

HEALTH GS PAPER II
Compassion in Healthcare

The World Health Organization (WHO) recently released a report highlighting the need for compassion in primary healthcare.

What is Compassion in Healthcare?

- **Definition:** Compassion involves empathy, active listening, and responsive action tailored to the patient's context and emotions.

E.g. WHO defines it as “awareness, empathy, and action” in patient care.

- **Human-Centric:** Prioritises dignity, emotional support, and inclusivity in healthcare delivery

E.g. BHS's Amrit Clinics in Rajasthan focus on tribal patient dignity.

- **Continuous Engagement:** Involves building trust through sustained interaction and community engagement.
- **Personalised Support:** Care is adapted to socio-economic realities, especially in crisis situations.

E.g. An ASHA in Gujarat helps domestic violence survivors navigate care discreetly.

- **Whole-System Response:** Includes compassionate behaviour by staff at every level—ASHAs, doctors, and administrators alike.

Importance of Compassion in Healthcare:

- **Boosts Patient Trust:** Encourages early treatment-seeking and better adherence to medical advice.

E.g. TB patients like Tukaram trusted Amrit clinics due to dignified treatment.

- **Enables Responsive Systems:** Improves PHC response in disaster or epidemic situations.

E.g. Tamil Nadu's post-tsunami response was coordinated and compassionate.

- **Supports Vulnerable Groups:** Empowers ASHAs to identify and support violence survivors or elderly.

E.g. Gujarat's SWATI-trained ASHAs provide discreet referrals.

- **Enhances Health Outcomes:** People-centred care reduces mortality, relapses, and mental trauma.
- **Strengthens Health Infrastructure:** Compassionate systems attract higher footfall and engagement.

E.g. Amrit Clinics saw a rise from 40,000 to 51,930 patients in 3 years.

Challenges to Compassion in India's Health System

- **Overburdened Staff:** PHC doctors manage 40+ national programs, reducing time per patient.

E.g. Rajasthan PHC doctors juggle administration, reporting, and patient care.

- **Systemic Fragmentation:** Decentralisation without accountability hampers compassionate delivery.

E.g. Eastern India PHCs lacked epidemic training seen in Tamil Nadu.

- **Lack of Training:** Compassion and trauma-informed care are not integrated into medical education.
- **Infrastructure Gaps:** Shortages of drugs, diagnostics, and logistics disincentivise compassionate action.
- **Stigma and Fear:** Patients facing abuse or sensitive issues fear judgment from known community staff.

E.g. SWATI bypasses PHCs for counselling to protect survivor identity.

Way Ahead:

- **Curriculum Reform:** Include empathy and trauma-informed care in health education and in-service training.

- **Strengthen Support Systems:** Increase staffing and provide psychosocial support to frontline workers.

E.g. Tamil Nadu trains public health teams annually for disaster response.

- **Decentralised and Sensitive Care:** Empower ASHAs with referral pathways and community-based solutions.
- **Technology + Trust:** Digital tools must not replace human engagement but enhance outreach and diagnostics.
- **Systemic Integration:** Embed compassion into health policies and audits, ensuring it is measurable and not aspirational.

Conclusion:

Compassion is not a soft skill but a strategic necessity in healthcare. India's examples—from Amrit Clinics to Tamil Nadu's disaster response—show that when systems are responsive and respectful, outcomes improve significantly. A compassionate approach ensures equity, effectiveness, and trust—pillars for a robust public health future.

SCIENCE AND TECHNOLOGY GS PAPER III

Underwater Cables

Airtel's 2Africa Pearls subsea cable has landed in India, boosting internet capacity by 100 Tbps, highlighting the growing need for robust undersea cable infrastructure.

What Are Underwater Cables?

- **Definition:** Undersea or submarine cables are fibre-optic cables laid on the ocean floor that enable global internet and telecommunication connectivity.
- **Coverage:** As of early 2025, there are **over 600 active and planned cables** globally, spanning **1.48 million kilometres**.

How Do They Work?

