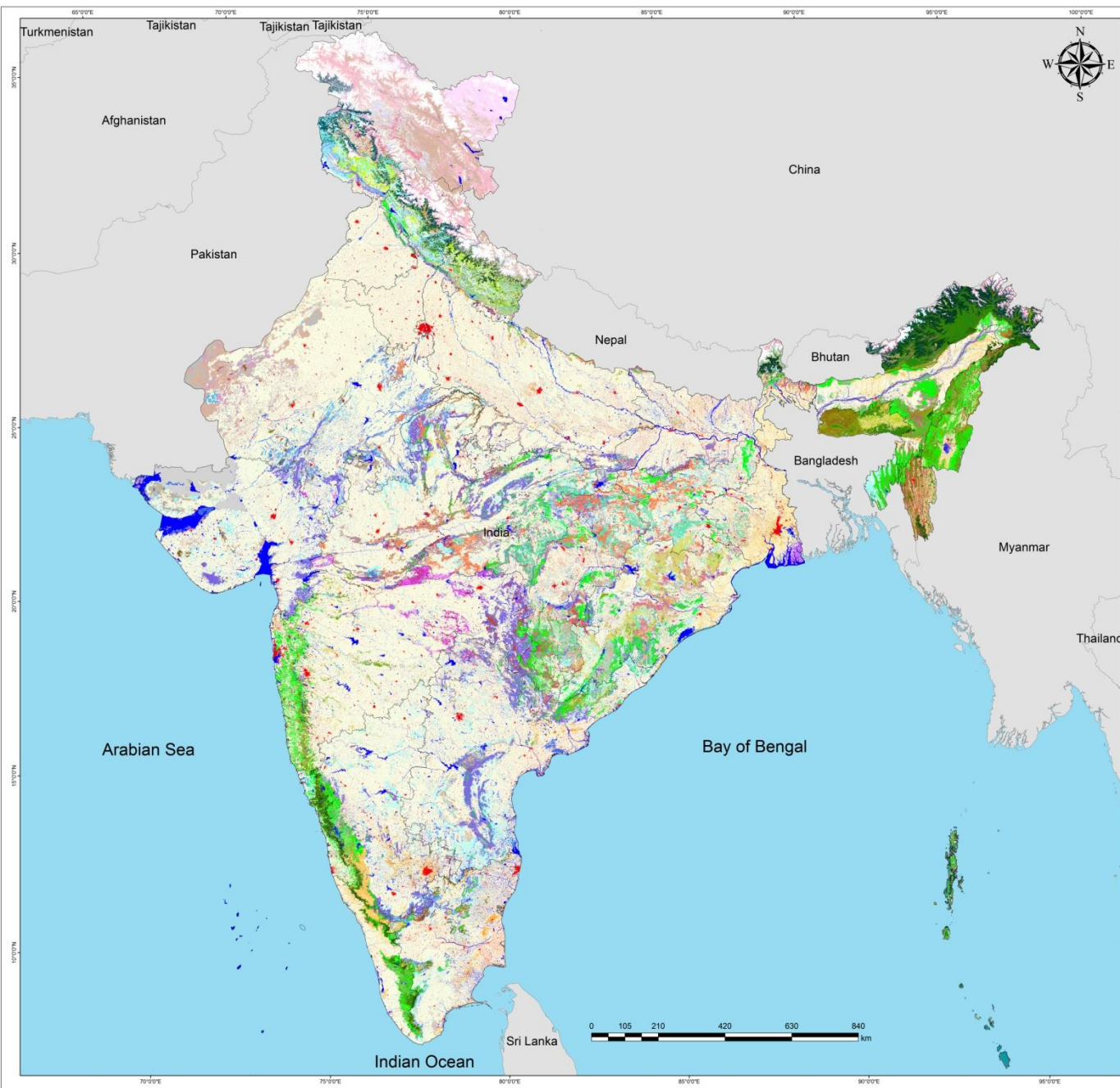
$$BR = \int(EU, SR, TC, DI, BV)$$

# Biodiversity Characterization at Landscape Level



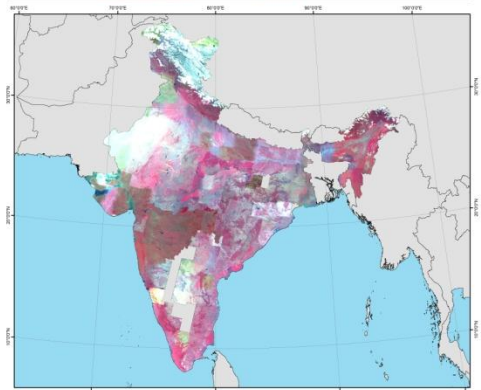
- Hybrid Classification approaches followed using IRS LISS III
- 16,206 field plot phytosociological data integrated
- 120 Vegetation types/habitats mapped





## VEGETATION TYPE AND LAND USE MAP OF INDIA

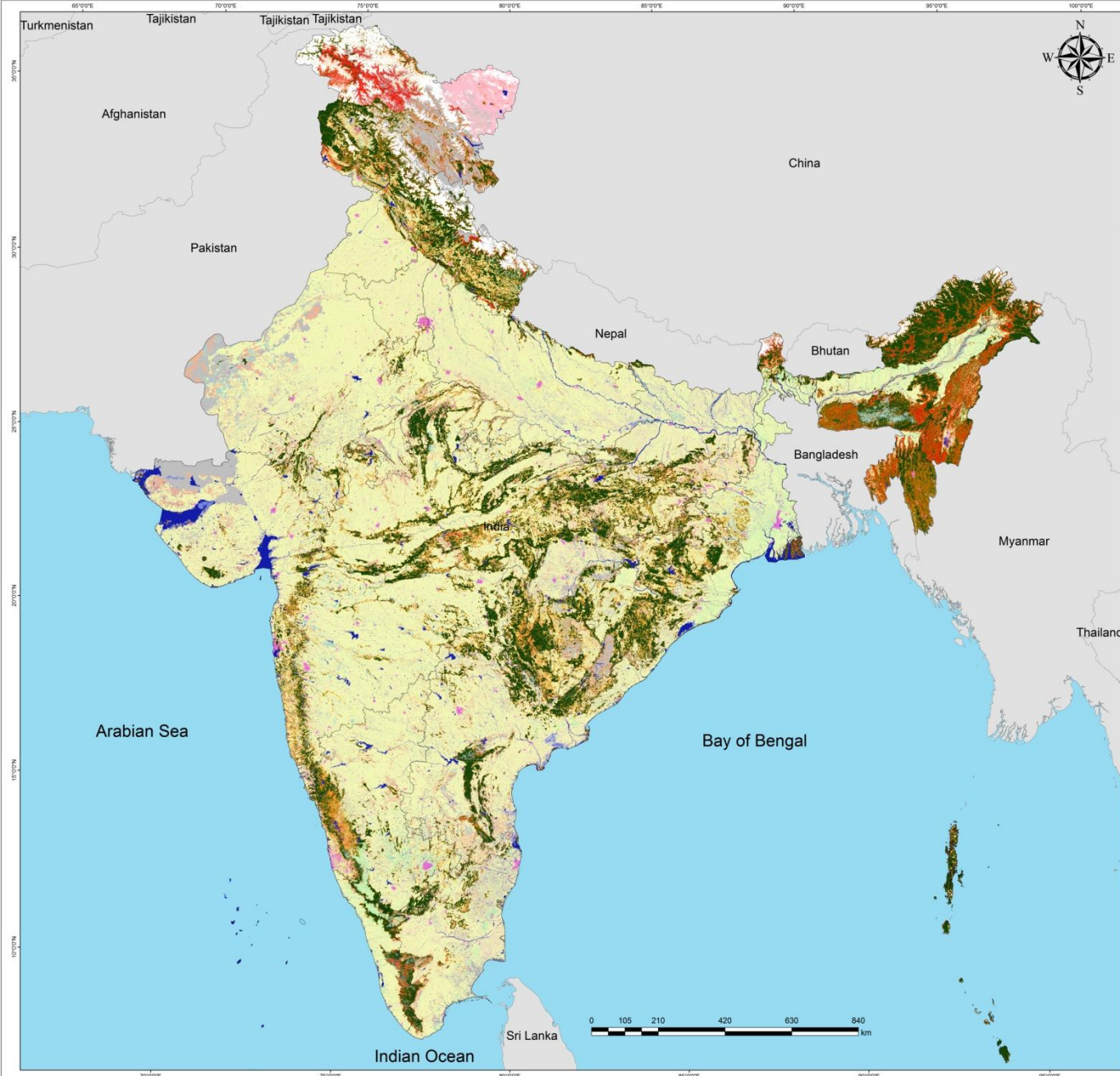
Projection - Spheroid - Lambert Conformal Conic  
 Datum - WGS84  
 Latitude of 1st standard parallel - 35:10:22.096000 N  
 Latitude of 2nd standard parallel - 12:28:22.638000 N  
 Longitude of central meridian - 80:00:00.00 E  
 Latitude of origin of projection - 24:00:00.00 E  
 False easting at central meridian - 4000000  
 False northing at origin - 4000000



- |   |   |   |
|---|---|---|
| <b>Mixed formations</b><br><ul style="list-style-type: none"> <li>Evergreen</li> <li>Andaman evergreen</li> <li>Southern Hilltop</li> <li>Secondary evergreen</li> <li>Sub-tropical broadleaved</li> <li>Sub-tropical dry evergreen</li> <li>Montane wet temperate</li> <li>Himalayan moist temperate</li> <li>Sub alpine</li> <li>Semi-evergreen</li> <li>Most deciduous</li> <li>Sal mixed moist deciduous</li> <li>Teak mixed moist deciduous</li> <li>Dry deciduous</li> <li>Sal mixed dry deciduous</li> <li>Teak mixed dry deciduous</li> <li>Thorn forest</li> <li>Bamboo mixed</li> <li>Temperate coniferous</li> <li>Pine mixed</li> </ul> | <b>Local Specific formations</b><br><ul style="list-style-type: none"> <li>Mangrove</li> <li>Artemisia</li> <li>Phoenix</li> <li>Littoral forest</li> <li>Sholas</li> <li>Riverine</li> <li>Dry evergreen</li> <li>Ravine</li> <li>Sacred groves</li> <li>Kans</li> <li>Tropical seasonal swamp forest</li> </ul> | <b>Scrub/Scrub land</b><br><ul style="list-style-type: none"> <li>Scrub</li> <li>Dry evergreen scrub</li> <li>Dry deciduous scrub</li> <li>Moist alpine scrub</li> <li>Dry alpine scrub</li> <li>Prosopis juliflora</li> <li>Lantana scrub</li> <li>Desert dune scrub</li> <li>Thorn scrub</li> </ul>                                       |
| <b>Gregarious formations</b><br><ul style="list-style-type: none"> <li>Sal</li> <li>Teak</li> <li>Dipterocarpus/Mesua</li> <li>Bamboo</li> <li>Pine</li> <li>Fir</li> <li>Oak</li> <li>Decid</li> <li>Acacia nilotica</li> <li>Acacia caschu</li> <li>Rhododendron</li> <li>Hollock</li> <li>Ephedra</li> </ul>   | <b>Forest Plantations</b><br><ul style="list-style-type: none"> <li>Forest plantations</li> <li>Sal</li> <li>Teak</li> <li>Eucalyptus</li> <li>Acacia</li> <li>Pine</li> <li>Casuarina</li> <li>Cashew nut</li> <li>Cryptomeria</li> <li>Mixed plantation</li> </ul>  | <b>Grasslands</b><br><ul style="list-style-type: none"> <li>Grassland</li> <li>Dry alpine pasture</li> <li>Moist alpine pasture</li> <li>Swampy grassland</li> </ul>  |
| <b>Degradational formations</b><br><ul style="list-style-type: none"> <li>Degraded forest</li> <li>Shifting cultivation</li> <li>Abandoned jum</li> <li>Degraded mangrove</li> </ul>  | <b>Woodland</b><br><ul style="list-style-type: none"> <li>Woodland</li> <li>Tree savannah</li> <li>Shrub savannah</li> </ul>  | <b>Cultivated/Managed</b><br><ul style="list-style-type: none"> <li>Orchard/Apple/Coffee etc.</li> <li>Tea</li> <li>Mango</li> <li>Coconut</li> <li>Agriculture</li> <li>Cold deserts</li> <li>Run of Kutubh</li> <li>Water body</li> <li>Wet lands</li> <li>Settlement</li> <li>Barren land</li> <li>Snow</li> <li>Reject class</li> </ul> |

