

Humboldt's Enigma

Why in news?

Explorers and naturalists have been curious why some areas are more biodiverse than others.

What is Humboldt's enigma?

- It is a term used to describe the puzzle of why some mountain regions, especially in the tropics, have exceptionally high biodiversity, contrary to the expected decrease in diversity away from the equator.
- It is named after **Alexander von Humboldt**, a 19th-century naturalist who explored the relationship between climate, geography, and species distribution.
- Humboldt's enigma challenges the conventional wisdom that the most biodiverse areas are the lowland tropical forests.
- **Tropical diversity**- They have more energy, resources and ecological niches leading to higher biodiversity.
- The diversity decreases away from the tropics, but mountains have been an important exception which is the essence of Humboldt's enigma
- **Mountain diversity**- Mountains play a key role in generating and maintaining diversity.
- The factors that drive biodiversity on mountains such as climate, geology and evolutionary processes.

What drives the biodiversity in mountain?

- Mountains can act as cradle or museum of species, depending on their history and stability.
- **Geological process**- Uplifts result in new habitats where new species arise, so the habitats are cradles.
 - **Northern Andes** in South America have diverse biomes and habitats supported by rich variety of species across elevation.
- **Climatic conditions**- Species on some climatologically stable mountains persist there for long time, so these spots are museums that accumulate many such species over time.
 - **Shola Sky Island in India**- Sholicola and the Montecincla ancient bird species have survived in isolated peaks of Western Ghats
- **Geological heterogeneity**- A key factor in biodiversity formation as different types of rocks and soils influence plant diversity and adaptation.
- Mountains with more geological diversity tend to have more biodiversity.
 - **Eastern Himalayas** have groups of birds which evolved elsewhere and dispersed to the Himalaya, resulting in higher diversity there.

What lies ahead?

- There is a need for more fine scale data on species distribution and evolution especially in under studied regions like the Eastern Ghats India to know about the rich biodiversity.
- National programmes such as National Mission on Himalayan Studies, the National Mission for Sustaining the Himalayan Ecosystem, and the National Mission on Biodiversity and Human Wellbeing should be strengthened, bolstered by the will to support basic research on diversity.

Quick facts

Steps taken to study biodiversity in India

National Mission on Himalayan Studies

- **Launch year**- 2015-16
- **Aim**- To provide much needed focus on the conservation and sustainable management of natural resources in the Indian Himalayan Region (IHR).
- **Goal**- To improve quality of life and maintain ecosystem health of the region to ensure long-term ecological security to the country.

National Mission for Sustaining the Himalayan Ecosystem

- **Launch year**- 2010
- It is one of the 8 missions outlined in the National Climate Change Action Plan (NAPCC) of India.
- **Aim**- To facilitate the development of long term policy measures for sustaining and safeguarding the Himalayan ecosystem, including Himalayan glaciers.

National Mission on Biodiversity and Human Wellbeing

- **Launch year**- 2018
- **Approval**- By Prime Minister's Science, Technology and Innovation Advisory council (PM-STIAC)
- **Aim**- To bring biodiversity and conservation to the forefront of Indian science, policy, and society's attention.

References

1. [The Hindu- What is Humboldt's enigma?](#)
2. [Science- Humboldt's enigma of mountain diversity](#)