- **Fiber-Optic Technology:** Cables carry data using light signals transmitted through **hair-thin glass fibres**, encoded by lasers at high speeds.
- **Signal Reception:** Receptors on the other end decode the light signals into usable internet data.
- **Seabed Placement:** Cables are either **buried near shores** or **laid directly on the ocean floor** in deeper regions.
- **Routing Strategy:** Careful mapping avoids **fault lines, anchor zones, and fishing areas** to minimize damage risk.
- **Transmission Capacity:** Each cable can carry **hundreds of terabits per second**, enabling seamless global data flow.

Key Features of Submarine Cables:

- **Thickness:** Comparable to a **garden hose**; core fibres are as thin as a **human hair**.
- **Protection Layers:** Composed of **plastic, steel wiring, and insulation**; extra armouring is used near coastlines.
- **Examples:**
- **Shortest:** CeltixConnect (131 km between Ireland and the UK).
- **Longest:** Asia-America Gateway (20,000 km).
- **Landing Points:** Connect to **onshore landing stations**, which then distribute the data via terrestrial networks.
- **Global Coverage:** Nearly all coastal nations are connected, with redundancy through **multiple cables** to avoid data blackouts.

Significance of Underwater Cable Connectivity:

- **Backbone of Internet:** Enables global data transfer including emails, streaming, financial transactions, and more.

- **Economic Enabler:** Supports \$10 trillion in global financial flows and 80% of trade via internet infrastructure.
- **Digital Sovereignty:** Reduces reliance on satellite-based or foreign-controlled connectivity options.
- **National Security:** Secure data transfer critical for defense and governance (e.g., encrypted diplomatic comms).
- **Growth Driver:** Fuels digital economy and innovation (e.g., cloud services, OTT platforms, remote work).

Challenges Associated with Subsea Cables in India

- **Vulnerability to Disruptions:** Cuts in Red Sea cables affected 25% of India's internet in 2023.
- **Limited Landing Points:** 95% of subsea cables land in a 6 km zone in Mumbai, creating a chokepoint.
- **Complex Regulations:** Over 51 permissions needed to land cables, delaying deployment.
- **Lack of Repair Infrastructure:** India lacks domestic repair vessels, relying on foreign ships with clearance delays.
- **Man-made Damages:** Fishing trawlers and dredging often damage cable lines (e.g., Versova coast, Mumbai).

Way Ahead

- **Regulatory Reforms:** Streamline multi-agency permissions through single-window clearances.
- **Geographical Diversification:** Develop new landing points (e.g., Vishakhapatnam, Kochi) to reduce chokepoint risk.
- **Build Repair Capacity:** Invest in Indian subsea cable repair ships and depots to reduce response time.
- **Public-Private Partnerships:** Encourage investments from telecom and digital giants for infrastructure sharing.
- **Strategic Planning:** Integrate cable infrastructure into India's Digital Public Infrastructure roadmap for resilience.

Conclusion:

Undersea cables are vital to India's digital economy, yet the country's current infrastructure is highly centralized and underprepared for disruptions. Streamlined regulation and strategic expansion are essential to ensure digital resilience and global competitiveness. A robust undersea ecosystem will power India's vision of Digital Bharat.

PRELIM FACTS

1. Kannadippaya GI Tag

Kannadippaya, a traditional tribal mat from Kerala, has been awarded the Geographical Indication (GI) tag, marking it as the first tribal handicraft from the state to receive such recognition.

About Kannadippaya GI Tag:

- *Kannadippaya*, meaning "mirror mat," is a **handwoven mat** made from **soft inner layers of reed bamboo**.
- **State of Origin:** It is crafted by tribal communities across Idukki, Thrissur, Ernakulam, and Palakkad districts in Kerala.
- **Unique Characteristics:**
- Known for its **reflective pattern**, it provides **thermal comfort**—warm in winters and cool in summers.
- Eco-friendly and **biodegradable**, it aligns with global sustainability trends.
- **Cultural Significance:**

- Preserved by indigenous tribes like **Oorali, Mannan, Muthuva, Malayan, Kadar, and Ulladan**.
- Its revival is essential to sustaining **tribal craftsmanship and livelihoods**.

About Geographical Indication (GI) Tag:

- A **GI tag** is an intellectual property label that certifies a product's **origin and quality** based on its **geographical source**.
- **Issuing Authority:**
- GI tags in India are governed by the **Geographical Indications of Goods (Registration and Protection) Act, 1999**.
- The Geographical Indication Registry under the Department of Industry Promotion and Internal Trade, Ministry of Commerce and Industry.
- **Year of Inception:** The first GI tag in India was awarded to Darjeeling Tea in **2004–05**.
- **Top GI Tag States:** **Uttar Pradesh** leads in GI-tagged products, followed by **Tamil Nadu**.