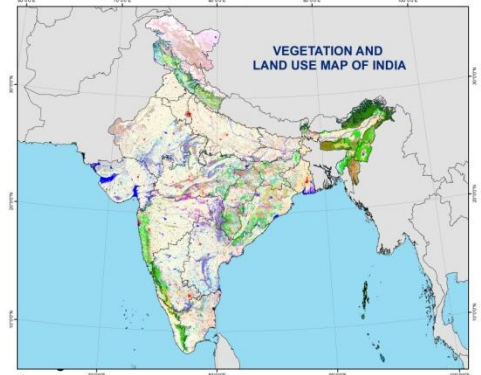
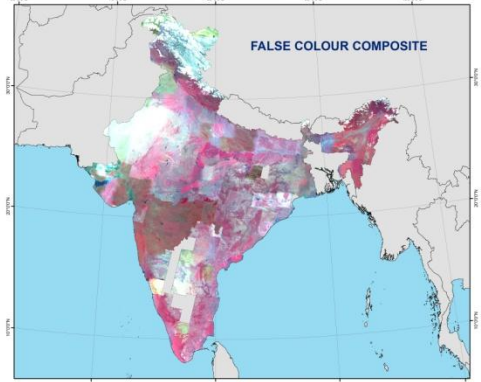
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 &  
**Department of Biotechnology (DBT), Govt. of India**



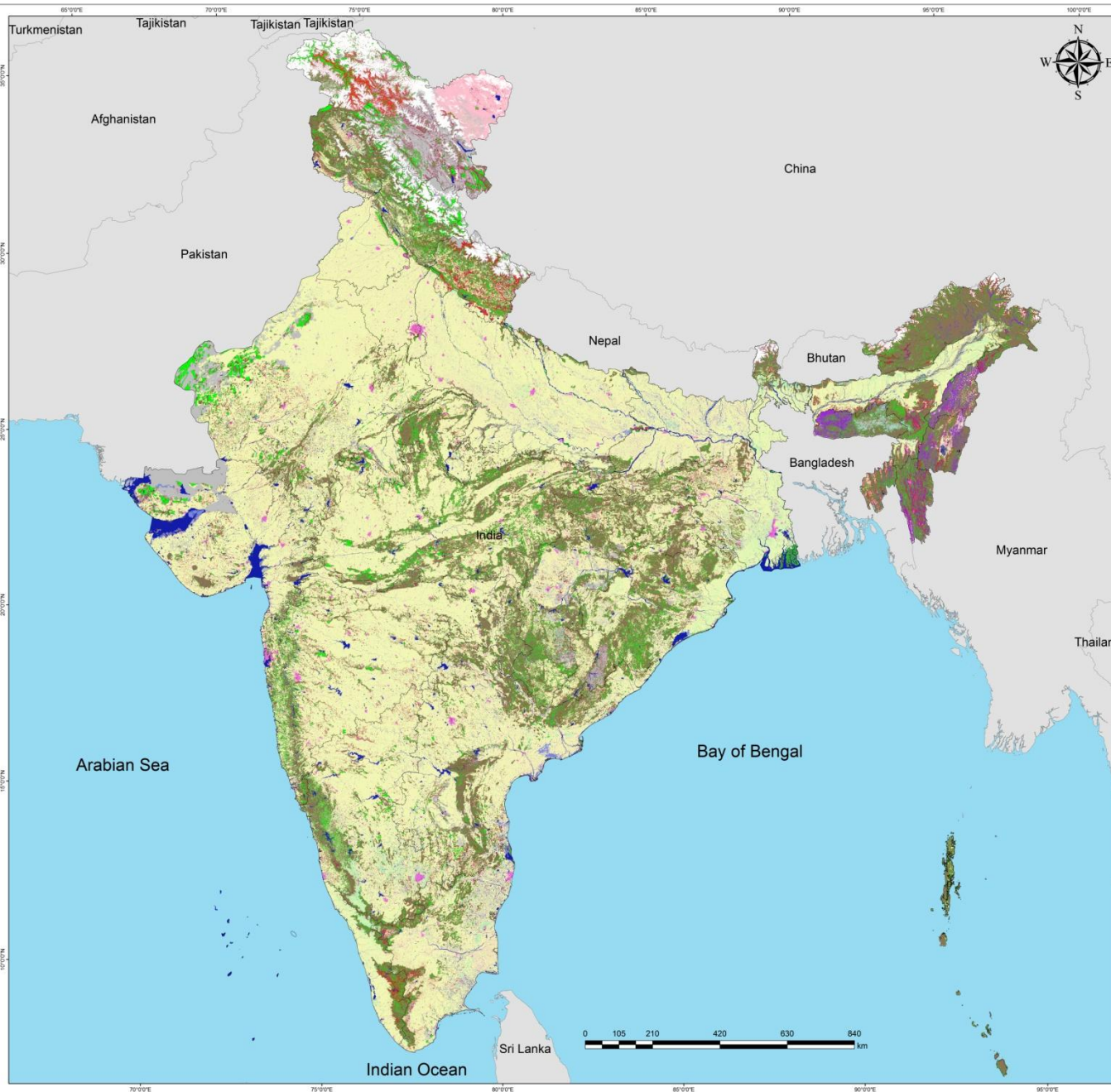
# FRAGMENTATION AND LAND USE MAP OF INDIA

Projection - Lambert Conformal Conic  
 Spheroid - WGS84  
 Datum - WGS84  
 Latitude of 1st standard parallel - 35:10:22.096000 N  
 Latitude of 2nd standard parallel - 12:28:22.638000 N  
 Longitude of central meridian - 80:00:00.00 E  
 Latitude of origin of projection - 24:00:00.00 E  
 False easting at central meridian - 4000000  
 False northing at origin - 4000000



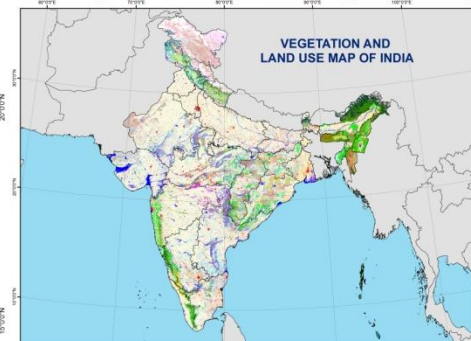
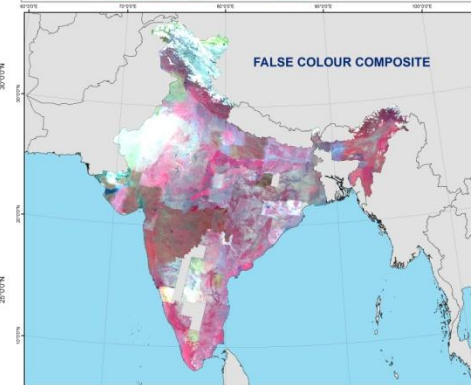
- |             |                |             |
|-------------|----------------|-------------|
| Low (1)     | Abandoned jhum | Barren land |
| Medium (2)  | Scrub          | Water body  |
| High (3-35) | Grassland      | Wet land    |
|             | Orchard        | Settlement  |
|             | Agriculture    | River sand  |
|             | Cold desert    | Snow        |

**Biodiversity Characterization at Landscape Level**  
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 Dept. of Space, Govt. of India  
 &  
 Department of Biotechnology (DBT), Govt. of India



## DISTURBANCE INDEX AND LAND USE MAP OF INDIA

Projection - Lambert Conformal Conic  
 Spheroid - WGS84  
 Datum - WGS84  
 Latitude of 1st standard parallel - 35:10:22.096000 N  
 Latitude of 2nd standard parallel - 12:28:22.638000 N  
 Longitude of central meridian - 80:00:00.00 E  
 Latitude of origin of projection - 24:00:00.00 E  
 False easting at central meridian - 4000000  
 False northing at origin - 4000000



Disturbance Index Classes		Other Classes	
Low (11 - 18)	Green	Abandoned jhum	Barren land
Medium (19 - 23)	Light Green	Scrub	Water body
High (24 - 28)	Dark Green	Grassland	Wet land
Very High (29 - 70)	Red	Orchard	Settlement
		Agriculture	River sand
		Cold desert	Snow

### Biodiversity Characterization at Landscape Level

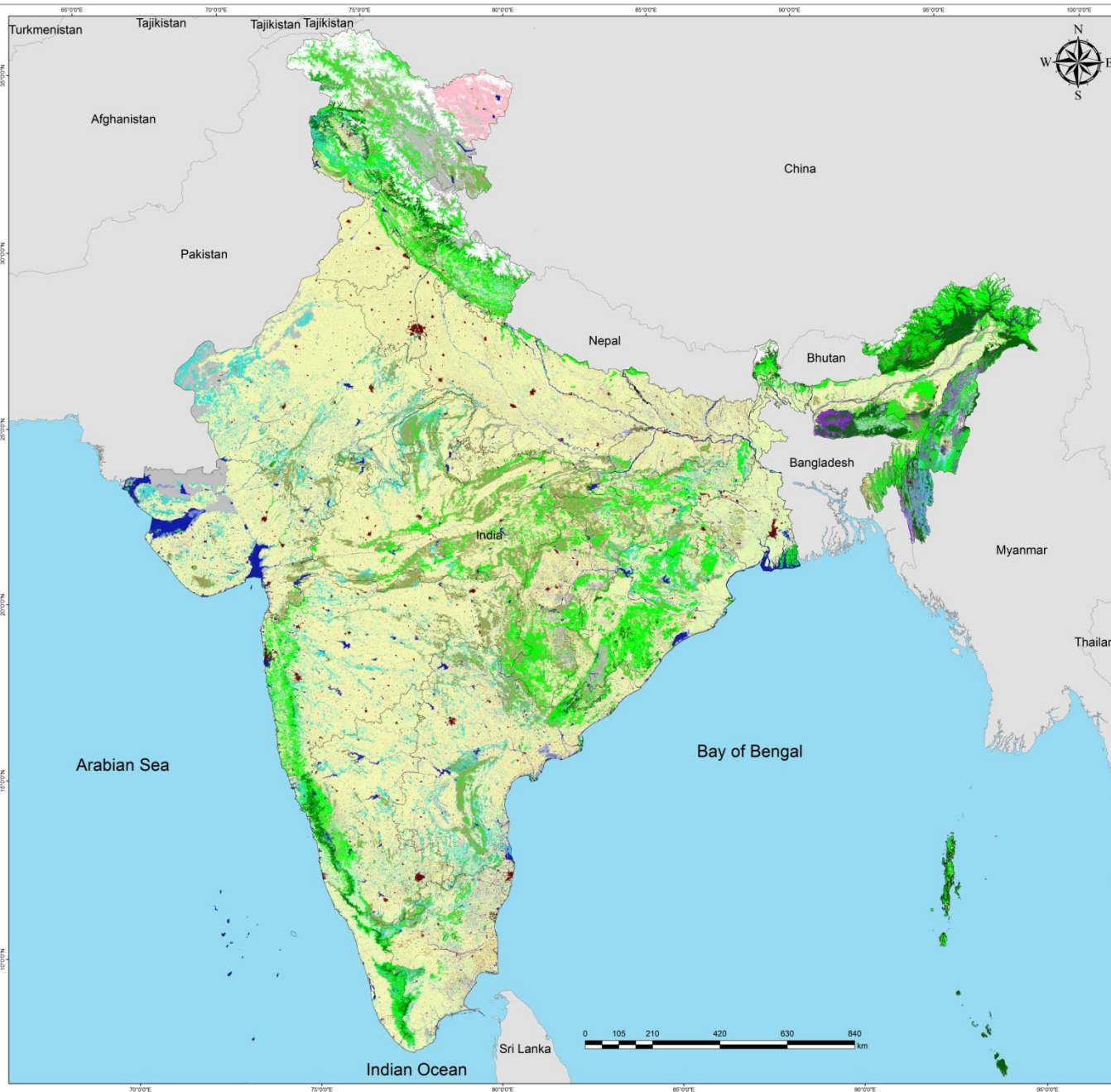
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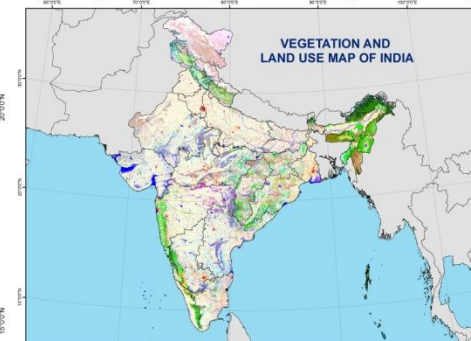
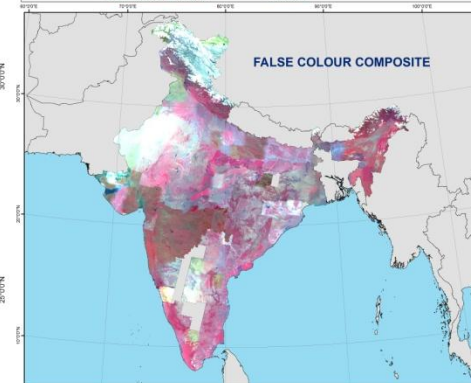
Department of Biotechnology (DBT), Govt. of India





