GREATER NICOBAR INFRASTRUCTURE PROJECT: ENVIRONMENT

NEWS: Environment impact study for Great Nicobar project downplays earthquake risk

WHAT'S IN THE NEWS?

The Great Nicobar Infrastructure Project (GNIP) faces criticism for downplaying severe earthquake and tsunami risks in a highly seismically active zone, prompting environmental and legal scrutiny.

1. Context and Recent Development

- The Environmental Impact Assessment (EIA) for the Great Nicobar Infrastructure Project (GNIP) has reportedly downplayed the seismic risks in the region, including the potential of tsunami-scale earthquakes.
- The GNIP area was one of the worst affected during the 2004 Indian Ocean tsunami.
- The region lies in **Seismic Zone V**, the most seismically active zone in India.

2. About the Great Nicobar Infrastructure Project (GNIP)

- The GNIP includes key strategic and development components:
    - A trans-shipment port.
    - An international airport.
    - Township development.
    - A 450 MVA (Megavolt-Ampere) gas and solar-based power plant.
- It has received environmental and preliminary forest clearance from the Centre.

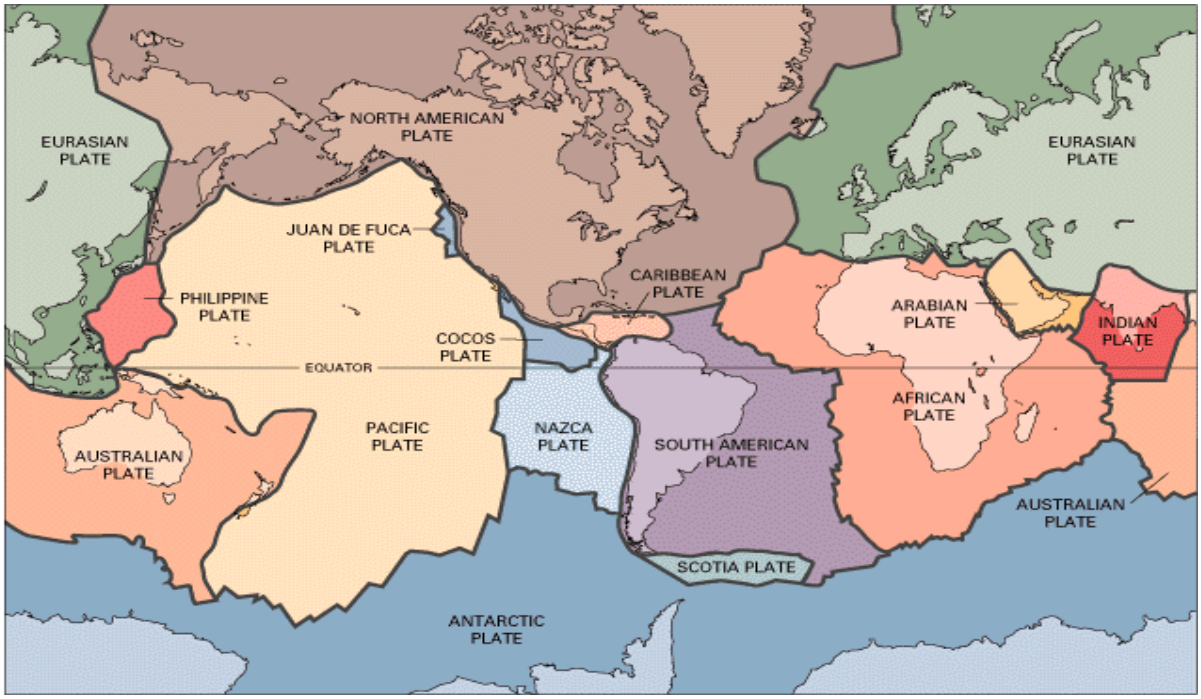
3. Concerns Raised

- **Ecological Impact**: Massive tree-felling, destruction of mangroves, and biodiversity loss.
- **Tribal Displacement**: Threat to the Shompen and Nicobarese tribes living in the area.
- **Seismic Risk Ignored**: The region lies on the Andaman Trench, where the Indian Plate sub-ducts under the Burmese Microplate—a tectonic process known to trigger large quakes.
- **NGT Involvement**: The National Green Tribunal has ordered a review of the EIA due to these ecological and seismic concerns.

