

# Coastal Cities under Risk of Inundation by 2050

Hindustan Times (Front Page) carries an exclusive coverage on an RMSI Coastal Mapping Study – “Major Coastal Cities of India under threat due to rise in sea level by 2050”.

Print Coverage

hindustantimes.com  
MUMBAI METRO  
FRIDAY, APRIL 08, 2022



# Hindustan Times

FIRST VOICE. LAST WORD.

MUMBAI/METRO  
Friday, April 08, 2022

## Scouncer to Imran: Can't evade trust vote

**Reared In Lucknow**  
NEW DELHI: Pakistan Prime Minister Imran Khan defied a major blow on Thursday as the country's apex court ordered the dissolution of parliament and the convening of a session on April 14. It was a landmark ruling, a blow judge bench led by Chief Justice Umar-e-Raza Khan ordered an early election to the National Assembly by President Arif Alvi on the same day.

**Khan closer to ouster**  
Pakistan's rise that the dissolution of parliament was unconstitutional. A move that may spell the beginning of Imran Khan's ouster.

**IMRAN'S FATE TO BE DECIDED TOMORROW**  
THE NATIONAL ASSEMBLY WILL MEET AT 10 AM ON THURSDAY. FOR IMRAN, THIS MEANS THAT HE WILL HAVE TO FACE A CONFIDENCE VOTE. SOMETHING HE IS NOT EXPECTED TO SURVIVE AS THE OPPOSITION HAS MORE THAN 172 SEATS NEEDED TO OUST HIM.

**ANOTHER NO-CONFIDENCE VOTE FOR IMRAN**  
AFTER THE SC RULING, IMRAN WAS FORCED TO FACE ANOTHER NO-CONFIDENCE VOTE ON THURSDAY. THIS TIME, THE NATIONAL ASSEMBLY WILL MEET AT 10 AM ON THURSDAY.

**Oppn terms it victory of Pak constitution and institutions**  
NEW DELHI: The opposition has hailed the Supreme Court's ruling on Thursday as a victory for the constitution and institutions of Pakistan.

**IMRAN'S FATE TO BE DECIDED TOMORROW**  
THE NATIONAL ASSEMBLY WILL MEET AT 10 AM ON THURSDAY. FOR IMRAN, THIS MEANS THAT HE WILL HAVE TO FACE A CONFIDENCE VOTE. SOMETHING HE IS NOT EXPECTED TO SURVIVE AS THE OPPOSITION HAS MORE THAN 172 SEATS NEEDED TO OUST HIM.

## Fortified rice to be part of food schemes, midday meals

**Zia Heng**  
NEW DELHI: The Union cabinet on Thursday approved a programme to supply fortified rice to government-run food schemes and midday meals in order to tackle malnutrition and poor health outcomes of a large section of the population, a person close to the development said, requesting anonymity.

## Russia suspended from UNHRC, India abstains

**Prachar Jha**  
WASHINGTON: Triggered by a decision of Human Rights Council to suspend Russia, India abstained from voting on Thursday.

**Dramatic showdown**  
The 19th General Assembly on Thursday ended suspended Russia from the Human Rights Council.

## Police start seizing vehicles for driving on the wrong side

**MUMBAI:** The Mumbai police has started seizing vehicles of motorists driving on the wrong side of the road. A senior police officer said, despite a warning from the traffic police, several motorists were still driving on the wrong side of the road.

## Budget session ends after 11 bills pass both Houses

**NEW DELHI:** The budget session of Parliament has ended after 11 bills passed in both Houses. The session was held in the Lok Sabha and Rajya Sabha.

## BJP leader and son booked over INS Vikrant fund misuse

**MUMBAI:** A BJP leader and his son have been booked for the misuse of funds from the INS Vikrant fund. The police has filed a case against them.

## Imports of another 101 items to be phased out

**MUMBAI:** The government has decided to phase out the imports of 101 items. This move is part of the government's efforts to reduce the trade deficit.

## Sea link, WE Highway at risk of being submerged by 2050

**MUMBAI:** A study has revealed that the sea link and WE Highway in Mumbai are at risk of being submerged by 2050 due to rising sea levels.