## BIOLOGICAL RICHNESS AND LAND USE MAP OF INDIA

Projection - Lambert Conformal Conic  
 Spheroid - WGS84  
 Datum - WGS84  
 Latitude of 1st standard parallel - 35:10:22.096000 N  
 Latitude of 2nd standard parallel - 12:28:22.638000 N  
 Longitude of central meridian - 80:00:00.00 E  
 Latitude of origin of projection - 24:00:00.00 E  
 False easting at central meridian - 4000000  
 False northing at origin - 4000000



Biological Richness Classes		Other Classes	
Low (17 - 33)	Abandoned jhum	Barren land	Water body
Medium (34 - 49)	Scrub	Grassland	Wet land
High (50 - 69)	Orchard	Agriculture	Settlement
Very High (70 - 90)	Cold desert	River sand	Snow

### Biodiversity Characterization at Landscape Level

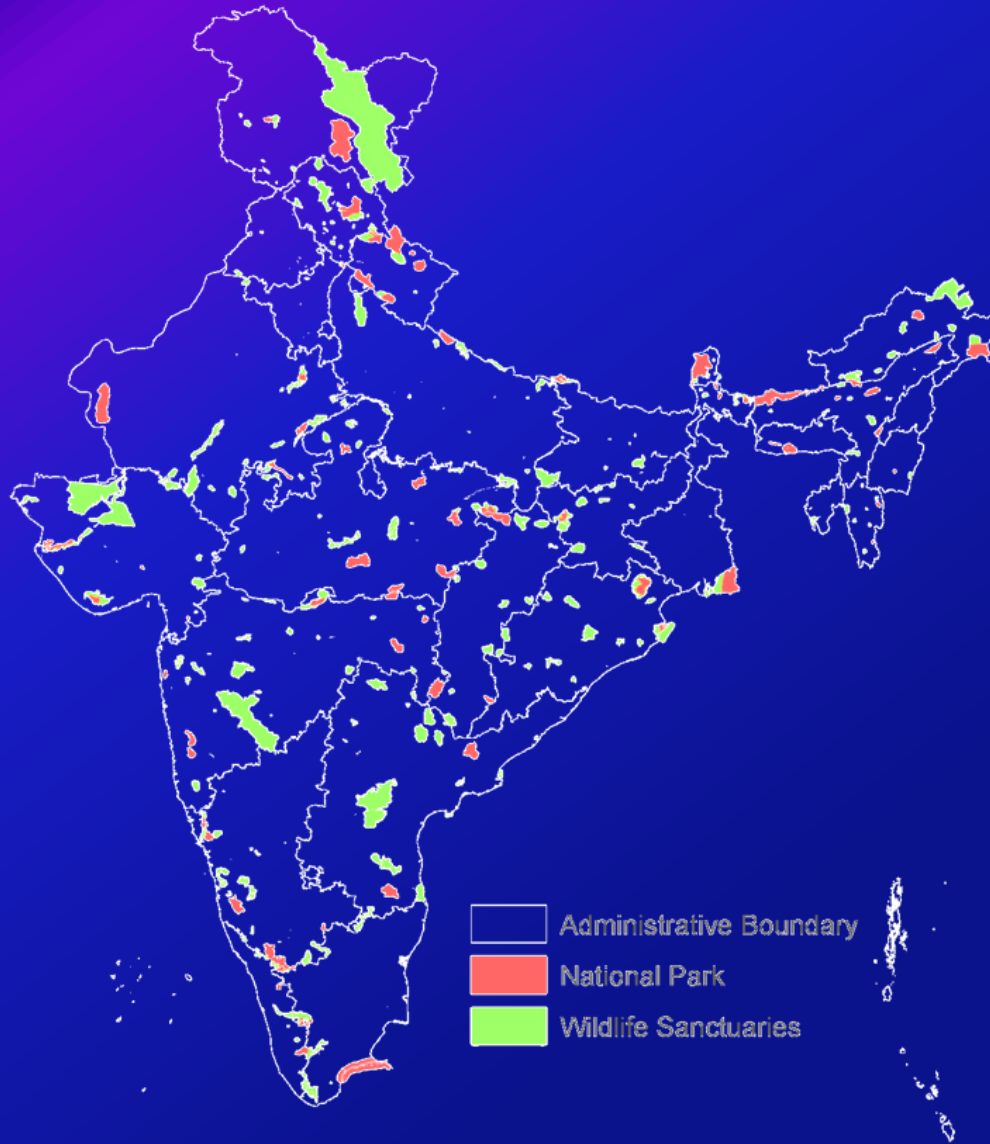
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&

Department of Biotechnology (DBT), Govt. of India

# Protected Areas in India



- ❖ As on April 2007, there are 96 national parks.
- ❖ The national parks constitutes 38,029.18 km<sup>2</sup> or 1.16% of India's Geographical area.
- ❖ A total of 166 national parks have been authorized.
- ❖ Number of wild life sanctuary is 441.

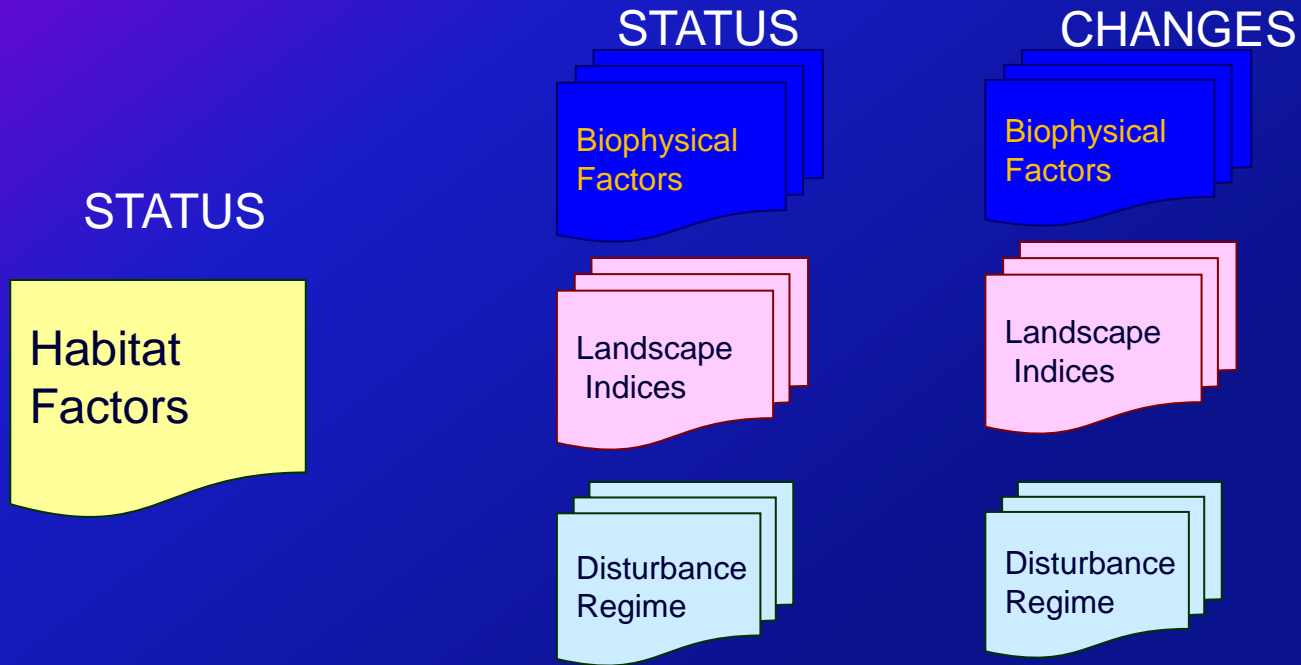
# BCLL Project Publications



# Database Utilization

S No.	Usage	Organizations	Media	Application
1	NTFP abundance	Andhra Pradesh, Tamil Nadu, Jharkhand, Punjab and Orissa State Forest Departments	Reports, digital maps and inventory in digital forms	NTFP spp. maps with spatial distribution of its qualitative abundance
2	Forest Working plan preparation	Orissa, Tamil Nadu, Punjab, Jharkhand and Andhra Pradesh, West Bengal, Uttaranchal and Andamans	Reports, digital maps and inventory in digital forms	For the preparation of working circles, inventory design, and inputs for chapters on biodiversity and disturbance.
3	Protected Area Management	Andhra Pradesh, Punjab, Meghalaya and Orissa State Forest Departments, Wild life Institute	Digital map data for Spatial Analysis	Corridor analysis for joining the PAs. "Nomination of Suitable Sites in Western Ghats under UNESCO's Natural World Heritage List"
4	Biodiversity Registers	Biodiversity boards of state and NGOs viz Kalpavriksh, ATREE.	Reports, digital maps and inventory in digital forms	For documentation of the Local biodiversity wealth.
5	Bioprospecting of chemical principles	Regional Research Labs, Bhubaneshwar	Reports, digital maps and inventory in digital forms	Screening and bioprospecting the plant for high value chemical extraction.
6	Niche Modeling and local habitat description.	Department of Space R&D projects, Research Organizations; FMR-CDF, Chennai (NGO);	Reports, digital maps and inventory in digital forms	For mapping the potential niche of the important or Key Species
7	Biodiversity change and fragmentation studies.	Uttar Pradesh, Madhya Pradesh, W.B., SFDs and Andhra Pradesh Biodiversity Board; SACON; MS Swaminathan Research Foundation (MSSRF), Chennai	Reports, digital maps and inventory in digital forms	For mapping the size class distribution of forest fragmentation patches for prioritization for conservation as well as base line data for future Biodiversity monitoring; Impact of climate change on lichen biodiversity
8	Economic & Ecosystem service Evaluation	SFDs	BCLL Reports & Geospatial data	Economic Evaluation inputs for working plans
9	Policy, Planning and Monitoring.	State Biodiversity Boards, SFDs and MOEF; Forest survey of India; Environment & Wildlife Management Department- Sikkim; Wildlife Research and Conservation Society (WRCS), Pune	Reports, digital maps and inventory in digital forms	For compliance to the communications to be made to CBD for 2010 and for Conservation & prioritization, Green India Mission, Sikkim Biodiversity Conservation and Forest Management Project, Conservation, wildlife management