4. Earthquake: Basic Concepts

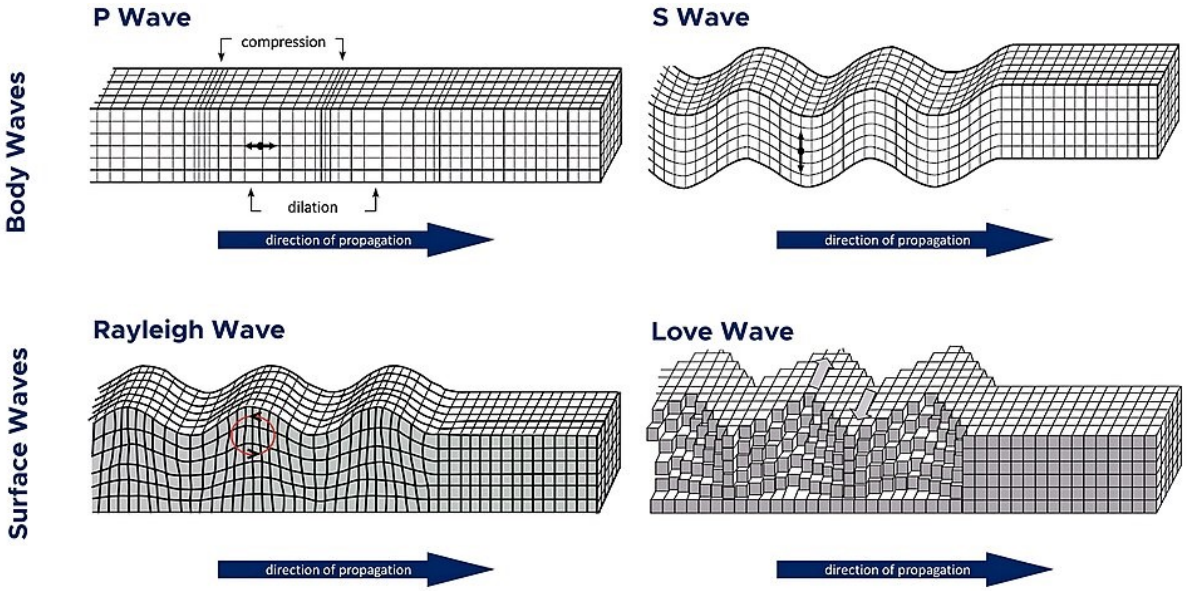
- **Definition**: Sudden shaking of the Earth's crust due to the release of energy from fault lines.
- **Cause**: Stress build-up from tectonic plate movements, especially at subduction zones.
- **Epicenter**: Surface location directly above the earthquake's origin point (hypocenter).

- **Seismic Zones**: India is divided into Zones II to V, with Zone V being the most earthquake-prone.



5. Seismic Waves

- **Body Waves**:
    - **P-Waves (Primary)**: Compressional, fastest, travel through solids, liquids, gases.
    - **S-Waves (Secondary)**: Shear waves, slower, travel only through solids.
- **Surface Waves**:
    - Travel on Earth's surface.
    - Cause maximum damage due to larger amplitude.
    - Slower than body waves but more destructive.