## Delhi becomes first state to extend subsidy to electric cycles

**NEW DELHI:** Delhi has become the first state to extend a subsidy to electric cycles. The government has announced a scheme to provide a subsidy of up to ₹20,000 for the purchase of electric cycles.

## Rich farmers may soon face stricter tax scrutiny

**DELHI:** The government is planning to introduce a new law to increase the tax scrutiny on rich farmers. This move is aimed at reducing the tax evasion in the agricultural sector.

## ED questions Omar, vicious vilification

**MUMBAI:** The Enforcement Directorate (ED) has questioned Omar Abdullah on Thursday. The ED is investigating the alleged misuse of funds by Omar Abdullah.

## Disaster management, world at par with most developed countries

**AMIT SHAH:** The Union Minister for Disaster Management has said that India's disaster management system is at par with most developed countries.

## Delhi becomes first state to extend subsidy to electric cycles

**NEW DELHI:** Delhi has become the first state to extend a subsidy to electric cycles. The government has announced a scheme to provide a subsidy of up to ₹20,000 for the purchase of electric cycles.

## It's a proud Hindi moment, says Indian author on International Booker shortlist

**Gautam Shree:** The author of the shortlisted book 'The Nightingale' has said that it is a proud Hindi moment for India.

## Rich farmers may soon face stricter tax scrutiny

**DELHI:** The government is planning to introduce a new law to increase the tax scrutiny on rich farmers. This move is aimed at reducing the tax evasion in the agricultural sector.

## Disaster management, world at par with most developed countries

**AMIT SHAH:** The Union Minister for Disaster Management has said that India's disaster management system is at par with most developed countries.

## Delhi becomes first state to extend subsidy to electric cycles

**NEW DELHI:** Delhi has become the first state to extend a subsidy to electric cycles. The government has announced a scheme to provide a subsidy of up to ₹20,000 for the purchase of electric cycles.

## Rich farmers may soon face stricter tax scrutiny

**DELHI:** The government is planning to introduce a new law to increase the tax scrutiny on rich farmers. This move is aimed at reducing the tax evasion in the agricultural sector.

# Imports of 101 more items to be phased out in 5 years

Rahul Singh

**NEW DELHI:** In a renewed push to attain 'indigenisation' (self-reliance) in defence, India on Thursday published a new list of 101 weapons and systems that will come under a phased import ban over the next five years, with the military hardware sought to be developed locally ranging from light weight tanks, main battle tanks, armoured personnel carriers and mounted artillery gun systems to medium altitude long endurance unmanned aerial vehicles, missiles and so-called 'listering munitions'.

Following the third positive 'indigenisation list', defence minister Rajnath Singh highlighted the fruits of operating imported weapons and systems whose software codes could be compromised and prove to be dangerous for the country's security apparatus as it would open a 'window of vulnerability'.

The list has come out at a time when complications are arising from the wide-ranging sanctions slapped on Russia by the US and its allies on the back of the war in Ukraine have posed new challenges for the India-Russia defence relationship, put India's military preparedness to the test and assigned new urgency to reduce dependence on imported military hardware to stay battle-ready.

Russia accounted for 46% of the country's imports during the last five years even though India made fewer purchases from that country over the last decade. Its weapons exports to India fell 17% between 2016-18 and 2017-21, according to a report published by the Stockholm International Peace Research Institute (SIPRI) last month. Two-thirds of Indian military equipment is of Soviet/Russian origin.

"Anyone can now break into the security system of a country with the help of different communication methods. No matter how strong the system is, if it is linked to another country,



Union defence minister Rajnath Singh, along with other officials, releases the third list of weaponry to be banned in a phased manner in New Delhi on Thursday.

released in August 2020 and May 2021, respectively. The new list has taken the combined number of weapons and systems under a phased import ban by India to 302. Import substitution of ammunition, which is a recurring requirement, has been given special emphasis, said Lieutenant General Anil Puri, additional secretary, department of military affairs.