# Biodiversity Information System - Scientific Relevance



REMOTE SENSING CAPABILITIES

CROSS DISCIPLINARY INTERFACE

SCIENCE Questions

Species Distributions  
Habitat Relationships  
Models  
( eg. Gap Analysis)

Inventorying Patterns

Multivariate Modeling  
Long term Datasets

Formulating and Testing Hypotheses

Extinction Models  
Multi-temporal Data  
( eg. Global Change)

Monitoring and Forecasting Changes

# Biodiversity Information System

www.bisindia.org

**BIODIVERSITY INFORMATION SYSTEM**  
DEPARTMENT OF SPACE  
DEPARTMENT OF BIOTECHNOLOGY  
GOVERNMENT OF INDIA

BCLL BIOSPATIAL FRIS PHYTOSIS BIOCONSDSS BIOSPEC IBIN RESEARCH

GOOGLE SEARCH  
Go

TSRO  
IIRS  
DBT  
PROJECT TEAM  
INTERNET GIS  
DISCUSSION FORUM  
FEEDBACK  
CONTACT  
ABOUT US

Welcome to Biodiversity Information System.

Vegetation cover characterization, fragmentation, disturbance and biological richness across the landscape has been organized in the form of Biodiversity Information System (BIS). Satellite remote sensing based vegetation type map in association with ground based field samples of key community characteristics have been upscaled using geospatial extrapolation. The species database has been linked with above spatial details. BIS allows identification of gap areas, species / habitat relationship and helps in biodiversity conservation planning by setting priority areas. Detailed site-specific field inventories with this database can be used for identifying areas for bioprospecting. The entire spatial and non-spatial data on Indian plant biodiversity has been organized and available in BIS, with its five major components i.e BIOSPATIAL (Biodiversity spatial query shell), PHYTOSIS (Plant Information system), FRIS (Forest resource information system), BIOSPEC (Biodiversity conservation spatial decision support system). Most of the data is accessible through authentic username and password. [More](#)

5,274 Visitors  
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ClustrMaps® Click to see

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The motive of conceptualization of Biodiversity Information System (BIS) is collection and organization of the available but distributed spatial and non spatial database, into an interactive system which is capable of presenting a user friendly and easily accessible interface to its clients;

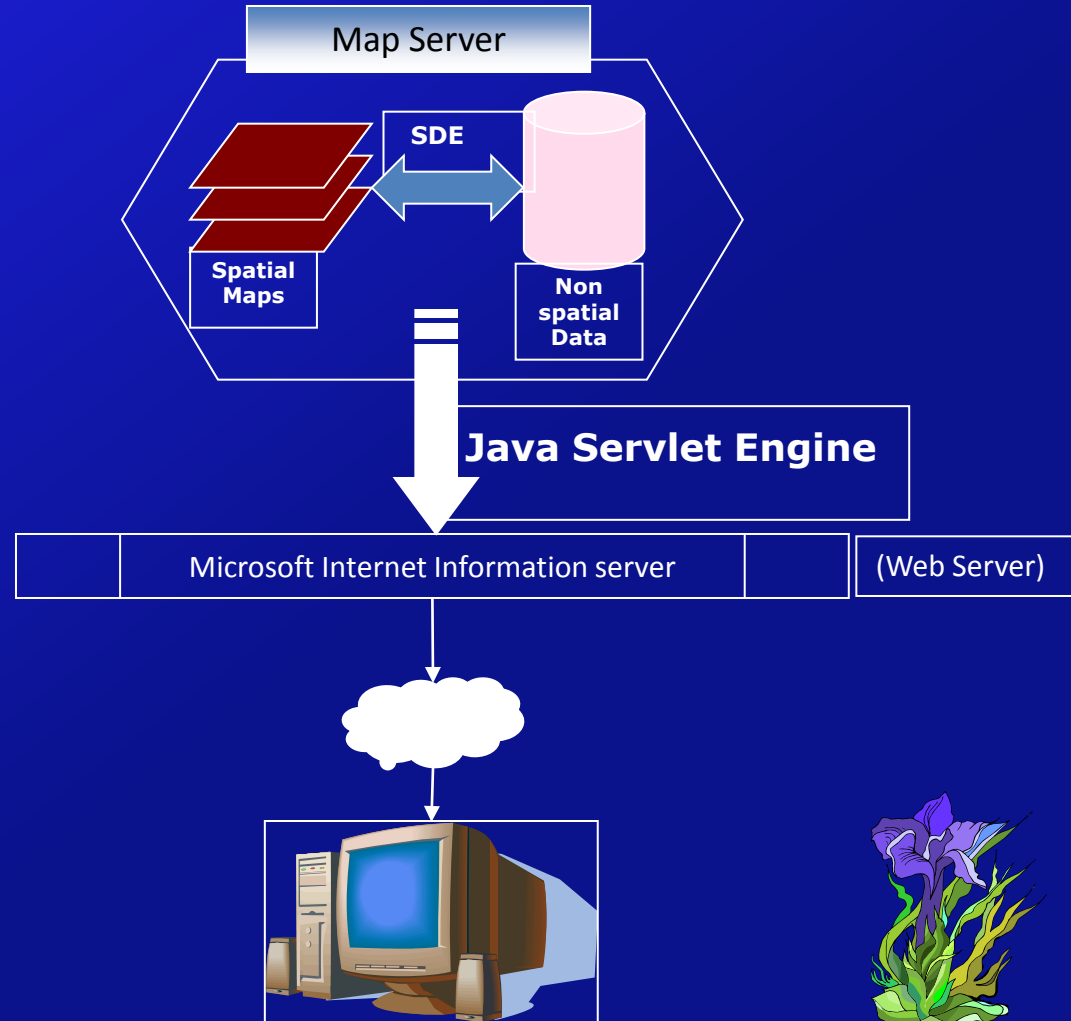
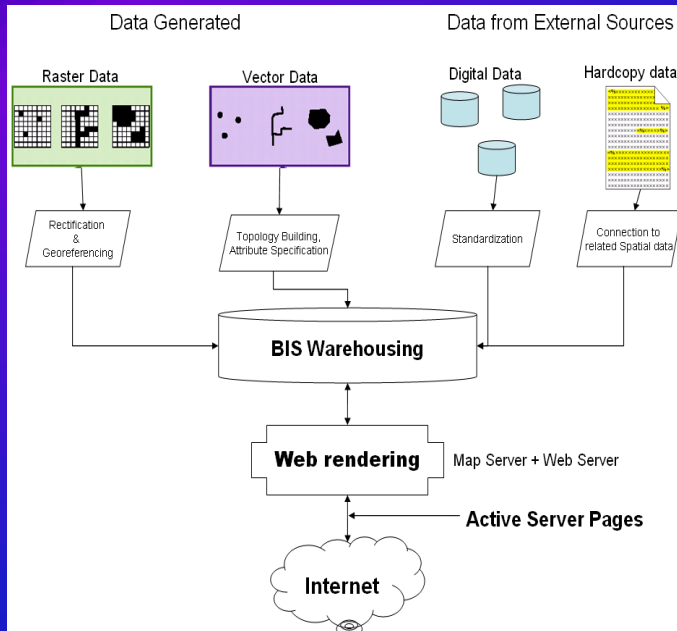
*A Centralized repository of BCLL Phase I, II & III is available with interactive GUI for data access and dissemination.*

## Biodiversity information system (BIS) enables

- ❑ Interacting ,querying and region specific conservation planning
- ❑ Overlay of spatial products with administrative boundaries and base details
- ❑ Access and analyze ~16200 strong point phyto-sociology data against vegetation type and ecoregion
- ❑ Access to ecological categorization ( rare, endangered ..... ) of species studies



# Approach and Architecture



## Operating System :

Microsoft Windows 2003 standard server

## Web Server :

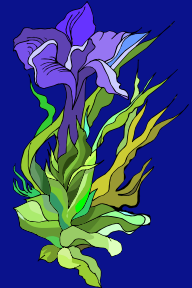
IIS/ Apache

## Internet GIS Software :

Arc GIS & UMN MapServer 4.X

## Database engine :

Oracle 10G



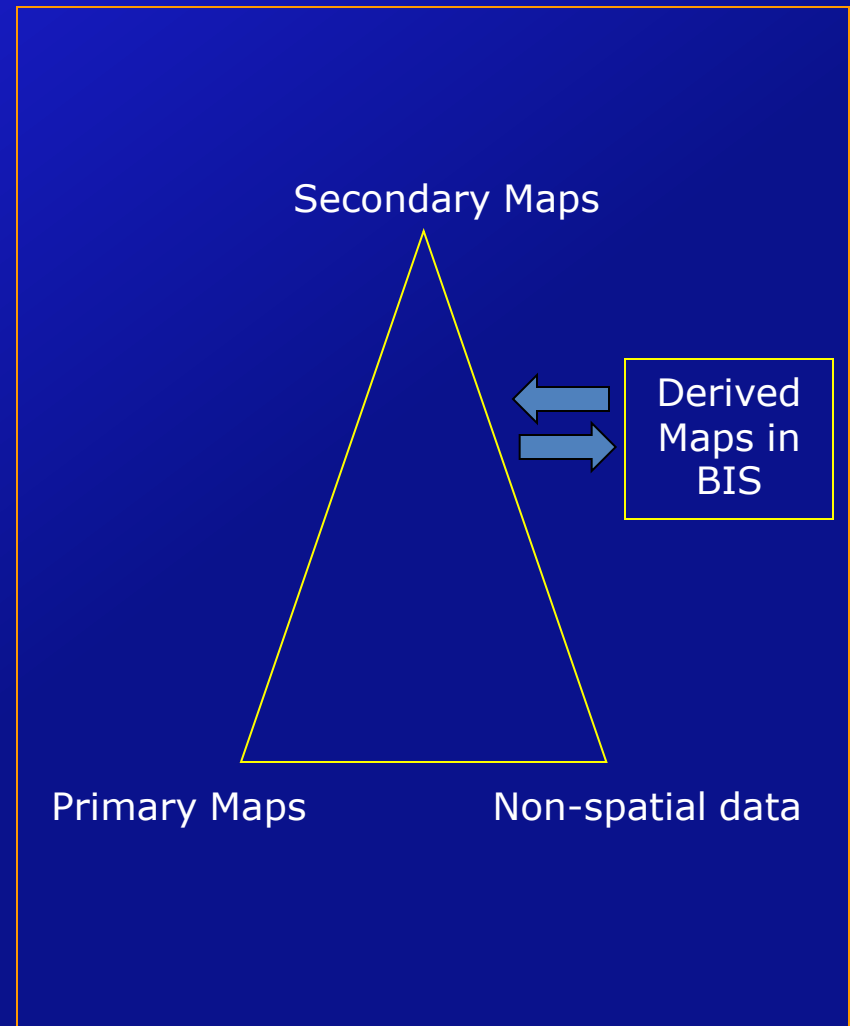
# Inputs to the Biodiversity Information System

## Primary data sets

1. Field Data
2. Vegetation Map
3. Fragmentation Map
4. Disturbance Regimes
5. Biological Richness

## Additional data sets/ Secondary Maps

- Digital elevation models
- Village location, road network, drainage information ;
- Survey of India toposheets (1:250,000 & 1:50,000 scales)
- Biogeographical digital maps (WII, Dehradun)
- Climatic maps of NATMO on 1:1 million
- Agroclimatic maps for entire country  
(National Bureau of Soil and Landuse Survey, Nagpur)
- Socio economic data of national census 1991 & 2001
- Protected Area Network map (WII, Dehradun)
- Forest/ Vegetation Cover Maps (FSI, Dehradun)
- Administrative boundaries (SOI, Dehradun)
- High resolution climate data ( 1km resolution)
- High resolution DEM (10m)
- Land Use and Landcover Map
- Soil Map with profile attributes





# Biodiversity Information System

## BIOSPATIAL

Regional and State level maps of the Phase I & Phase II of BCLL on Vegetation Type, Fragmentation, Disturbance Regimes, Biological Richness in addition to the Satellite data used. Dynamic querying at any specified spot on maps is provided.

