Environment & Ecology · GS - III

Examine the ecological and socioeconomic impacts of marine heatwaves and swell surges along India's coastline. Discuss the role of ocean observation and early-warning systems in reducing coastal vulnerability.

EXAM YEAR	PAPER	SUBJECT
DAILY PRACTICE 04/11/2026	GS - III	Environment & Ecology

MARKS	WORD LIMIT
10	~150 words

Answer Hint

Rising sea surface temperatures, coral bleaching, fisheries and livelihoods, coastal flooding, erosion, INCOIS, ocean monitoring, early warnings, disaster preparedness, coastal resilience.

Model Answer

Introduction

Marine heatwaves and swell surges pose growing challenges to India's coastal ecosystems, communities and maritime activities. While marine heatwaves involve unusually high ocean temperatures, swell surges can produce powerful waves and hazardous coastal conditions.

Ecological and Socioeconomic Impacts

Marine heatwaves can cause coral bleaching, alter species distribution and affect fish breeding and migration. These changes threaten biodiversity and the livelihoods of fishing communities. Swell surges can inundate low-lying coastal areas, accelerate erosion, damage infrastructure and endanger fishers and coastal residents.

Role of Ocean Observation and Early Warnings

The Indian National Centre for Ocean Information Services (INCOIS) provides ocean information, forecasts and warning services. Satellite observations, ocean buoys and forecasting models can help identify hazards and communicate risks to coastal communities and maritime operators.

Way Forward

India should strengthen coastal monitoring, improve last-mile dissemination of warnings, protect natural buffers such as mangroves and restore vulnerable ecosystems. Coastal planning must incorporate climate risks and community preparedness.

Conclusion

Integrating ocean science with disaster management and ecosystem conservation can reduce coastal vulnerability and protect livelihoods in a changing climate.

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