The defence minister said that domestic production of ammunition was critical as it ensured uninterrupted supply during war, adding that full situation was paid to self-reliance in ammunition in the first two lists as well.

Singh said self-reliance did not mean working in isolation from the world, but to work with the active participation of global partners within the country. "From under 'Atmanirbhar Bharat' Abhiyan, we have provisions which provide suitable opportunities and environment to foreign companies to invest, collaborate, set up joint ventures and earn profit," he said, adding that the government was focused on creating an environment where

- The latest import list covers light weight tanks, main battle tanks, armoured personnel carriers, mounted artillery gun systems, unmanned aerial vehicles, missiles and 'listering munitions'
- Domestic industry makes 10 items worth Rs 1,30,000 crore as a result of the third 'positive indigenisation list'
- The military hardware in the first two lists included missile destroyers, ship borne cruise missiles, light combat aircraft, light transport aircraft, long range land-attack cruise missiles and basic trainer aircraft
- Since the withdrawal of the first two lists, imports worth Rs 53,899 crore have been stopped by the armed forces

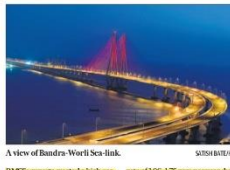
## INDIGENISATION IMPETUS

# By 2050, infra in 6 cities in danger

Jayashree Nandi

**NEW DELHI:** A new analysis on the impact of sea level rise on coastal Indian cities has revealed that some critical properties and road networks in Mumbai, Kochi, Mangalore, Chennai, Vishakhapatnam, and Thiruvananthapuram will be submerged by 2050.

The analysis by RMSI, a global risk management firm, has found that Haji Ali dargah, Jawahar Lal Nehru Port Trust, Western Express Highway, Bandra-Worli Sea-link and Queen's Necklace on Marine drive, all in Mumbai are at risk of submergence.



A view of Bandra-Worli Sea-link.

RMSI considered findings from the Intergovernmental Panel on Climate Change's sixth assessment report 'Climate Change 2021: The Physical Science Basis' released in August last year, various publications based on the IPCC report, the latest climate change data and its own models to find out possible impact on the Indian coastline.

Six coastal cities of India, Mumbai, Chennai, Kochi, Vizag, Mangalore, and Thiruvananthapuram were considered for this analysis.

the MoES report said. The corresponding projection for the global mean rise is approximately 180

"How much water will go inland is a function of what kind of continental shelf we have. The impact of sea level rise will be different in different parts. We checked asked us to do these modelling studies, because the IPCC report suggested Indian coastal cities could be in danger, we felt we should quantify these findings. We intend to reach out to affected state governments and we will definitely share the findings with the World Bank and National Disaster Management Authority," said Puspendra Johari, senior VP, Sustainability, RMSI Pvt Ltd.

Johari added that with early knowledge of how coastal cities are going to be impacted, some interventions can be made, including land reclamation; increasing the height of roads and strengthening buildings against corrosion or relocating them.

"We considered RCP 4.5 which is an intermediate scenario. Sea level is expected to rise at least 2050 and then stabilise," he said.

# Private dental colleges in state stare at a large no of vacant seats

Shreya Bhandary

**MUMBAI:** Nearly 607 seats across private dental institutes in the state, out of a total of 2,675 seats, remain vacant this academic year (2021-22). Information shared by the state common entrance test (CET) cell has revealed.

While this figure is lower compared to seat vacancies reported across private dental colleges in Maharashtra in the past few years, officials said this number is likely to go up as students who were allotted seats in the last step-up round might not confirm admissions. All government seats have been filled.

What managed to allot all remaining seats in the recent step-up round 2 (released on April 4), but the number of students dropping out of dental course in order to pick up seats in other paramedical courses is

high in the last few years," said an official from the state CET cell.

According to information shared by CET cell, almost 27% of seats, i.e. 852 seats, out of 2,675 seats in private dental colleges in Maharashtra went vacant last academic year (2020-21), post three common admission rounds and two step-up rounds.

Vacancy in the year 2018-20 stood at 1,028 seats out of 2,250 seats in private dental colleges after three common admission rounds and the same figure stood at 622 in 2019.

