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Q4

How are climate change and the sea level rise affecting the very existence of many island nations? Discuss with examples.

UPSC Civil Services Mains 2025 · GS I · 10 marks · Geophysical Phenomena

Important Geophysical phenomena such as earthquakes, tsunami, volcanic activity, cyclone etc., geographical features and their location-changes in critical geographical features (including water-bodies and ice-caps) and in flora and fauna and the effects of such changes.

Core demand of the question

- Link climate warming to thermal expansion and ice melt, then to sea-level rise
- Show how atoll and low island nations lose land, fresh water and legal identity
- **Use named examples:** Maldives, Tuvalu, Kiribati, Sundarbans as a delta cousin

Revision summary

Sea level rises mainly because seawater expands as it warms and because land ice melts.

Low atolls lose their freshwater lens and then their dry land to tides and storm surge.

The Maldives, Tuvalu, Kiribati and the Marshall Islands live inside that risk.

Legal identity, EEZ and citizenship become questions if territory disappears.

Deltas such as the Sundarbans drown in a related way even though they are not island states.

Introduction

Sea level does not rise as a metaphor. It rises because oceans **warm and expand**, and because **ice on land** slides into the sea. For a continent that is a few centimetres of a map, that is an inconvenience. For an atoll whose highest ridge is two or three metres, it is a question of **whether the country still exists**.

Body

The physical chain

Global mean sea level has risen by more than **twenty centimetres** since 1900, and the rate has **accelerated**. The IPCC links most of the recent rise to **thermal expansion** of seawater and to melt from **Greenland, Antarctica and mountain glaciers**. Storm surge then rides on a higher base. King tides flood streets that used to stay dry. Salt water pushes into thin **freshwater lenses** under coral islands, so wells turn brackish before the houses actually drown.

Nations that are also reefs

The **Maldives**, a chain of atolls in the Indian Ocean, has average island heights of one to two metres. Male's sea walls are a daily argument with the tide. **Tuvalu** and **Kiribati** in the central Pacific have already bought land or discussed migration pathways because some islets are uninhabitable in spring tides. **Marshall Islands** faces the same arithmetic. These are not

only environmental stories. They are **legal** stories. A State needs a defined territory. If the reef is under water, diplomats ask what happens to the **exclusive economic zone** and to citizenship.

Bangladesh's **Sundarbans** and parts of the **Ganga-Brahmaputra delta** are not island nations, but they show the same drowning of villages, cyclone deaths and saline fields. **Fiji** has moved inland villages. **Indonesia's** north Java coast is sinking under both sea rise and **subsidence** from groundwater pumping, which is a reminder that local geology can worsen a global trend.

Small islands also lose **airports, tourism and fish** when beaches erode. Culture is mapped onto a particular islet's graveyard and church. Climate finance and the **loss-and-damage** debates at the UNFCCC exist because these states did little to cause the carbon, and they cannot raise their islands by a Himalayan centimetre.

Existence here means land, water that can be drunk, a runway, and a name on the map that still has soil under it.

Flow diagram

Indian and Pacific oceans
Maldives
Tuvalu
Kiribati
Marshall Islands
South Asia
Sundarbans South Asia
Warming -> Thermal expansion
Warming -> Ice melt
Thermal expansion -> Sea-level rise
Ice melt -> Sea-level rise
Sea-level rise -> Maldives
Sea-level rise -> Tuvalu
Sea-level rise -> Kiribati
Sea-level rise -> Sundarbans delta

Conclusion

Warming raises the sea by expansion and melt. Atoll states such as the Maldives, Tuvalu and Kiribati lose fresh water and dry land first, then the ordinary meaning of a country. Deltas share the flood even when they are not sovereign reefs.

Facts & figures

Observed rise

Global mean sea level is more than about twenty centimetres above early-twentieth-century levels, with a faster rate in recent decades.

Maldives elevation

Most inhabited Maldivian islands sit only one to two metres above mean sea level.

Loss and damage

UN climate talks created a fund because small islands argued that adaptation money was not enough once land is gone.

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