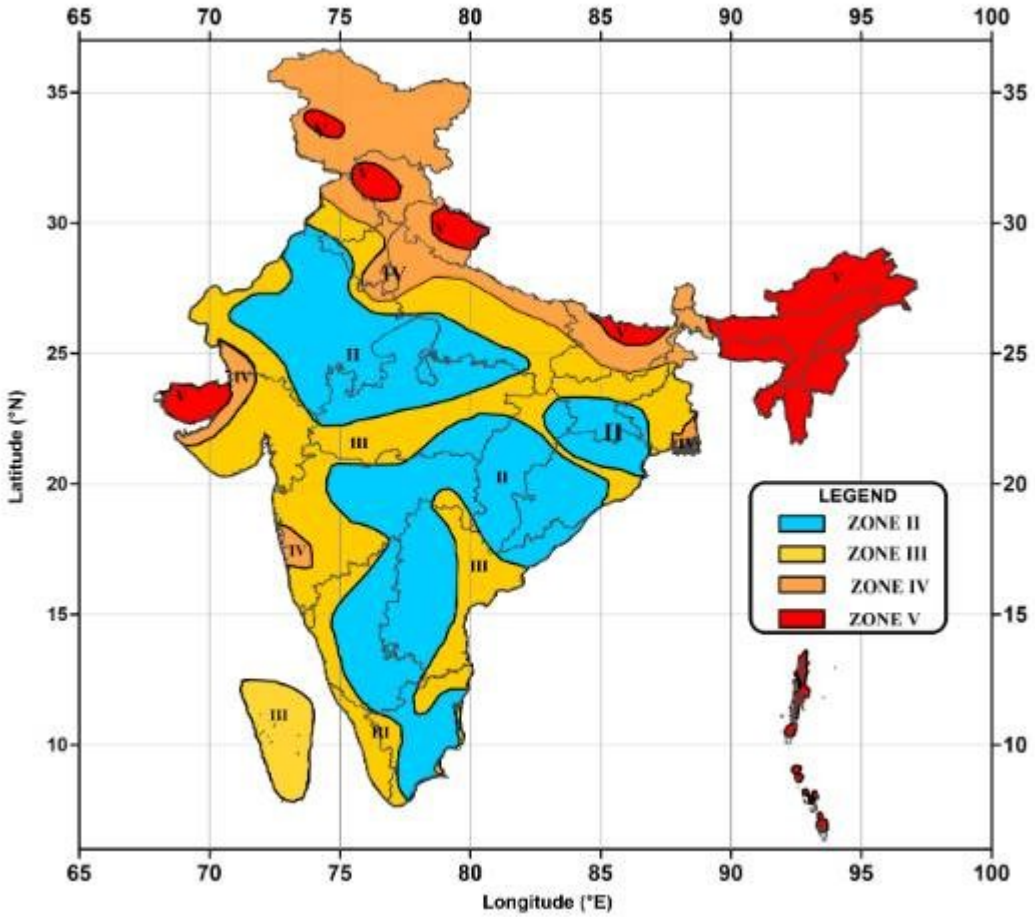


6. Earthquake Measurement Tools

- **Seismometer**: Instrument that detects and records seismic waves.
- **Richter Scale**: Measures the magnitude (energy released).
- **Mercalli Scale**: Measures the intensity (damage observed).

7. India's Earthquake Vulnerability

- **58.6%** of India's landmass is prone to moderate to high intensity earthquakes.
- Seismic Zonation:
    - **Zone V** (Very High Risk): ~11%
    - **Zone IV** (High Risk): ~18%
    - **Zone III** (Moderate Risk): ~30%
    - **Zone II** (Low Risk): ~41%
- The **Andaman and Nicobar Islands**, including Great Nicobar, lie in **Zone V**, making them highly vulnerable.



8. Subduction Zone and 2004 Tsunami

- The Indian Plate subducts under the Burmese Microplate in the Andaman Trench.
- This zone triggered the **2004 Sumatra-Andaman Earthquake**, with a magnitude of 9.1, causing a massive tsunami.
- GNIP's location in the same tectonic setting raises concerns over similar future disasters.

9. Need for Robust Earthquake Impact Assessment

- Infrastructure projects in seismically active zones must integrate seismic micro-zonation studies, tsunami modelling, and long-term geological data.
- Proper disaster-resilient design and strict EIA procedures must be enforced before approvals.

Source: https://www.thehindu.com/sci-tech/energy-and-environment/environment-impact-study-for-great-nicobar-project-downplays-earthquake-risk/article69777674.ece