For next year, seats in private dental institutes have been going vacant across India. An applicant need to score at least 50 per cent in National Eligibility cum Entrance Test (NET-UG) in order to be eligible for admission to a dental institute, however, last year the state of Karnataka sought to reduce this eligibility

expensive after even after graduation. As an MBBS, one can join many existing organisations/hospitals but after BDS, most choose to set up their own private practice, which is very high investment. Unless students have financial backing, many choose to opt for paramedical courses like physiotherapy or Ayurveda instead of BDS," said the dean of a private medical college in Pune.

Constant delay in conducting admissions to MBBS as well as BDS courses year after year has also attracted lesser applicants to the course over the years. "Students with low scores would rather choose seat in an IISc college, and pursue a career in research instead of spending time, money, and effort after courses like BDS which have been limited job options post-graduation," said Manjari Khan, three-based medical education consultant.

Nearly 62% of seats in private dental colleges have gone vacant in Punjab this year, raising queries against the government's decision to give permission for the setting up of 50 new private dental institutes in Punjab. "Density, unlike MBBS, is an

## Hindustan Times - Delhi

# Key infra in 6 coastal cities may submerge by '50

Jayashree Nandi

letters@hindustantimes.com

**NEW DELHI:** A new analysis on the impact of sea level rise on coastal Indian cities has revealed that some critical properties and road networks in Mumbai, Kochi, Mangalore, Chennai, Vishakhapatnam, and Thiruvananthapuram will be submerged by 2050.

The analysis by RMSI, a global risk management firm, has found that Haji Ali dargah, Jawahar Lal Nehru Port Trust, Western Express Highway, Bandra-Worli Sea-link and Queen's Necklace on Marine drive, all in Mumbai, are at risk of submergence.

RMSI considered findings from the Intergovernmental Panel on Climate Change's sixth assessment report 'Climate Change 2021: The Physical Science Basis' released in August last year; various publications based on the IPCC report, the

A view of Bandra-Worli Sea-link.

latest climate change data, and its own models to find out possible impact on the Indian coastline.

Six coastal cities of India, Mumbai, Chennai, Kochi, Vizag, Mangalore, and Thiruvananthapuram were considered for this analysis. RMSI's experts created a high-resolution Digital Terrain Model

SATISH BATE/HIT

(topography) for the coastline of the identified cities. They then used a coastal flood model to map the cities' inundation levels based on various sea-level rise forecasts. IPCC has projected that the sea level around India will rise significantly by 2050. 'Assessment of climate change over the Indian

region' a report of the Ministry of Earth Sciences (MoES) also said that sea-level rise in the North Indian Ocean (NIO) occurred at a rate of 1.06-1.75 mm per year during 1874-2004 and has accelerated to 3.3 mm per year in the last two-and-a-half decades (1993-2017), which is comparable to the current rate of global mean sea-level rise.

The moderate emissions (RCP 4.5) scenario of IPCC projects that steric sea level (variation in the ocean volume due to density changes) of the north Indian Ocean will rise by approximately 300 mm (a foot) relative to the average values from 1986 to 2005, the MoES report said. The corresponding projection for the global mean rise is approximately 180 mm.

"How much water will go inland is a function of what kind of continental shelf we have. The

impact of sea level rise will be different in different parts. No client asked us to do these modelling studies. Because the IPCC report suggested Indian coastal cities could be in danger, we felt we should quantify these findings. We intend to reach out to affected state governments and we will definitely share the findings with the World Bank and National Disaster Management Authority," said Puspendra Johari, senior VP, Sustainability, RMSI Pvt Ltd.

Johari added that with early knowledge of how coastal cities are going to be impacted, some interventions can be made, including land reclamation; increasing the height of roads and strengthening buildings against corrosion or relocating them.

"We considered RCP 4.5 which is an intermediate scenario. Sea level is expected to rise at least 2050 and then stabilise," he said.