## BIODIVERSITY INFORMATION SYSTEM

DEPARTMENT OF BIOTECHNOLOGY  
GOVERNMENT OF INDIA

HOME | BIOSPATIAL | FRIS | PHYTOSIS | BIOCONSDSS | BIOSPEC | IBIN | RESEARCH

GOOGLE SEARCH

ISRO | IIRS | DBT | PROJECT TEAM | INTERNET GIS | DISCUSSION FORUM | FEEDBACK | CONTACT | ABOUT US

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METADATA CATALOGUE | OGC WMS SERVICES | BIOSPATIAL | FRIS | PHYTOSIS | BIOCONSDSS | BIOSPEC | IBIN

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## Related Systems

FRIS, BIOSPEC, BioConsSDSS are some of the related development where the BCLL project outputs are one of the critical and important inputs

BIOSPATIAL  
Spatial Query Shell

Site search:   Thu, Jul 26 - 2007

Home Page | Project | How to Proceed | Query Shell | Password | About Us | Feedback | Contact Us

BIOSPATIAL - Spatial Query Shell for Biodiversity Characterization

Biospatial is the query shell available to those who have the privilege to use it. All the spatial information shown in the shell is in the form of maps. These maps have been derived in a customized software "BioCap" and then rendered on the internet using ArcGIS (Internet Map Server). These maps are dynamic in nature and can be queried for the vector themes overlaid on the raster images.

How to Proceed

Enter the username and password provided to you by Indian Institute of Remote Sensing, Dehradun to proceed. In case you do not have a username / password, apply by mail to [dean@iirs.gov.in](mailto:dean@iirs.gov.in) or write to:-

INDIAN INSTITUTE OF REMOTE SENSING  
National Remote Sensing Agency  
Department of Space,  
Government of India,  
4 - Kailash Road, Dehradun  
Uttarakhand - 248001

Indian Biodiversity Information system  
[www.biodia.org](http://www.biodia.org)

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## PHYTOSIS

Non Spatial Information of the sampled species in the identified biodiversity hotspots. Contains Species dependent, Species independent (eg. Location wise) and Plot wise queries on the available database.

HOME | CONTACT

Site Search:

Phyto SIS  
Species Information System

About SIS | How to Proceed | Query Shell | About Us | Related Development

Welcome to Species Information System

An extensive field work has been carried out by scientists and researchers in the first and second phase of the project titled Biodiversity Characterization at Landscape Level using Remote Sensing and Geographic Information System. About 10,000 plots were laid down in the North East India, Western Ghats, Western Himalayas, Andaman & Nicobar Islands, Central India, Eastern Ghats and East Coast of Mangrove ecosystems. This query shell provides a user friendly interface to the user to query on the database created from this field work. When you click on the link "Query Shell" the computer will ask for the username & password. Please enter the username & password assigned from INDIAN INSTITUTE OF REMOTE SENSING (IIRS).

In case you do not have a username & password and you desire to have them, please write to the DEAN, IIRS at the following address, justifying your requirements for the same.

INDIAN INSTITUTE OF REMOTE SENSING  
National Remote Sensing Agency  
Dept. of Space, Govt. of India,  
4 - Kailash Road, Dehradun  
Uttarakhand - 248001

Indian Biodiversity Information System  
[www.biodia.org](http://www.biodia.org)

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FRIS  
Forest Resource Information System

HOME PAGE | ABOUT FRIS | FOREST REVIEW | ABOUT US | RELATED LINKS | CONTACT US

Thu, Jul 26 - 2007

Login

Enter the username & Password provided to you by IIRS to proceed. In case you do not have a username / password, apply by writing to IIRS at [dean@iirs.gov.in](mailto:dean@iirs.gov.in) stating your requirements for use.

Username:   
Password:

Welcome to our website

This site deals with providing the same information to Environmentalists, Researchers, Planners, Administrators, Decision makers and Local communities to provide them with source, adequate and updated information on forests of India and role of Remote Sensing & Geographic Information System (GIS), thus supporting a holistic approach to planning and forest management.

Information

Forests have acquired increasing importance in the recent past for their role not only in meeting the material requirements but also for their ecological and environmental functions. Therefore accurate and updated information on forest resources is of paramount importance.

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Conservation Spatial Decision Support System - Microsoft Internet Explorer

Home | Project | How to proceed | Query Shell | Password | SDSS | About Us | Links

Biodiversity Information System > Spatial Decision Support System > Home

THE PROJECT

The Department of Biotechnology and the Department of Space are collaborating in a major national level project titled "Biodiversity Characterization at Landscape Level using Remote Sensing and GIS". There is an emerging need for the conservation of biodiversity and its management tools are being developed. [Click...](#)

HOW TO PROCEED

When you click on the link "Query Shell" the computer will ask you the username and password. Please enter the username and password assigned to you from Indian Institute of Remote Sensing, Department of Space.

Do case you do not have a username and a password, and you desire to have them, please write to [dean@iirs.gov.in](mailto:dean@iirs.gov.in).

ABOUT IIRS

Indian Institute of Remote Sensing (IIRS) under National Remote Sensing Agency, Department of Space, Govt. of India is premier training and educational institute set up for developing trained professionals in remote sensing.

ABOUT DBT

Decision support systems (DSS) are computer programs that are designed to bring the whole of the information available to a problem. This is achieved by providing a flexible and adaptive solution system that makes explicit use of ... [Click...](#)

QUERRY SHELL

The query shell has been created using Active Server Pages at a front end and ArcGIS based Internet GIS based technology has been used for the generation of maps for spatial decision support. As a pilot project, Makkai biosphere reserve has been taken up for study.

SDSS | DBT | IIRS

HOME | CONTACT | ABOUT

Site Search:

BIOSPEC  
Bioprospecting Query Shell

Department of Biotechnology  
Department of Space

Project | How to Proceed | Query Shell | Password | Molecular Markers | Links | Feedback

Welcome to our website

A multi-institutional collaborative programme on Bioprospecting of Biologically Wealth using Biotechnological tools was initiated in October 1997 by the Department of Biotechnology. The study concentrated mainly on the two hot-spot regions - North Eastern Himalayas and South Western Ghats and in addition the Lahaul and Spiti region of the Western Himalayas. There are 9 major sub-programmes involving 13 institutes. Extensive studies have been suggested to address issues of identifying bioresources, gene markers, understanding genetic and species variability, developing habitat relationship of economically important plant resources, their habitat characterization and landscape characters so as to focus on comprehensive biodiversity conservation.

Under the aegis of "Biodiversity Characterization at Landscape Level" has been jointly supported and implemented by the Department of Biotechnology and Department of Space. The satellite remote sensing, with its varied sensor systems, allows assessment and monitoring of vegetation cover and its attributes. The Geographic Information System allows building of comprehensive database on physical, biological and environmental parameters, which govern the spatial distribution of biodiversity. These landscape information unveils the impacts of human intervention, spatial pattern and spatial organization of the habitats. The unique attempt in the DBT-DOS project, allows combining field lab data, ancillary data and information derived from satellite remote sensing for defining conservation strategies and prioritizing sites for bioprospecting. [More](#)

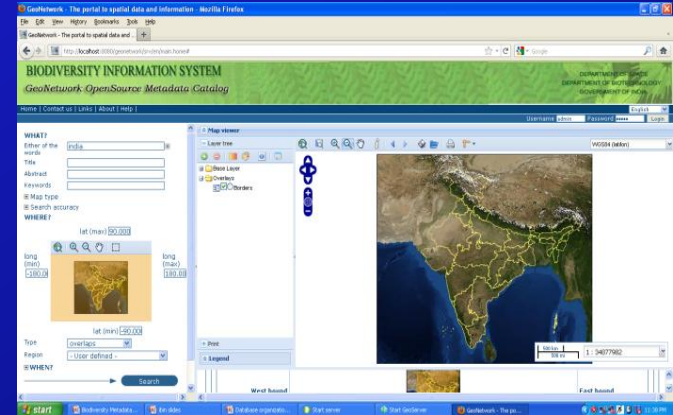
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Username:   
Password:

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# BIODIVERSITY METADATA CATALOGUE USING OPEN SOURCE

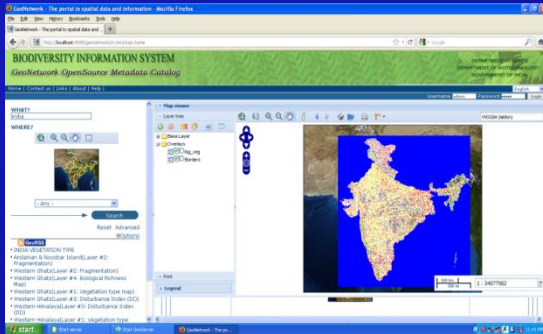
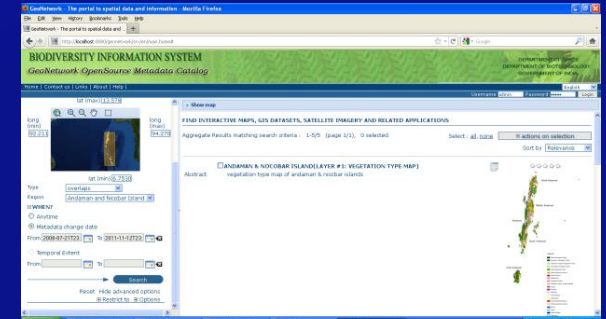
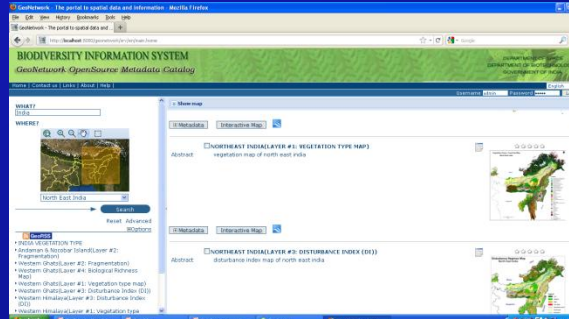
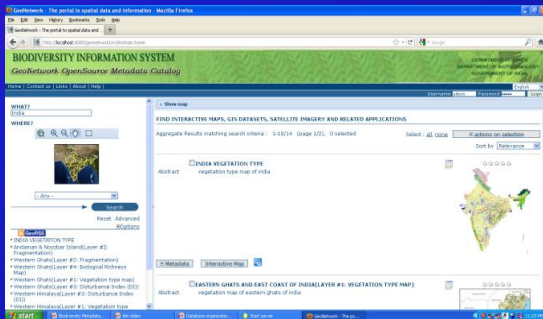
Biodiversity Metadata Catalogue Portal is a standard based and de-centralised spatial information management system, designed to enable access to geo-referenced biodiversity databases and from a variety of data providers through descriptive metadata, enhancing the spatial information exchange and sharing between organizations and their audience, using the capacities and the power of the Internet.



