

India's Coastline Recalculated

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India's Coastline Recalculated: Methodology, Challenges, and Impact

Context:

India's coastline has been **revised from 7,561.60 km to 11,098.81 km**, marking an **increase of 3,537.21 km**, or nearly **50%**.

This update results from advanced measurement methods and better mapping technology. Understanding the reasons and implications is crucial for policy, security, and planning.

Challenges in Measuring Coastline

- **Coastline Paradox:** Introduced by **Lewis Fry Richardson** in the 1950s, it highlights that the length of a coastline varies with the scale of measurement.
- **Fractal Nature:** **Benoît Mandelbrot** (1967) found coastlines exhibit **fractal-like properties** — the more detailed the measurement, the longer the coastline appears.
- **Ruler Dependency:**
 - A **200 km ruler** smooths out small features.
 - A **1 km ruler** captures every inlet, creek, and curve.
 - As the ruler gets smaller, the measured length **increases**.

Reasons for the Increase in India's Coastal Length

- **Change in Calculation Method:**

- Earlier methods used **straight-line distances**.
 - New method uses a **fractal approach**, recording every natural feature and curve.
 - **Higher Map Resolution:**
 - Previous data used a **1:4,500,000 scale** from the 1970s.
 - Updated data used **1:250,000 scale** electronic navigation charts by the **Survey of India** and **National Hydrographic Office (NHO)**.
 - **Updated High Water Line:**
 - Based on **2011 high tide data**.
 - River mouths and creeks were closed at a fixed inland point.
 - **Inclusion of Offshore Islands:**
 - About **1,389 islands/islets** not included earlier are now considered.
 - Coastline of each **individual island** is included in the final measurement.
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Revised Coastline Length by Region

- **Andaman & Nicobar Islands - 3,083.5 km**
- **Gujarat - 2,340.6 km**
- **Tamil Nadu - 1,068.7 km**
- **Andhra Pradesh - 1,053.1 km**
- **Maharashtra - 878.0 km**
- **West Bengal - 721.0 km**

- Kerala - 600.2 km
- Odisha - 574.7 km
- Karnataka - 343.3 km
- Goa - 194.0 km
- Lakshadweep Islands - 144.8 km
- Daman & Diu - 54.4 km
- Puducherry - 42.7 km
- Total - 11,098.81 km

The coastline will now be reviewed **every 10 years** using updated datasets.

Implications of the Updated Coastline

- **Maritime Security:**

- A longer coastline demands **enhanced maritime surveillance** and resource allocation.

- **Disaster Preparedness:**

- Helps in better planning for **cyclones, sea-level rise**, and other coastal hazards.
- Improves **zoning regulations** and **climate adaptation** strategies.

- **Exclusive Economic Zone (EEZ):**

- May result in an **expansion of marine rights** over natural resources like **fisheries, oil, and gas**.

- **Coastal Regulation and Development:**

- Requires updates to **CRZ norms** and coastal management plans.
- Affects **construction, tourism, and environmental conservation**.

- **Infrastructure Planning:**

- Enables more **accurate planning** of ports, industrial zones, and coastal projects.

- **Educational Revisions:**

- The revised length must be reflected in **textbooks and official documents**.