New Delhi

KOCHI. SATURDAY. 9 APRIL 2022

## 'Coastal cities under risk of inundation by 2050'

Based on 'deep dive' into IPCC findings, a geospatial analytics firm identifies areas at risk

VINSON KURIAN

Thiruvananthapuram, April 8  
 According to a study by Noida-based geospatial analytics firm RMSI, parts of Chennai, Kochi, Visakhapatnam, Mangaluru and Thiruvananthapuram, apart from Mumbai, risk inundation from rising sea levels by the year 2050.

RMSI did a deep dive into the findings of the Intergovernmental Panel on Climate Change and its various publications by coupling numerical models with the latest data to find out possible repercussions for India, says Pushpendra Johari, Senior Vice-President-Sustainability. It created a high-resolution digital terrain model at sub-metre accuracy for the coastline of these cities, and used coastal flood modelling capabilities to

map inundation levels based on various sea-level rise forecasts studies.

**Chennai:** A majority of residential buildings in the low-lying areas of Mullima Nagar, Tondiarpet and Tiruvottiyur are at risk. A few buildings along the Chennai Port Trust, Kasimedu Beach, Gospel church, and Sai Vikash seafood restaurant may also be affected. Others include residential buildings along the coast in Ennore, Talanguppan, Tondiarpet, Tiruvottiyur, Port shipyard on NH-4; parts of Napier's Bridge Road, Rajaji Salai, Foreshore Estate Link, Ennore High Road, 14th Cross Street, and Creek Bridge.

**Kochi:** Mostly residential buildings, followed by commercial, are at risk here. Likely affected areas include

the low-lying Valayar village, along Ettapurackal Road, Kalamangalam Road, Pallikal village, Valamangalam North, and some resorts such as the Kayalpara Island Resort and 36 Palm Beach Resort.

Other assets at risk are ferry and port-related facilities such as Cochin Port Trust Guest House, the Vypeen-Ernakulam Ferry Service, the Western Jetty, the High Court Boat Jetty, KINCO Jetty, Ferry Terminal, Nettoor Ferry, Chellanam Harbour, Fort Kochi, Tourist Jetty, Embarkation Jetty, and Cochin Fisheries Harbour.

**Thiruvananthapuram:** Buildings at risk comprise approximately 60 per cent residential and 40 per cent commercial. Most residential buildings are situated in Valiathope, Lana Road, Valakkadavu, and the Valiathura beach.

Also at risk is the road stretch along Star road,



Palayam-Airport-Valiyathura road, Lana Road, and Kovalam Beach road.

**Visakhapatnam:** A majority of the buildings are commercial, followed by residential, industrial, and port-related infrastructure. Affected areas would be Jalari Peta, MVP Colony, Appu Ghar and Lawsons Bay Colony.

Multiple industrial and port buildings have also been identified in the Naval dockyard, Hindustan Shipyard Limited, the Matsya shelter dock, the slipway jetty, exporters procurement

area, QC labs, and the Port Control Office.

**Mangaluru:** The 15 buildings at risk comprise some residential and commercial ones situated along the coast and Harbour area of Mangaluru. Also at risk are the Edapally-Panvel highway, Bolar ferry road, a few berths and the jetty at the Total Oil India and the booster pump house of the Port Trust.

State governments are lately waking up to the climate change challenge, Johari told *BusinessLine*, adding that Andhra Pradesh, Jammu & Kashmir and Ladakh have already started separate engagements through multi-hazard risk assessment studies. RMSI is conducting this analysis and providing outcomes embedded into web-based solutions for easier dissemination of the findings and their utilisation for mitigation and developmental planning, Johari added.

# HT Hindustan Times

MUMBAI. FRIDAY. 8 APRIL 2022

## Sea link, WE Highway at risk of being submerged by 2050

Jayashree Nandi

letters@hindustantimes.com

**NEW DELHI:** A new analysis on the impact of sea level rise on coastal Indian cities has revealed that some critical properties and road networks in Mumbai, Kochi, Mangalore, Chennai, Vishakhapatnam, and Thiruvananthapuram will be submerged by 2050. The analysis by RMSI, a

global risk management firm has found that Haji Ali dargah, Jawahar Lal Nehru Port Trust, Western Express Highway, Bandra-Worli Sea-link, and Queen's Necklace on Marine Drive, all in Mumbai, are at risk of submergence.