2. Seaweeds

- The **Pradhan Mantri Matsya Sampada Yojana (PMMSY)** aims to boost **India's seaweed production to 1.12 million tonnes** over five years.
- The **\$5.6 billion global seaweed industry** is expanding rapidly, with India's contribution increasing steadily.

What is Seaweed?

- **Seaweed is a marine plant** that grows in **oceans and seas**.
- It is **nutrient-dense**, containing **54 trace elements, vitamins, minerals, and amino acids**.
- It helps combat **cancer, diabetes, arthritis, heart disease, and high blood pressure** while also **boosting immunity**.
- **Unlike traditional crops**, seaweed **does not require land, freshwater, fertilizers, or pesticides**, making it an **eco-friendly and sustainable** agricultural resource.
- **Microscopic seaweeds**, such as **phytoplankton**, form the **foundation of marine food chains** and play a key role in **oceanic primary productivity**.
- **Large seaweeds**, like **giant kelp**, create **dense underwater forests** that serve as biodiversity hotspots, offering shelter and food to a variety of species.
- Seaweeds contribute to **oxygen generation and carbon sequestration**, playing a significant role in **climate regulation**.

3. Artificial Rains

- Delhi's Environment Minister recently chaired a meeting with key government agencies to explore the feasibility of artificial rain through cloud seeding.

About Artificial Rains

- **Artificial rain** refers to the process of **inducing precipitation** through **cloud seeding**, a weather modification technique.
- It is primarily used to **enhance rainfall**, combat **drought conditions**, and **reduce air pollution**.

How Does It Work?

- The method involves **dispersing chemicals** like **silver iodide, potassium iodide, and dry ice** into clouds to encourage the formation of raindrops using aircraft or helicopters.
- These chemicals **act as nuclei** around which **water vapour condenses to form larger droplets**, eventually leading to rainfall.
- The success of cloud seeding **depends on the presence of sufficient moisture and appropriate atmospheric conditions**.

Types of Cloud Seeding

- **Hygroscopic Cloud Seeding:** Accelerates the merging of droplets in liquid clouds, making them large enough to fall as rain.

- **Glaciogenic Cloud Seeding:** Introduces ice-forming agents into supercooled clouds, converting water vapour into ice crystals, which then melt into rain.

Alternative Technologies

- **Static artificial rain-inducing system:** Uses **natural ionisation technology** to stimulate precipitation.
- **Stratospheric Aerosol Injection (SAI):** A form of **solar geoengineering**, inspired by volcanic eruptions, where **aerosols like sulphur dioxide or other reflective particles** are injected into the atmosphere to **cool the planet and reduce smog**.
- **Diamond dust experiment:** Scientists have explored using **diamond dust** as a non-toxic, long-lasting alternative to **sulphur-based aerosols** for climate cooling. However, the **high cost (\$175 trillion)** makes it unfeasible..

ANSWER WRITING

Q. Examine the global economic implications of unilateral tariff measures by major economies in light of the recent U.S. rollout of ‘Liberation Day’ tariffs. In this context, analyse how India can mitigate associated risks and strategically leverage emerging opportunities in global trade realignments.

Unilateral tariff measures, imposed without reciprocal agreements, disrupt **global trade flows**, leading to retaliatory actions and supply chain shifts. The U.S. **‘Liberation Day’ tariffs**, aimed at boosting domestic manufacturing, reflect rising **protectionism**.

