

NMSHE: An overview of Landscape Ecology and Visualization Laboratory



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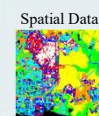
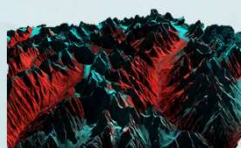


Introduction

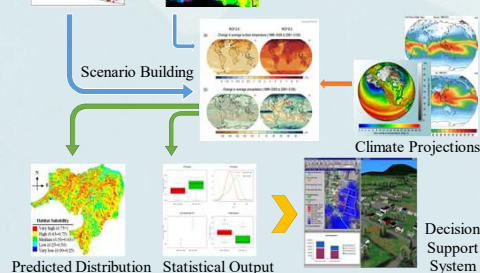
The Landscape Ecology and Visualization Laboratory (LEVL) has been established at Wildlife Institute of India as a part of National Mission for Sustaining the Himalayan Ecosystem (NMSHE), a program being coordinated by the Department of Science and Technology (DST), Government of India.

The LEVL is aimed at developing infrastructure to provide hardware and software capabilities that allow

- Creation of inter-operable spatial database
- Linking field data and GIS data
- Spatial analyses and modeling to map species distribution and to discern various drivers of biodiversity responses
- Climate change scenario building
- 2D and 3D visualizations
- Capacity building for developing adaptations and policy planning.

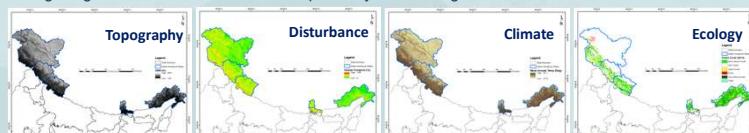


Methodology



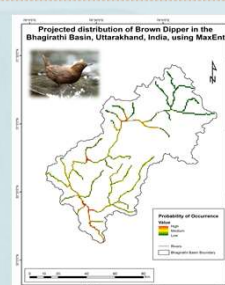
Spatial Database

A total of 35 datasets have so far been compiled; Administrative Boundary (9), Topography(3), Disturbances (3), Climate (6), Hydrology (4), Socio Economic (3) and Ecology Data (7). Field data are being integrated to the database for interoperability and sharing.

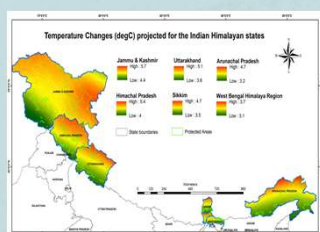


Distribution Model

- Distribution of Brown Dipper was estimated using "Presence Only Model" considering climatic and anthropogenic factors.
- Human Footprint (33.2%) and Annual Precipitation (29.8%) were found to be the best predictors.
- Accuracy of prediction: AUC=0.81

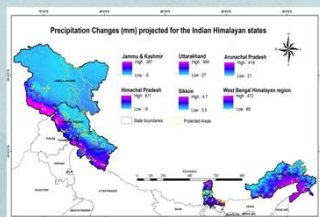


Climate Change Scenarios



Temperature

- Changes of more than **5.7° C** in the long term (2080) RCP85
- More pronounced in the upper ranges of IHR

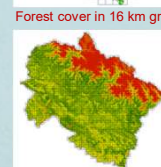
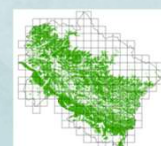


Precipitation

- Increase in precipitation up to **25%** in the long term (2080) RCP85
- Prominent trend of shift towards higher altitude

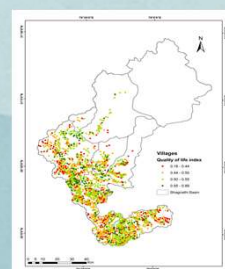
Multiscale Determinants

- **Temperature** is the most important determinant at all scales (16km, 4km & 1km grids).
- Seasonal extremes are the controlling factors operating at both the medium and fine scales.
- Changes in productivity were driven primarily by **precipitation**.
- Human factor is the primary driver behind decline in productivity.



Decision Support

- Population Census of India (2011) data was used to depict human well-being in Bhagirathi basin.
- Quality of Life Index, a proxy to understand human well-being and exploring interactions amongst different ecosystem services



Implications and Policy Interface

A strong public participation in environmental governance could increase the commitment among stakeholders, which would also strengthen the compliance and enforcement of policies. At LEVL, we focus on spatially explicit information in three-dimensional (3D) perspective views for effectively engaging stakeholders and to visualize futuristic impacts for efficient climate change adaptation and mitigation strategies in the IHR. The outputs are likely to provide scientific support to DST and MoEFCC for national level discussions and international negotiations.

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