Six coastal cities of India, Mumbai, Chennai, Kochi, Vizag, Mangalore, and Thiruvananthapuram, were considered for this analysis.

RMSI's experts created a high-resolution Digital Terrain Model (topography) for the coastline of the identified cities. They then used a coastal flood model to map the cities' inundation levels based on various sea-level rise forecasts.

In Mumbai, around 998 buildings and 24km of road length will be affected by potential sea-level rise by 2050, the analysis found.

→P11



# THE HINDU

DELHI. THURSDAY. 21 APRIL 2022

## 'Sea may inundate many cities by 2050'

Population, infrastructure and property to be affected: study

DHINESH KALLUNGAL  
THIRUVANANTHAPURAM

As per a study by RMSI, a Noida-based IT consulting firm, on Intergovernmental Panel on Climate Change (IPCC) reports for key coastal cities, due to the rising sea levels by 2050, a significant number of population, property, and infrastructure in Kochi and Thiruvananthapuram along with four other cities – Mumbai, Chennai, Vizag, Mangaluru – will be under water.

The IPCC assessment report indicates that India's sea level will rise significantly by 2050. Sea-level rise in the North Indian Ocean



Chellanam village near Kochi has been facing recurring sea incursion. • FILE PHOTO

(NIO) occurred at a rate of 1.06-1.75 mm per year from 1874 to 2004 and has accelerated to 3.3 mm per year in the past two-and-a-half decades (1993-2017).

RMSI used its coastal flood modelling capabilities to map the cities' inundation (submergence) levels based

on various sea-level rise forecast studies.

Based on inundation, it conducted an analysis to identify the number of buildings and key infrastructure that could be potentially submerged in each of these cities.

As per the analysis, 464

buildings will be affected by the potential sea-level rise in Kochi. Taking into consideration sea-level rise and high tide, 1,502 buildings are likely to be inundated.

These buildings are mostly residential (91%), commercial (6%), and around 2% industrial and port and ferry

terminal buildings.

As per the two scenarios of potentially new coastline and coastline along with the high tide, 10 km and 53 km of road length will be impacted respectively.

In Thiruvananthapuram, due to the potential new coastline and coastline with high tide, 349 and 387 buildings respectively are likely to be impacted.

The stretch along the Star road, airport-Valiyathura road, Lana road, and Kovalam Beach road will be submerged by the potential sea-level rise.

"This is a scenario we have mapped during the normal and high tide times. If there is a storm surge induced by cyclones, the area of inundation will be much higher," says Pushpendra Johari, Senior Vice President - Sustainability, RMSI.

MUMBAI. THURSDAY. 21 APRIL 2022

## Many coastlines may be under water by 2050: study

Good number of population and infrastructure to be affected

**DHINESH KALLUNGAL**  
THIRUVANANTHAPURAM

As per a study by RMSI, a Noida-based IT consulting firm, on Intergovernmental Panel on Climate Change (IPCC) reports for key coastal cities, due to the rising sea levels by 2050, a significant number of population, property, and infrastructure in Kochi and Thiruvananthapuram along with four other cities – Mumbai, Chennai, Vizag, Mangaluru – will be under water.

The IPCC assessment report indicates that India's sea level will rise significantly by 2050. Sea-level rise in the North Indian Ocean



A file photo of the Thoppumpady bridge in Kochi. •H. VIBHU

(NIO) occurred at a rate of 1.06-1.75 mm per year from 1874 to 2004 and has accelerated to 3.3 mm per year in the past two-and-a-half decades (1993-2017).

RMSI used its coastal flood modelling capabilities to map the cities' inundation (submergence) levels based on various sea-level rise forecast studies. Based on inundation, it conducted an ana-

lysis to identify the number of buildings and key infrastructure that could be potentially submerged in each of these cities.