Global Economic Implications of Unilateral Tariff Measures

- **Disrupts Global Supply Chains:** Unilateral tariffs force companies to shift production, raising costs and disrupting established supply chains, affecting manufacturers and consumers worldwide.
For example: The **US-China trade war** led to Apple moving production from China to Vietnam and India, altering electronics supply chains.
- **Triggers Retaliatory Tariffs:** Affected nations impose counter-tariffs, escalating trade conflicts, reducing market access, and increasing costs for businesses globally.
For example: After US tariffs on **EU steel and aluminum**, the EU retaliated with tariffs on American whiskey, motorcycles, and jeans, impacting US exports.
- **Slows Global Economic Growth:** Higher tariffs reduce trade volumes, lower business investments, and increase inflation, leading to slower GDP growth worldwide.
For example: The **IMF** estimated that **US-China tariffs** reduced global GDP by **0.8%** in 2020, hampering economic recovery.
- **Shifts Trade Partnerships:** Countries affected by tariffs seek alternative markets, realigning global trade networks and benefiting nations offering competitive manufacturing.
For example: After **US tariffs on Chinese goods**, **Vietnam, India, and Mexico** gained from companies relocating manufacturing operations.
- **Weakens Multilateral Trade Frameworks:** Frequent unilateral tariffs undermine WTO principles, reducing trust in global trade agreements and encouraging protectionism.
For example: The US withdrawal from the **Trans-Pacific Partnership (TPP)** weakened collective trade strategies in the Asia-Pacific region.

How India Can Mitigate Associated Risks

- **Enhancing Domestic Manufacturing:** Improving infrastructure, logistics, and ease of doing business can reduce dependency on volatile global trade policies.
For example: The **Production-Linked Incentive (PLI) scheme** for electronics manufacturing attracted investments from **Apple, Samsung, and Foxconn**, reducing reliance on imports.
- **Diversifying Export Markets:** Expanding trade with **ASEAN, Africa, and Latin America** can reduce exposure to tariffs from major economies like the US and China.

For example: India's wheat and sugar exports to Indonesia and Brazil increased after trade tensions disrupted traditional suppliers.

- **Strengthening Bilateral Trade Agreements:** Negotiating preferential trade agreements with countries affected by US tariffs can secure stable market access.

For example: The India-Australia Economic Cooperation and Trade Agreement (ECTA) lowered duties on Indian textiles and pharmaceuticals, boosting exports.

- **Promoting Value-Added Exports:** Shifting from raw material exports to finished goods and high-tech products enhances competitiveness and reduces dependency on tariff-sensitive commodities.

For example: India's growth in pharmaceutical exports post-COVID was driven by value-added formulations rather than raw bulk drugs.

- **Developing Local Supply Chains:** Reducing dependency on imports by encouraging local component manufacturing helps counter supply disruptions due to tariff wars.

For example: The Atmanirbhar Bharat initiative pushed Indian auto manufacturers to develop local battery and semiconductor suppliers, reducing reliance on China.

How India Can Strategically Leverage Emerging Opportunities

- **Attracting Diverted Investments:** Companies shifting from China and tariff-affected regions can be incentivized to establish manufacturing hubs in India.

For example: Apple's contract manufacturers (Foxconn, Pegatron, Wistron) expanded in India after US-China trade tensions, boosting smartphone exports.

- **Positioning as a Manufacturing Alternative:** India can promote itself as a cost-effective, skilled-labor hub, benefiting from the China +1 strategy adopted by global firms.

For example: Vietnam and India gained from US firms relocating garment and footwear production post-China tariffs.

- **Boosting Free Trade Agreements (FTAs):** Strengthening regional trade partnerships with tariff-affected nations helps expand India's export footprint.

For example: The India-UAE CEPA agreement led to 35% growth in Indian jewelry and textiles exports to the Middle East.

- **Developing High-Tech Sectors:** Investing in semiconductors, electronics, and AI-driven industries enhances India's global export competitiveness.

For example: The Indian Semiconductor Mission aims to develop chip fabrication units, reducing import dependency.

- **Strengthening Trade Facilitation Policies:** Reducing bureaucratic hurdles, customs delays, and logistics costs enhances India's trade competitiveness.

For example: The implementation of faceless e-assessment for customs clearance reduced processing times for export shipments.

A balanced trade strategy is India's key to navigating the disruptions caused by unilateral tariff measures. Strengthening export diversification and enhancing domestic manufacturing through initiatives like PLI schemes can mitigate risks. As Keynes aptly noted, "The difficulty lies not so much in developing new ideas as in escaping from old ones." India must proactively embrace supply chain realignments and deepen regional partnerships to emerge as a resilient global trade player..

