

Existential Threats Faced by the Panama Canal

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Why in News?

- The decline in water levels of Lake Gatun, the artificial reservoir key to the Panama Canal system's operation, as a result of climate change induced drought, is posing an existential threat to the canal.

About the Panama Canal:

- **Location:**

- It is an artificial 82-km (51-mile) waterway in Panama that **connects the Atlantic Ocean with the Pacific Ocean**, cutting across the Isthmus of Panama.
- **It was constructed by the US** (at a cost of 375 million dollars) and the first ship passed through the canal on August 15, 1914.
- The US government owned and operated the canal until 1999 when the Panamanian government started controlling **one of the most important shipping lanes in the world**.

- **Significance:**

- **Vital strategic asset:**
- The US has a vested interest in the secure, efficient, and reliable operation of the canal, as ~72% of transiting ships are either going to or coming from U.S. ports.
- For the US, the canal's strategic significance **encompasses national security, defense capabilities, diplomatic relations, and logistical resilience**.

- **Shorter transit routes:**

- It saves approx. 12,600 km in a trip between New York and San Francisco.
- Thus, enabling ships to avoid the lengthy and hazardous voyage around Cape Horn at the southern tip of South America.

- **Environmental benefits:** By providing a shortcut, the canal contributes to the reduction of carbon emission and helps mitigate the environmental impact of global maritime transportation.

- **Global supply chain:** The Canal connects 180 maritime routes that reach 1,920 ports in 170 countries, and about 5% of global maritime trade transits through it.

The Panama Canal System's Operation:

- The Panama Canal is not a simple channel of water connecting two larger water bodies.
- This is because the elevation of the **Pacific Ocean is slightly higher than the Atlantic**.
- This difference means that for a ship entering the canal through the Atlantic, it needs to gain elevation during its journey to the Pacific.
- Hence, **the canal works on a highly-engineered system**, which uses a system of locks and elevators to lift and drop vessels to the required sea level at either end of the canal.
- **The locks** are either flooded (to gain elevation) or drained (to lose elevation), and act as water elevators. **These locks are serviced using artificial lakes and channels.**
- Most of this water is supplied from **Lake Gatun** (the artificial reservoir key to the Panama Canal system's operation) using the force of gravity (no pumps are needed).

Potential Dangers the Panama Canal Faces from Climate Change:

- **The Panama Canal needs massive amounts of fresh water** to facilitate the passage of ships. **For instance**, the passage of a single ship needs more than 50 million gallons (almost 200 million litres) of water.
- While over 36 ships pass through the canal each day on average (Dec 2023), **traffic has dropped to as low as 22 ships a day now** (that too with a reduced cargo).

- **A drought driven by the El Niño** meteorological phenomenon has reduced water in the Lake Gatun, causing lengthy and costly disruptions to international trade and supply chains.
- Historically, there has been a rainfall shortage on average once every 20 years due to major **El Niño events**.
- However, the year 2023 is the 3rd major rainfall deficit (in the last 26 years) and this permanent problem stems from a larger issue of **climate change**, which threatens humanity.

What Can Be Done to Restore the Panama Canal's Significance?

- **Using ocean water to work the system of locks:** However, this will increase the salinity of Lake Gatun, which is also the source of drinking water for more than half of Panama's 4.4 million people.
 - **Creating a second source of water for the canal:** Recently, Panama's Supreme Court ordered to build a \$1.6 billion dam across Rio Indio, which will fix the problem for the next 50 years.
 - However, the reservoir of the dam will flood the homes of people, predominantly from the lower socio-economic strata.
 - They will have to be relocated, and will lose lands and livelihoods that they have had for decades.
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Q.1. What is the El Niño meteorological phenomenon?

The term El Niño refers to a warming of the ocean surface in the central and eastern tropical Pacific Ocean. Due to this, rainfall is below average over Indonesia and above average over the central or eastern Pacific.

Q.2. What is the significance of the Suez Canal?

The Suez Canal is considered to be the shortest link between the east and the west due to its unique geographic location. It is an important international navigation canal linking the Mediterranean Sea at Port Said and the Red Sea at Suez.

Source: [Why climate change poses an existential threat to Panama Canal](#)

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