WHAT

WHERE

WHEN



# Indian Bio-resource Information Network

Indian Bioresource Information Network

Home Help Site Map

ABOUT IBIN STRUCTURE COMPONENTS NODES TEAM TECHNOLOGY CONTACT

IBIN DATA

Site search:  Search

**SPECIES DATA**

- Jeeva Sampada
- Plants of India
- Western Ghat's Plants
- Others

**SPATIAL DATA**

- Jeeva Mandhira- Spatial Node
- Web Map Services (WMS)
- Metadata

**IMPORTANT NOTES**

- Data Policy
- Data Providers
- How to Browse
- Technical Support
- Legal Issues

**RELATED SYSTEM**

- Biodiversity Information System
- BIOSPEC Query Shell

Welcome to Indian Bioresource Information Network

Indian Bioresources Information Network (IBIN) is a distributed national database infrastructure offering information on diverse aspects of bio-resources of the country. The IBIN logo contains three circles which represent the three components our planet that sustains our biological systems: **Blue** for water; **Green** for vegetation and other life and **Brown** for soil or earth. These also represent the three elements viz., aquatic, terrestrial and aerial habitats that sustain the entire life system. The three are also shown to be merging smoothly suggesting critical inter-linkages among the diverse life sustaining systems.

DBT nisc iirs UAS

1,846 Visitors  
26 May 2010 - 19 Nov 2011

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010476

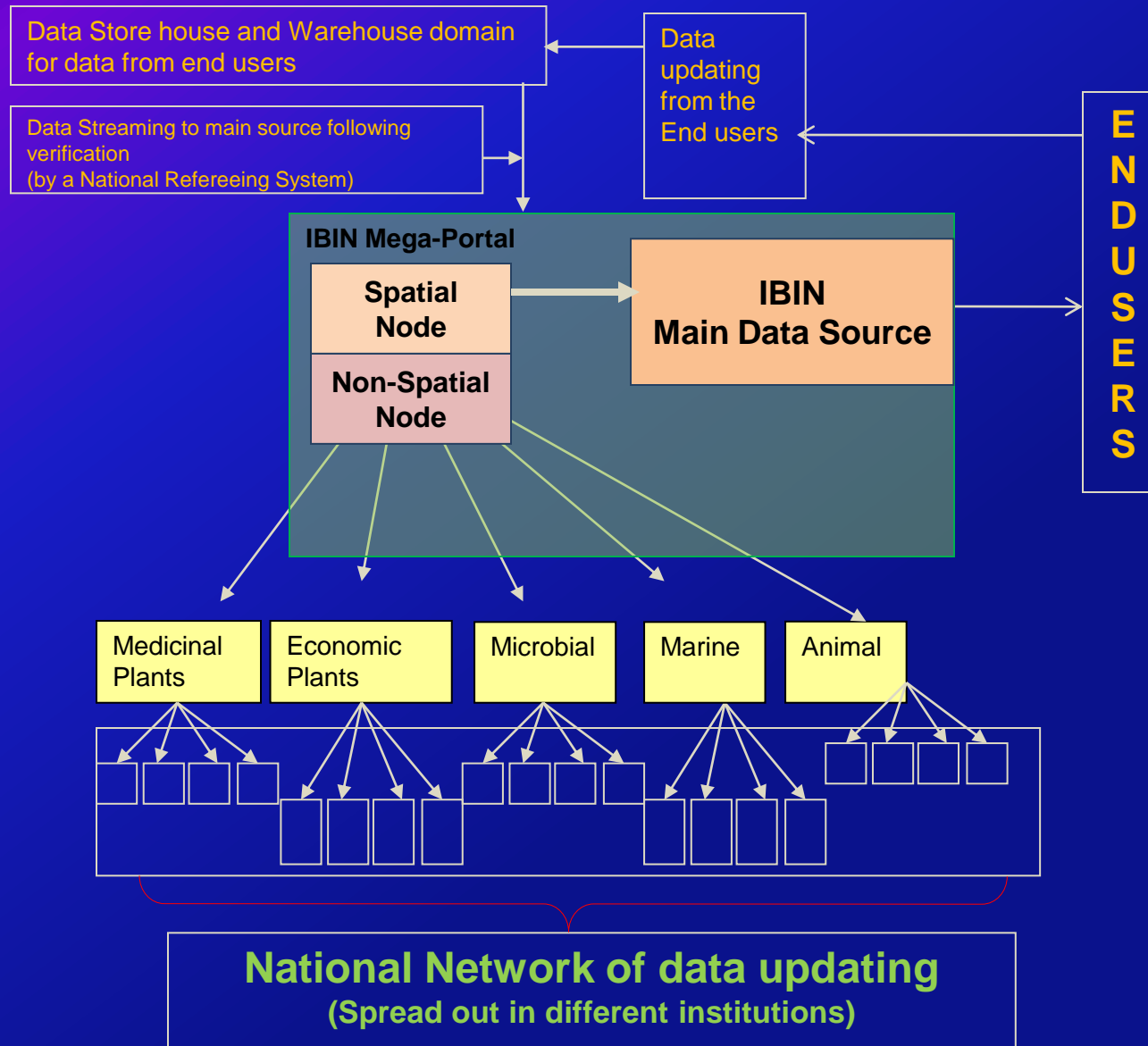
There is an urgent need to bring in one common platform the distributed information on biodiversity like :

- faunal data of Zoological Survey of India,
- Historical plant species and distribution database of Botanical Survey of India,
- other biodiversity related database of various other universities and institutions,
- traditional knowledge mostly unwritten about the medicinal properties and other economic uses of the plants and animals.

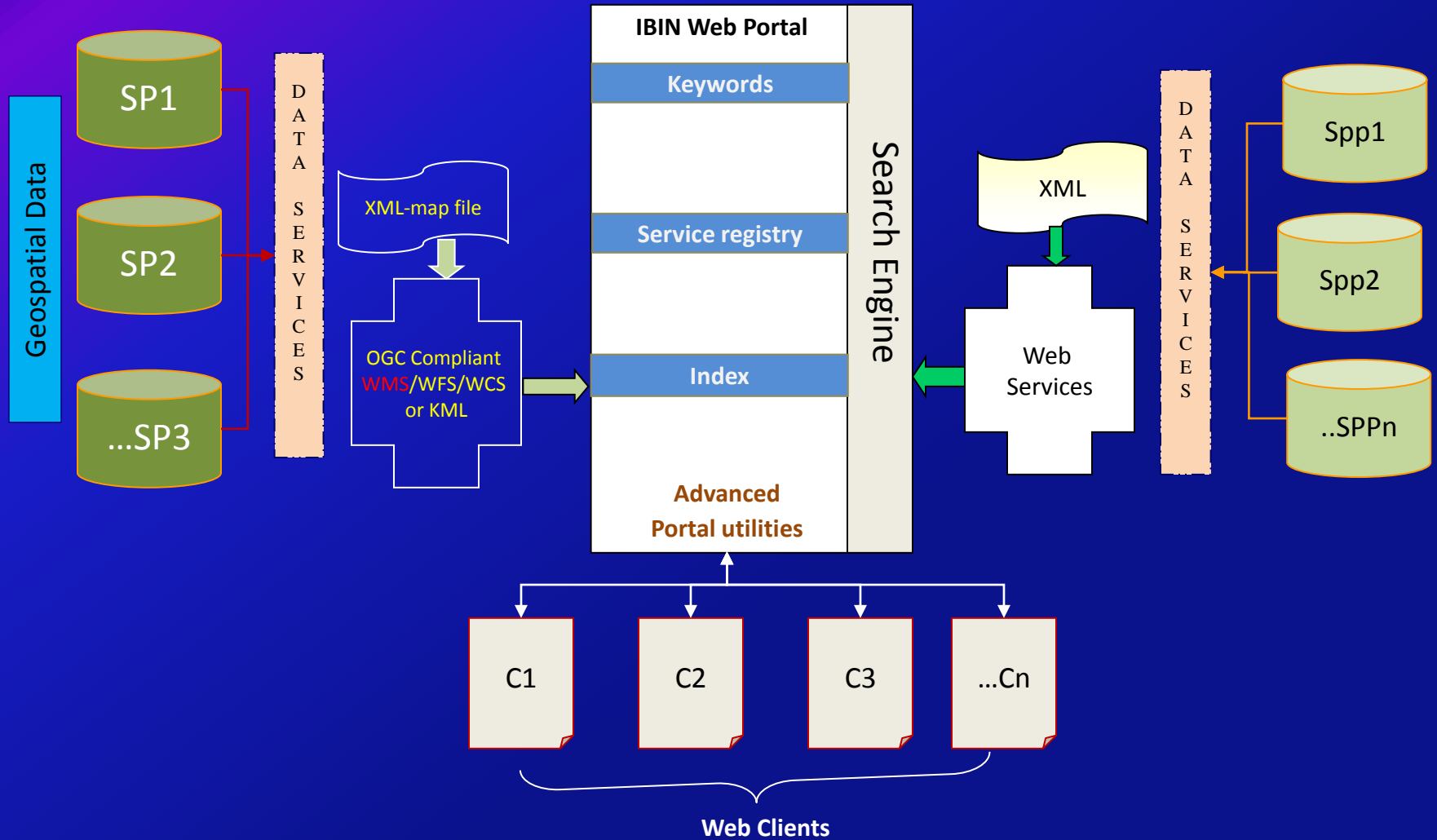
The web-portal enables data organization, services and dissemination wherein each data source of the parent institution will act as a node for web portal in form of Indian Bio-resource Information Network (IBIN).



# INTEGRATION OF BRICS AND CORE DATA SETS INTO IBIN PORTAL



# SYSTEM ARCHITECTURE FOR IBIN PORTAL



# Database contributed by nodes and brics

## IIRS - Spatial Node

### BCLL National Spatial Database

- Vegetation Type
- Fragmentation Type
- Disturbance Index
- Biological Richness

### BCLL Sample Plot Grids: 16518 Sample Plots

- Grid Based field plots
- Sample Plot Info
- Species Info
- Species Diversity Info
- Medicinal Info
- Economical Info
- Endemic Info

## UAS - Non Spatial Node

### Databases of biodiversity and bioresources in India

#### Digitized inventory of Plant and Animal Resources

- **Plant Resources of Karnataka**
- **Sasya Sahyadri:** 6,100 species of plants of Western Ghats,
- **Sasya Bharathi:** 13, 000 species plants of South India
- **Crotalaria – Sesbania:** 175 species of genera *Crotalaria* and *Sesbania* of India
- **Sahyadri Pathangam:** 300 species of butterflies in Western Ghats
- **Pathanga Suchya:** 120 species of butterflies of the Bangalore region
- **Bird database:** 1200 species of birds
- **Other Insect databases:** Tiger, Beetle and Ants
- **Sasya Sampada:** Medicinal and Economic Plants of India

## BRICS

**FRLHT:** Medicinal plant database especially Ayurveda / Sidhdha Unani

Swarigpa and Folk data Nomenclature corrélation, taxonomy, images etc

**NBRI:** 7520 Herbarium specimens 1977 Plant sps Morphology Distribution and Legumes

**NEHU:** Spatial and non-spatial data on Helmenth parasites, mosquitoes, fish and insects Plants Microbes, Fermented food and beverages Nematodes (AICOPTAX)

**IHBT:** High altitude plants (1000)- Taxonomy, distribution, uses of plants and images. Spatial data and geo-reference data