As per the analysis, 464 buildings will be affected by the potential sea-level rise in Kochi. Taking into consideration sea-level rise and high tide, 1,502 buildings are likely to be inundated. These buildings are mostly residen-

tial (91%), commercial (6%), and around 2% industrial and port and ferry terminal buildings.

As per the two scenarios of potentially new coastline and coastline along with the high tide, 10 km and 53 km of road length will be impacted respectively.

The road stretches include national and State highways as well as significant roads, namely ICT road (NH 966 A), Indira Gandhi road (NH 966 B), Aroor-Thoppumpady road (NH 66), Perumpadppe road (SH 66), Vellankanni Church street (SH 66), Kumbalangi road, and Saudi Manassery road. It also includes Thoppumpady bridge, Paravoor-Cherai road, Vypin-Pallipuram road, Goshree road, Kela-mangalam road, Ettupurackal road, Parayil Junction road, S. Veluthully N road,

Irappuzha road, Kunde Kadavu road, Monthachal road, St Augustines road, and Poojappura road that will be potentially submerged and damaged by the increase in sea-levels, the report said.

In Thiruvananthapuram, due to the potential new coastline and coastline with high tide, 349 and 387 buildings respectively are likely to be impacted.

The stretch along the Star road, airport-Valiyathura road, Lana road, and Kovalam Beach road will be submerged by the potential sea-level rise.

"This is a scenario we have mapped during the normal and high tide times. If there is a storm surge induced by cyclones, the area of inundation will be much higher," says Pushpendra Johari, Senior Vice President - Sustainability, RMSI.

TIRUVANANTHAPURAM. THURSDAY. 21 APRIL 2022

## Rising sea levels a threat to State's coastline

Kochi, Thiruvananthapuram coastline may be inundated by 2050, says RMSI study

DHINESH KALLUNGAL  
TIRUVANANTHAPURAM

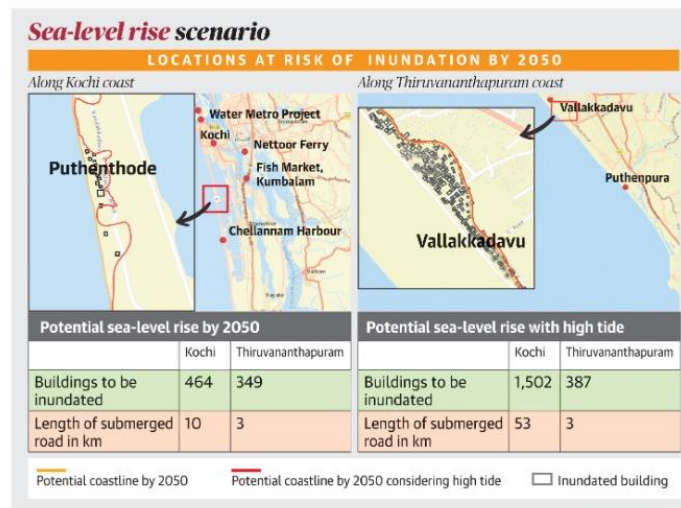
As per a study by RMSI, a Noida-based IT consulting firm, on Intergovernmental Panel on Climate Change (IPCC) reports for key coastal cities, due to the rising sea levels by 2050, a significant number of population, property, and infrastructure in Kochi and Thiruvananthapuram along with four other cities – Mumbai, Chennai, Vizag, Mangaluru – will be under water.

The IPCC assessment report indicates that India's sea level will rise significantly by 2050. Sea-level rise in the North Indian Ocean (NIO) occurred at a rate of 1.06-1.75 mm per year from 1874 to 2004 and has accelerated to 3.3 mm per year in the past two-and-a-half decades (1993-2017).

### Flood modeling

RMSI used its coastal flood modeling capabilities to map the cities' inundation (submergence) levels based on various sea-level rise forecast studies.

Based on inundation, it conducted an analysis to identify the number of buildings and key infrastructure that could be potentially sub-



merged in each of these cities.

### In Kochi

As per the analysis, 464 buildings will be affected by the potential sea-level rise in Kochi. Taking into consideration sea-level rise and high tide, 1,502 buildings are likely to be inundated. These buildings are mostly residential (91%), commercial (6%),

and around 2% industrial and port and ferry terminal buildings.

