

GOVERNMENT OF INDIA  
MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

**LOK SABHA**  
**UNSTARRED QUESTION NO. 1907**  
TO BE ANSWERED ON 29.11.2019

**Flood Risks due to Rising Sea Levels**

1907. SHRI SISIR KUMAR ADHIKARI:  
SHRI RAJIV PRATAP RUDY:

Will the Minister of ENVIRONMENT, FOREST AND CLIMATE CHANGE be pleased to state:

- (a) whether mean sea levels have risen in the last decade and if so, the details thereof along with the reasons therefor;
- (b) whether the Indian cities along the coastal areas are at high flood risks due to rising sea levels and if so, the details thereof;
- (c) whether the Government has prepared any survey/report in this regard and if so, the details thereof;
- (d) whether the Government has taken any steps for prevention and disaster management on account of rising sea levels; and
- (e) if so, the details thereof along with the other corrective measures taken by the Government in this regard?

**ANSWER**

**MINISTER OF STATE IN THE MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE**  
**(SHRI BABUL SUPRIYO)**

(a) According to the Special Report on 'The Ocean and Cryosphere in a Changing Climate' released in September 2019 by the Intergovernmental Panel on Climate Change (IPCC), Global Mean Sea Level (GMSL) is rising, with acceleration in recent decades due to increasing rates of ice loss from the Greenland and Antarctic ice sheets, as well as continued glacier mass loss and ocean thermal expansion. Total GMSL rise for 1902-2015 is 0.16 metre (likely range 0.12-0.21 metre). The rate of GMSL rise for 2006-2015 of 3.6 mm per year was about 2.5 times the rate for 1901-1990 of 1.4 mm per year.

(b) and (c) According to the information received from the Ministry of Earth Sciences, the rate of change in the sea levels estimated from the long term data (monthly mean sea levels) obtained from the sea level gauges installed at 10 major ports are given in the table below.

Sl. No.	Location	Rate of change of sea-level (mm/year)	Duration of data used (years)
1.	Chennai	0.33	1916-2005
2.	Diamond Harbour	5.16	1948-2005
3.	Haldia	2.89	1972-2005
4.	Kandla	3.18	1950-2005
5.	Kochi	1.30	1939-2005
6.	Mumbai	0.74	1878-2005
7.	Paradeep	1.03	1966-2005
8.	Port Blair	2.20	1916-1964
9.	Okha	1.50	1964-1991
10.	Vizag	0.97	1937-2005

Since no long term data on land subsidence or emergence are available for these locations, the rate of increase of sea level due to climate change cannot be attributed with certainty. For example, the higher rate of sea level increase at Diamond Harbour is also due to the larger land subsidence happening there. The same may apply to Kandla, Haldia and Port Blair as well. On an average, the sea level along the Indian coast is considered to be rising at about 1.70 mm/year meaning thereby that during the past 50 years, the sea level along the Indian coasts has risen by 8.5 cm. Further, satellite altimetry and model simulations showed that the North Indian Ocean (NIO) also exhibits decadal variability. During the last decade (2003-2013) it experienced sea level rise at a rate of 6.1 mm/year. The rising sea levels can exacerbate the coastal inundation along low lying areas during the extreme events such as tsunami, storm surge, coastal flooding and coastal erosion. However, the coastal areas that might get inundated due to the rising sea level need to be evaluated based on their elevation above mean sea level.

(d) and (e) The Government is implementing National Action Plan on Climate Change (NAPCC) which comprises eight missions in specific areas of solar energy, energy efficiency, water, agriculture, Himalayan ecosystem, sustainable habitat, green India and strategic knowledge on climate change. NAPCC provides an overarching framework for all climate actions. Thirty three States/Union Territories (UTs) have prepared their State Action Plan on Climate Change in line with NAPCC taking into account State's/UT's specific issues relating to climate change. The Government is also implementing the scheme, 'National Adaptation Fund for Climate Change' to support adaptation measures of States/UTs in areas that are particularly vulnerable to the adverse impacts of climate change.

The Government has taken a number of initiatives in protecting India's coastal areas and coastal communities, which include:

- (i) Formulation of the National Disaster Management Plan (NDMP) to assist all stakeholders including State Governments in disaster risk management of various hazards including hazards related to climate change. The revised NDMP, approved in October 2019, also highlights sea level rise and possible coastal inundation in order to sensitize stakeholders on this aspect.
- (ii) Regulatory measures like the issuance of Coastal Regulation Zone Notification 2019 and the Island Protection Zone Notification 2019 to regulate high impact activities on the coast and in maintaining coastal sustainability.
- (iii) Under the Integrated Coastal Zone Management (ICZM) project of the Ministry of Environment, Forest and Climate Change, the 'Erosion line' projected to the next 100 years based on the annual rate of erosion computed from high resolution aerial photographs and satellite images has been delineated over the entire coastline.
- (iv) ICZM Project also includes development of the Shoreline Management Plans by the State Governments for five coastal stretches namely, Gulf of Kachchh (Gujarat), Gopalpur to Chilika (Odisha), Paradip to Dhamra (Odisha), Digha to Sankarpur (West Bengal) and Sagar Island (West Bengal).
- (v) A Shoreline Change Atlas for the Indian Coast based on satellite data of 1989-91 and 2004-06 on 1:25000 scale and similarly a Coastal Vulnerability Index (CVI) on 1:100,000 scale for the entire country has been prepared. A web-based coastal service on shoreline change has been developed to disseminate information to all stakeholders using public domain tools.
- (vi) National Institute of Ocean Technology (NIOT), Chennai has completed two demonstration shore protection projects at in Tamil Nadu and Pondicherry for beach restoration.
- (vii) The Government has also initiated a project co-funded by Global Climate Fund (GCF) across the States of Andhra Pradesh, Maharashtra, and Odisha on enhancing climate resilience of India's coastal communities in these States.

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