**ATREE:** Bird data, Plant database, Ants database and Public domain data captured on IBIN Portal

**CASCCR, KOLKATA:** Cytogenetics data, karyotypes and chromosome images of Plants 2015 species:

# UAS, Bangalore

**SPECIES DATA**

- Jeeva Sampada
- Plants of India
- Western Ghat's Plants
- Others



# Distributed Searching Portal

Indian Bioresource Information Network

Home | Help | Site Map

ABOUT IBIN | STRUCTURE | COMPONENTS | NODES | TEAM | TECHNOLOGY | CONTACT

IBIN DATA

Site search:  Search

**SPECIES DATA**

- Jeeva Sampada
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- Others

**SPATIAL DATA**

- Jeeva Manchitra- Spatial Node
- Web Map Services (WMS)
- Metadata

Welcome to Indian Bioresource Information Network

**IMPORTANT NOTES**

- Data Policy
- Data Providers
- How to Browse
- Technical Support
- Legal Issues

**RELATED SYSTEM**

- Biodiversity Information System
- BIOSPEC Query Shell

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DBI | **IBIN** | **IRSC** | 1,846 Visitors | **iirs** | UAS

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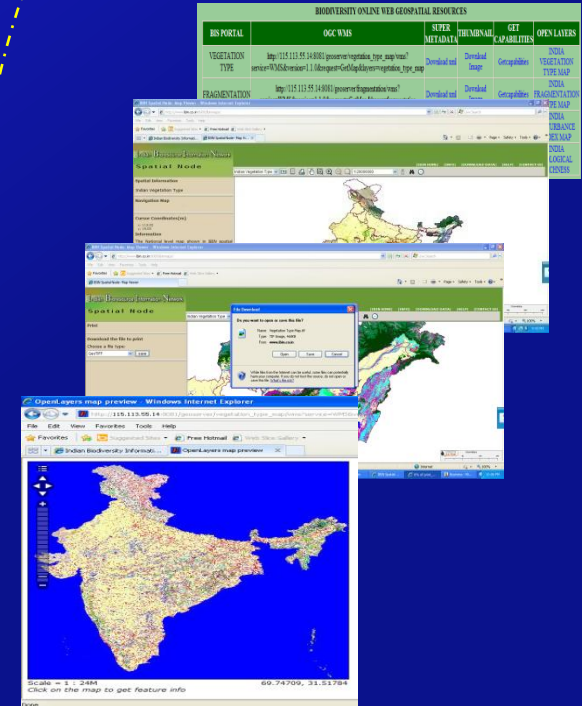
**Service Registry Catalogue**

- Spatial Data
- Species Data

# IIRS, Dehradun

**SPATIAL DATA**

- Jeeva Manchitra- Spatial Node
- Web Map Services (WMS)
- Metadata



## Species Data Browsing

- Jeevsampada
- Plants of India
- Western Ghats Plants
- Butterfly Conservation and Outreach

## Spatial Data Browsing

- OGC WMS Services
- Open Layers APIs
- Spatial Data Visualization
- Spatial Data Downloading

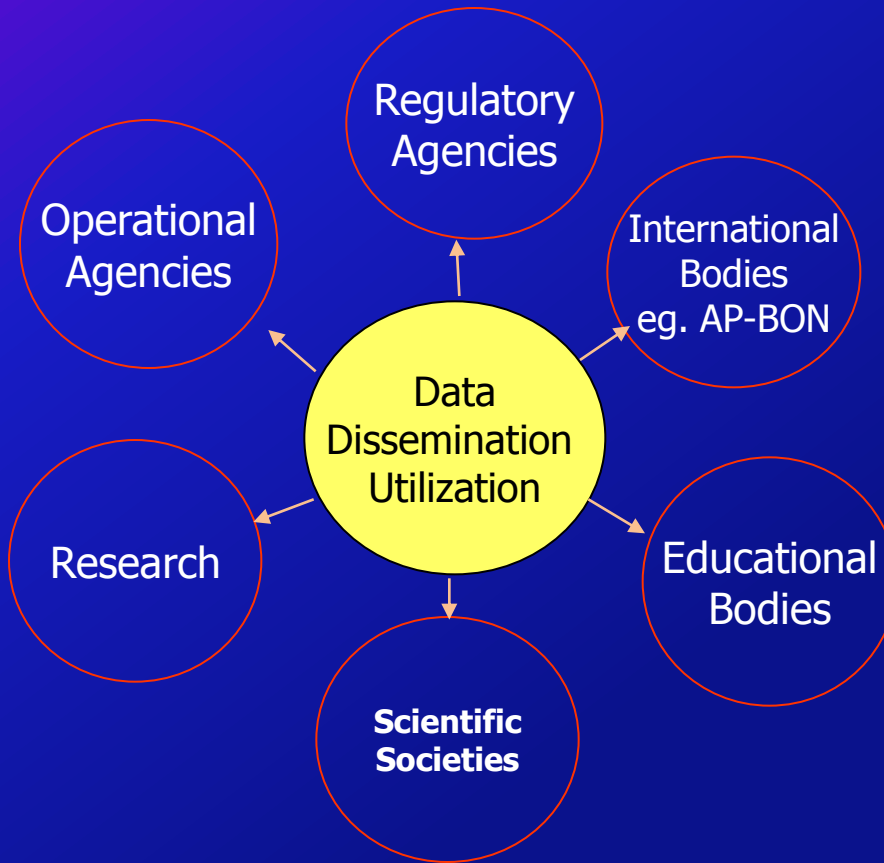
(www.ibin.co.in)



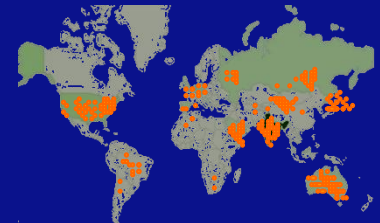
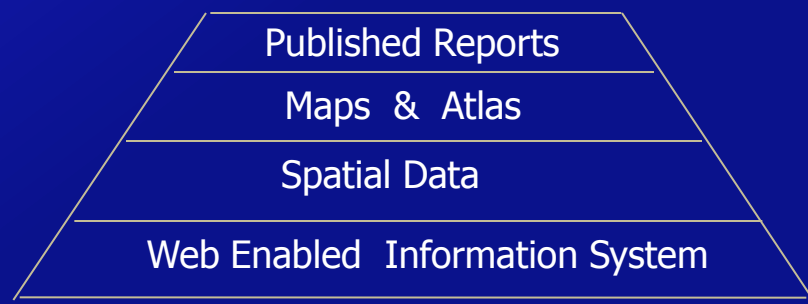
INDIAN BIORESOURCE INFORMATION NETWORK

# Prospective Users and Dissemination

Biodiversity Boards  
 Forest Departments  
 Wildlife Agencies  
 Pollution control Boards  
 NGOs  
 State & Central Ministries



Research Institutions  
 Colleges  
 Schools  
 Scientific bodies





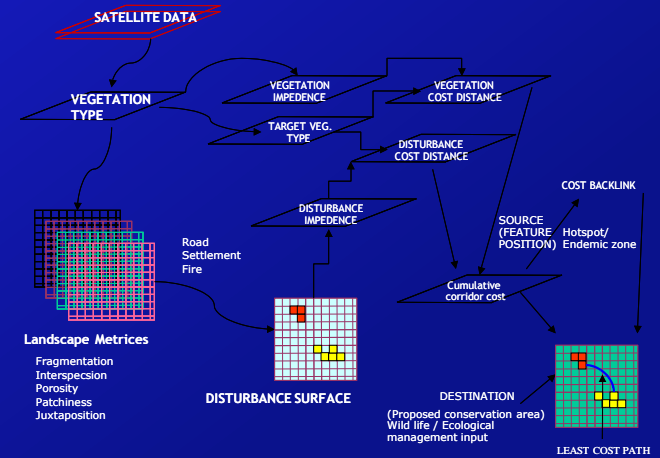
# Ongoing, proposed and future research directions



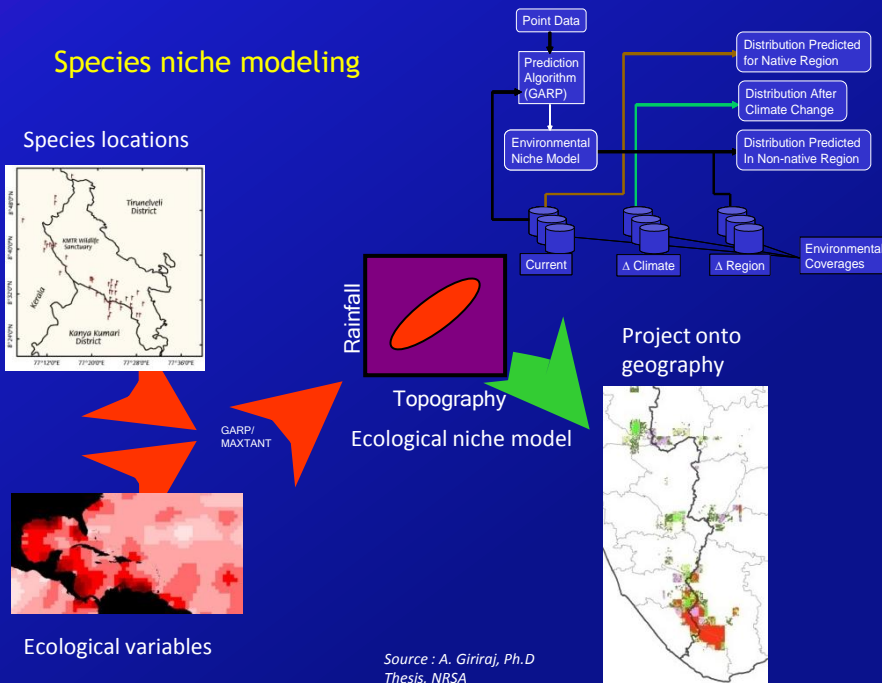
High altitude ecosystem studies in Indian Himalayas

- ❖ Ecosystem service valuation
- ❖ Carbon sequestration and stock
- ❖ Disturbance
- ❖ Fragmentation

