Science & Technology · GS - III

Examine the significance of undersea optical fibre cable networks in strengthening digital connectivity, disaster resilience and strategic security in India's island territories.

EXAM YEAR	PAPER	SUBJECT
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MARKS	WORD LIMIT
15	~250 words

Answer Hint

Digital inclusion, submarine communication infrastructure, disaster management, network redundancy, maritime security, strategic connectivity, infrastructure challenges.

Model Answer

Introduction

Undersea optical fibre cables are critical digital infrastructure connecting geographically isolated islands with mainland communication networks. The proposed PANI project seeks to improve connectivity across eight Andaman and Nicobar Islands.

Significance

1. **Digital inclusion:** Enables reliable internet access, supporting education, healthcare, e-governance and financial services.
2. **Disaster resilience:** Provides dependable communication channels for early warnings, evacuation and emergency coordination.
3. **Strategic security:** Strengthens communication capabilities in the strategically important Andaman and Nicobar region.

4. **Economic development:** Facilitates tourism, fisheries, trade and digital entrepreneurship.
5. **Network redundancy:** Alternative connectivity routes reduce dependence on vulnerable communication links.

Key Challenges

- High installation and maintenance costs in deep-sea environments.
- Vulnerability to earthquakes, seabed movements and accidental cable damage.
- Difficult repair operations due to geographical isolation.
- Need for cybersecurity and protection of critical infrastructure.

Way Forward

India should develop redundant cable routes, strengthen island-level terrestrial networks, establish rapid repair mechanisms and enhance surveillance of critical undersea infrastructure.

Conclusion

Projects such as PANI can transform island connectivity from a developmental necessity into an instrument of national resilience and strategic preparedness.

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