MCQ

1. With reference to Kannadippaya that recently received the GI tag, consider the following statements :

1. Kannadippaya is a traditional handwoven saree known for its distinctive check patterns and is native to Tamilnadu

2. The GI tag helps in preserving the cultural identity and provides legal protection to the unique weaving technique of kannadippaya

3. The registration of kannadippaya under the GI act is handled by the office of the

controller general of patents , designs and trademarks.

Which of the statements given above is/are correct ?

- a. 1 and 2 only
- b. 2 and 3 only**
- c. 1 and 3 only
- d. All three

2. Consider the following statements:

- 1. Aerosols (like sulphates and nitrates) trap heat and warm the Earth.
- 2. The absence of aerosols allows greenhouse gases to cause rapid warming.
- 3. Aerosols influence rainfall patterns.

How many of the statements given above are correct?

- a. Only one
- b. Only two
- c. All three
- d. None

3. Consider the following statements :

Statement-I : undersea cables are the backbone of global internet connectivity and are largely immune to natural disasters like earthquakes and tsunamis.

Statement-II : undersea cables carry over 95% global internet and communication traffic, making their damage a critical threat to economy worldwide.

Which of the statements given above is/are correct ?

- a. Both statement-I and statement-II are correct and statement-II is the correct explanation of statement-I
- b. both statements are correct, but statement-II is not the correct explanation of statement-I
- c. statement-I is correct, statement-II is incorrect
- d. statement-II is correct ,but statement-I is incorrect**

4. Consider the following statements :

statement-I : the smoot-Hawley tariff act of 1930, which raise tariffs on imported goods, was a major contributing factor to the deepening of the great depression.

statement-II :Reason® by increasing tariffs, the smoot-Hawley act reduced international trade leading to retaliatory tariffs from

other countries and further exacerbating the global economic downturn.

Which of the statements given above is/are correct ?

a. Both statement-I and statement-II are correct and statement-II is the correct explanation of statement-I

b. both statements are correct, but statement-II is not the correct explanation of statement-I

c. statement-I is correct, statement-II is incorrect

d. statement-II is correct ,but statement-I is incorrect

5. Which of the following species is endemic to the Nilgiri Biosphere Reserve?

- a) Bengal Tiger
- b) Olive Ridley Turtle
- c) Great Indian Bustard
- d) Star-eyed Bush Frog**

6. Consider the following statements regarding International Energy Efficiency Hub (IEEH):

1. It succeeded the International Partnership for Energy Efficiency Cooperation (IPEEC).

2. It focuses exclusively on financing energy efficiency projects for developing countries.

3. India's participation in IEEH is facilitated by the Bureau of Energy Efficiency (BEE).

4. Joining the IEEH aligns India's national initiatives with global energy efficiency efforts.

Which of the above statements is/are correct?

- (a) 1 and 2 only
- b) 1, 3, and 4 only**
- (c) 1, 2 and 3 only
- (d) 1, 2, 3 and 4

7. Consider the following statements about World Anti-Doping Agency (WADA):

1. WADA is funded entirely by the International Olympic Committee (IOC).

2. The World Anti-Doping Code standardizes anti-doping rules globally.

3. WADA focuses solely on conducting doping tests during international sporting events.
Which of the above statements is/are correct?
(a) 2 and 3 only
(b) 1 and 3 only
(c) **2 only**
(d) 1 and 2 only
8. Consider the following statements regarding the borrowing powers of the Union and State governments:
1. The Union government can borrow funds without any restriction on the source of borrowing.
 2. The State government can borrow within the territory of India but needs prior consent from the Centre if it owes outstanding loans to the Union.
 3. The borrowing powers of both the Union and States are subject to laws enacted by their respective legislatures.
- How many of the above statements is/are incorrect?
a) **Only one**
b) Only two
c) All three
d) None
9. Which of the following characteristics makes hypersonic missiles difficult to intercept?
a) Conventional propulsion systems
b) High payload capacity
c) Subsonic speeds
d) **Mid-flight manoeuvrability**
10. Consider the following statements regarding Armed Forces (Special Powers) Act (AFSPA):
1. AFSPA was enacted to address public order issues in disturbed areas.
 2. AFSPA is applicable in all northeastern states of India.
 3. The law permits armed forces to open fire after due warning if laws are contravened.
- How many of the above statements is/are incorrect?
a) **Only one**
b) Only two
c) All three
d) None



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