## Geospatial Modeling of Ecological Corridor

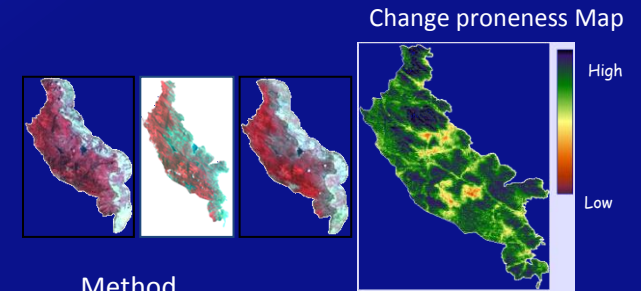


## Species niche modeling

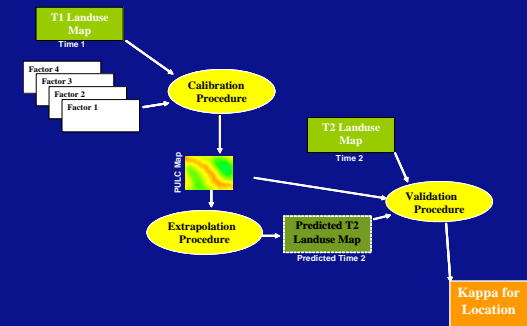


Source : A. Girraj, Ph.D Thesis, NRSA

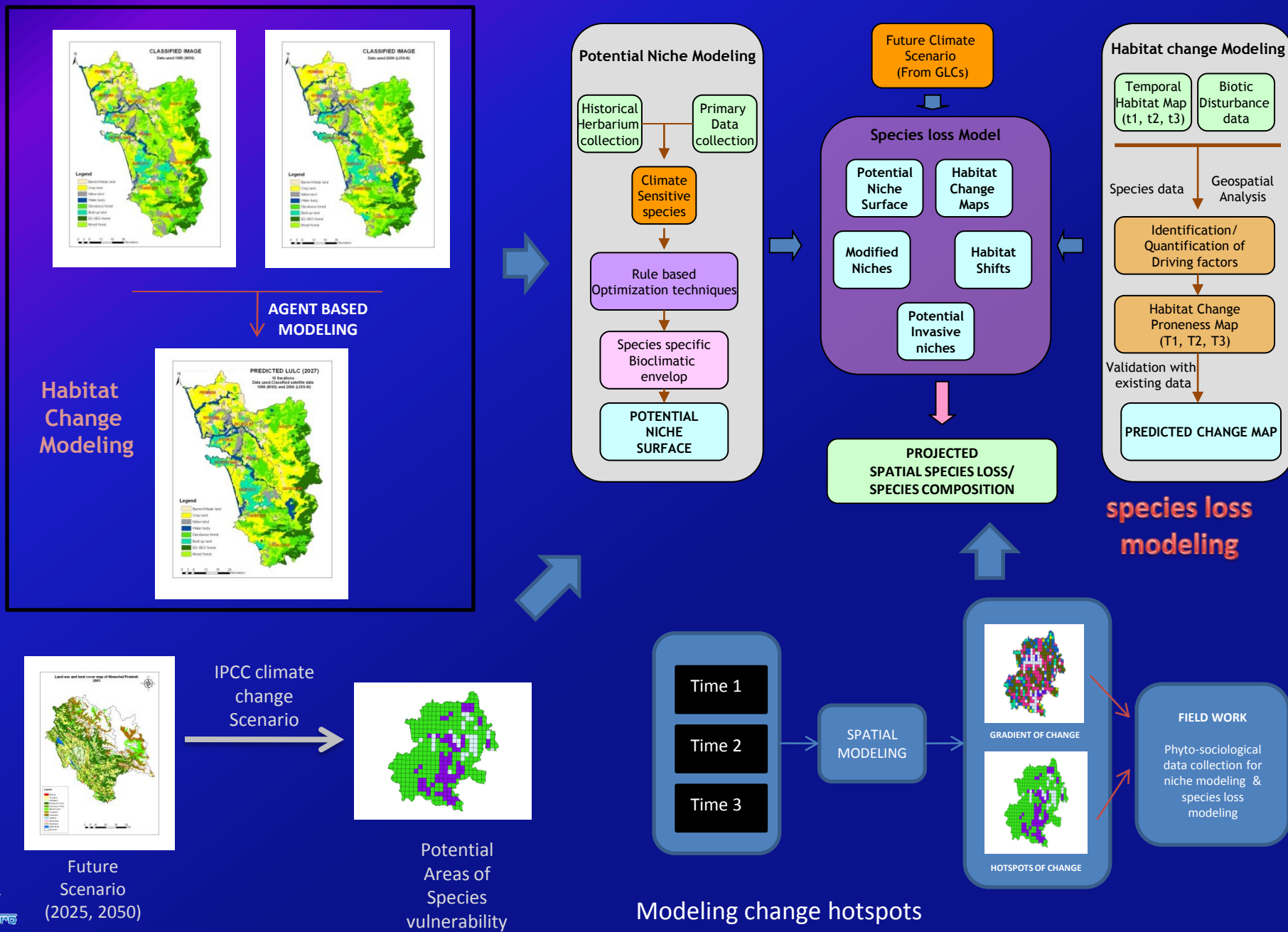
## Land cover change simulation



### Method



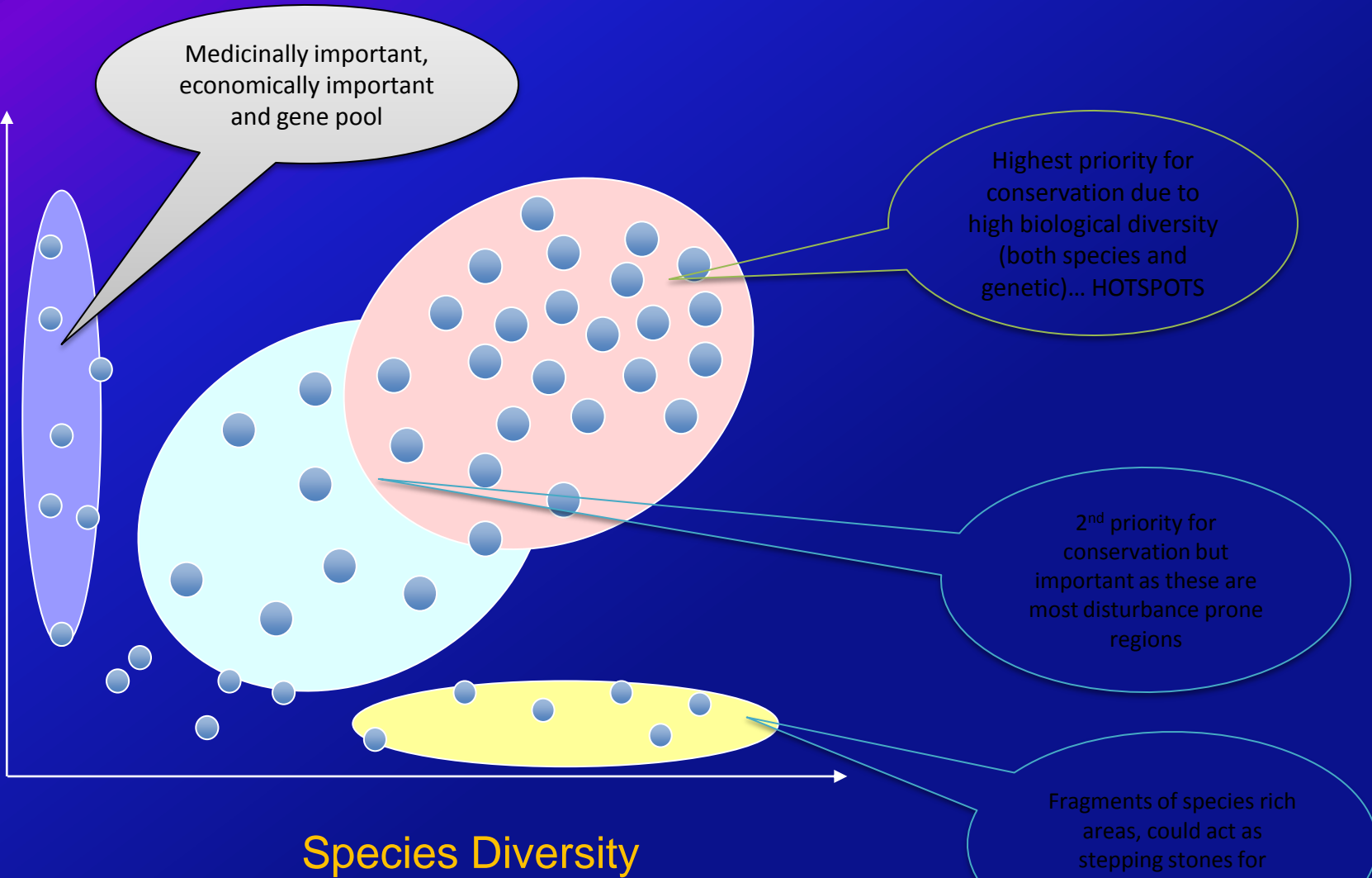
# Ongoing proposed and future research directions



# Approach for Prioritization



Genetic Diversity



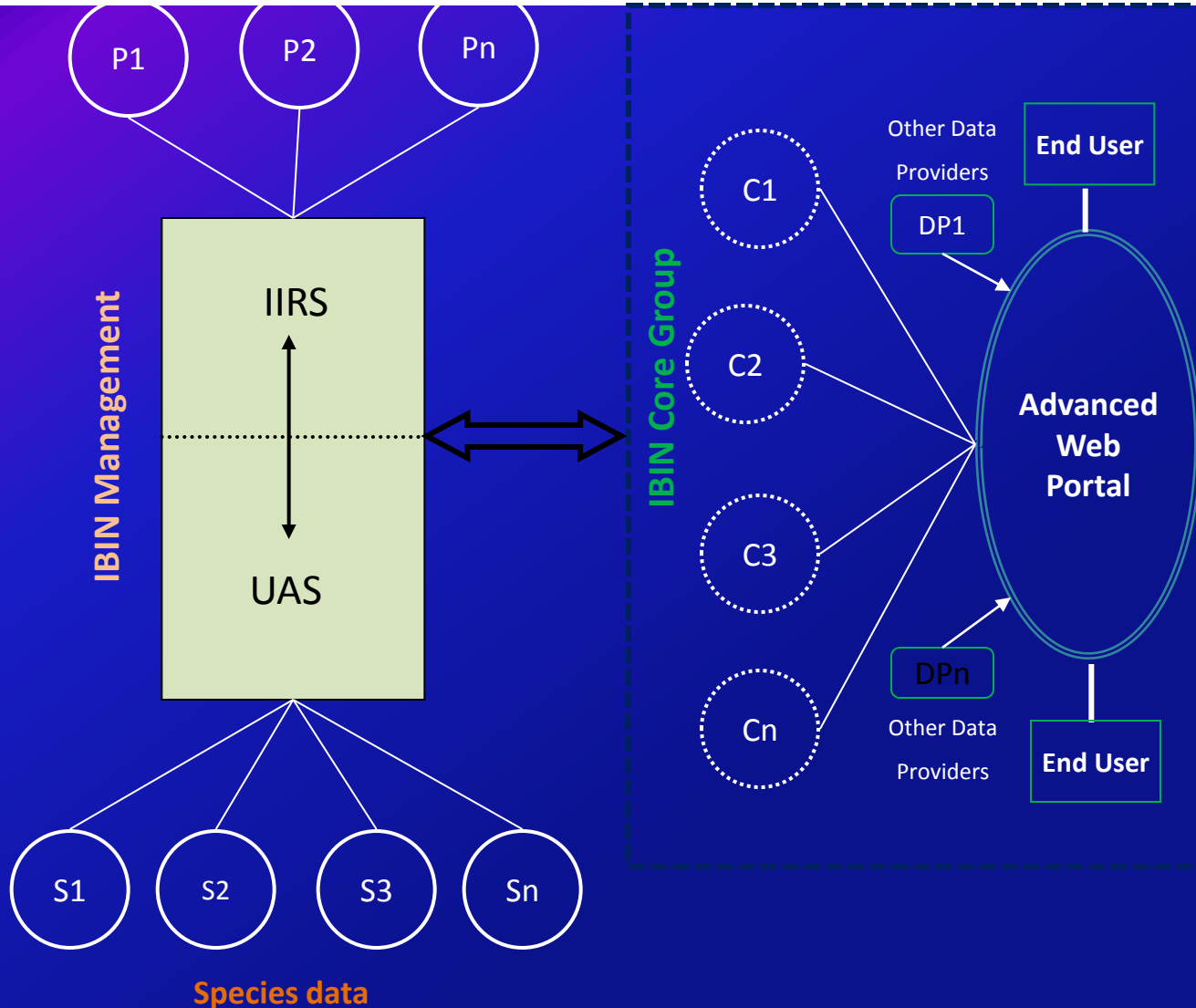


*Decade of biodiversity signifies  
value of biodiversity to all our lives*

*Space provides vantage point for monitoring and studying biodiversity as a  
complete system.....*

**Thank you.....**

## Spatial data from National Projects



- **Level 1 – The core contributors :**

Consortium of DBT, IIRS, UAS and primary line departments, institutions with core strength, Industries and NGOs

- **Level 2 – Data contributors**

The individual scientists, users and other NGOs