Subsea Cables

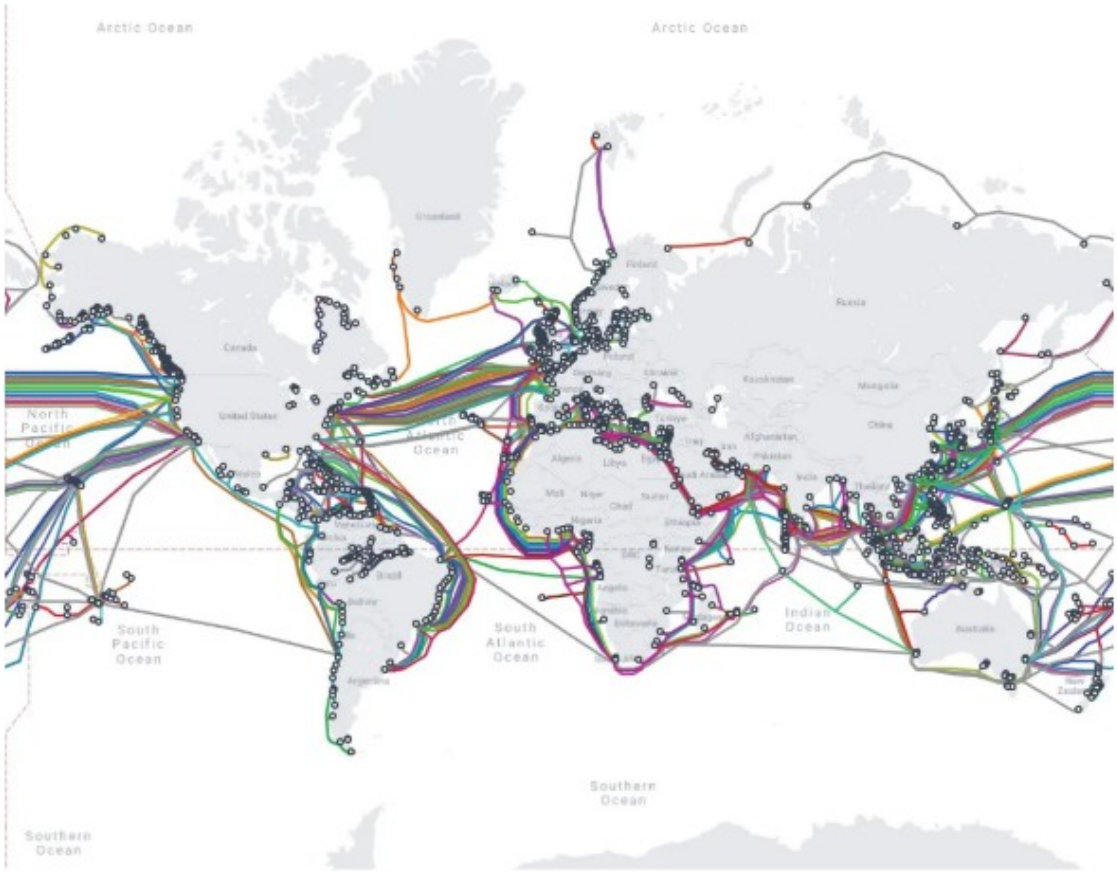
Mains: *GSIII – Infrastructure*

Why in News?

Recent suspected cable-sabotage incidents in the Baltic and Arctic regions have exposed vulnerabilities in subsea cables, making their protection vital for digital and economic security.

what is the Importance of Subsea Cables?

- **Subsea cables** – These are fibre-optic systems laid across the seabed that connect countries and continents.
- These cables *carry over 99% of international internet* traffic.
- They support:
  - International internet and telecommunications.
  - Global financial transactions and digital payments.
  - Government and defence communications.
  - Cloud computing and data-centre connectivity.
- Emerging technologies such as Artificial Intelligence (AI), which require high-bandwidth data exchange.
- Damage to a cable can disrupt connectivity, financial transactions, government services and emergency communications, potentially causing significant economic losses.



A map of undersea internet cables today. TeleGeography

Why are Subsea Cables Vulnerable?

- **Physical vulnerability** – Cables can be damaged by anchors, fishing activity, natural hazards and maritime accidents.
  - Recent incidents have raised concerns about deliberate sabotage by State or non-State actors.
  - The vast geographical spread of cable networks makes continuous surveillance difficult.
- **Cybersecurity risks** – Since sensitive information travels through these networks, disruption or compromise can have implications for data security and national security.
- **Concentrated supply chain** – Cable manufacturing is dominated by three major companies — Alcatel Submarine Networks (France), SubCom (US) and NEC (Japan).
  - Together, they have built around 90% of the cable length currently deployed.
  - Repair and maintenance capabilities are also concentrated among a limited number of specialised operators.
- **Limited repair capacity** – Cable repair requires specialised vessels, equipment and trained crews.
  - Limited global repair capacity can therefore increase the duration and economic impact of disruptions.
- **Changing Ownership** – Traditionally, subsea cables were financed and operated through telecommunication consortiums.
  - However, large technology companies or hyperscalers are increasingly investing directly in cable infrastructure because of rising bandwidth requirements.
- **Growth of AI** – It is further increasing demand for high-speed connectivity, as AI

applications generate large volumes of continuously changing data.
    - This is contributing to a shift from consortium-based models towards hyperscaler-led cable projects.
- **Implications for Digital Sovereignty** – The concentration of subsea cable ownership, manufacturing and repair capabilities raises concerns over digital sovereignty.
    - Countries may have limited control over Cable routes and landing sites, Availability and allocation of bandwidth, Repair and maintenance capabilities.
    - Hyperscaler-led projects may also favour direct intercontinental routes, potentially influencing the emergence of future connectivity hubs and data-centre locations.

India's Position
• **India** *currently has 18 subsea cables* landing at five major sites. • Although there is no identified immediate threat of deliberate sabotage in the Indian Ocean region, India remains vulnerable because: • Cable damage can be difficult to attribute. • Disruptions can affect economic and strategic communications. • India depends significantly on foreign companies for cable manufacturing and repair. • Regulatory and permit-related hurdles have historically discouraged domestic private investment in cable repair capabilities.

What is the Way Forward for India?

- **Develop domestic repair capacity** – India should encourage indigenous cable-repair vessels, specialised equipment and trained manpower.
- **Streamline regulations** – A single-window clearance mechanism can reduce delays in permits for cable laying, maintenance and repair.
- **Strengthen maritime surveillance** – Subsea infrastructure should be integrated into maritime domain awareness through satellite monitoring, Automatic Identification Systems and other surveillance mechanisms.
- **Diversify cable routes** – Multiple geographically diverse cable routes can prevent excessive dependence on a single connectivity corridor.
- **Promote public-private partnerships** – Given the capital-intensive nature of subsea infrastructure, government support can complement private-sector investment.
- **Strengthen international cooperation** – India should cooperate with other Indo-Pacific countries on cable protection, information sharing, rapid repair and mechanisms for attribution of deliberate damage.

What lies ahead?

- Subsea cables are the physical foundation of the global digital economy.
- Their increasing strategic importance, combined with concentrated ownership, repair capabilities, makes resilience a matter of both economic security and national sovereignty.
- For India, developing diversifying connectivity and strengthening maritime surveillance will be crucial to ensuring secure and uninterrupted digital connectivity.

Reference

[The Indian Express| Subsea Cables]