As per the two scenarios of potentially new coastline and coastline along with the high tide, 10 km and 53 km of road length will be impacted respectively.

### Road stretches

The road stretches include national and State highways

as well as significant roads, namely ICT road (NH 966 A), Indra Gandhi road (NH 966 B), Aroor-Thoppumpady road (NH 66), Perumpadppe road (SH 66), Vellankanni Church street (SH 66), Kumbalangi road, and Saudi Massery road.

It also includes Thoppumpady bridge, Paravoor-Cherai road, Vypin-Pallipuram road, Goshree road, Kela-

mangalam road, Ettupurackal road, Parayil Junction road, S. Veluthully N road, Irappuzha road, Kunde Kadavu road, Monthachal road, St Augustines road, and Poojappura road.

### In State capital

In Thiruvananthapuram, due to the potential new coastline and coastline with high tide, 349 and 387 buildings respectively are likely to be impacted.

These buildings comprise approximately 60% residential and 40% commercial buildings. Similarly, approximately three km of road length is identified to be affected.

The stretch along the Star road, airport-Valiyathura road, Lana road, and Kovalam Beach road will be submerged by the potential sea-level rise.

"This is a scenario we have mapped during the normal and high tide times. If there is a storm surge induced by cyclones, the area of inundation will be much higher than we quantified and it will be in proportional to the strength of cyclones," says Pushpendra Johari, Senior Vice President - Sustainability, RMSI.

# The Telegraph

KOLKATA. FRIDAY, 15 APRIL 2022

## TROUBLING TIDE

**T**he extent of the damage to India's coastline is alarming. In response to a question in Parliament, the ministry of earth sciences has revealed that 34 per cent of the coastline of the mainland is under varying degrees of erosion, 26 per cent is of an accreting nature, while the remaining 40 per cent is stable. West Bengal, with a long coastline of 534.35 kilometre, recorded the highest percentage of degradation along 60.8 per cent area from 1990 to 2018. This state is followed by Kerala at 46.4 per cent, Tamil Nadu at 42.7 per cent while more than half of the coastline in Puducherry has been adversely impacted. The crisis is expected to magnify in the coming years. According to a 2016 joint study by the Indian Institute of Technology, Mumbai and the National Centre for Earth Science Studies in Kerala, coastal erosion will occur 1.5 times faster in the next three decades than in the last 30 years. A new analysis by RMSI, a global risk management firm, has found that several locations in Indian coastal cities will be submerged by 2050.

The deterioration of India's coasts can be attributed to both natural causes and anthropogenic activities. Recurring cyclones and flooding — they are expected to increase in frequency because of climate change — have contributed to the acceleration of coastal damage. Furthermore, indiscriminate infrastructural construction, sand mining, and the destruction of mangroves have weakened the structural integrity of coasts. The looming ecological crisis would have an impact on the livelihoods of fishing and farming communities. The erosion, along with the rise in sea level, has significantly reduced arable land, contaminated freshwater sources and rendered thousands homeless. The regulatory framework is not helping either. The Coastal Regulation Zone rules, which govern human and industrial activity in coastal regions, have been diluted, opening up the possibility of further encroachments. Walls or bunds, the preferred interventions at the lower levels of the bureaucracy, redirect waves to cause damage in areas without a protective boundary. The pressure of tourism and 'development' on the weakened coast are significant too. This, in itself, is a manifestation of the myopia that continues to afflict policy. The disappearance of India's coastline and its fragile marine biodiversity will cause irreversible damage to mankind and species alike.



JAIPUR. SATURDAY. 23 APRIL 2022

## RISING SEAS, VANISHING LANDS

# THREAT TO INDIA'S FINANCIAL CAPITAL EDGES CLOSER



**BADRI CHATTERJEE**

The writer is a Contributing Author to First India as well as Communications & Engagement Strategist with Asac, which is a research and communications startup that seeks to address the big environmental and social challenges facing India.

**E**

ver thought about that sinking feeling? Imagine this. You are lounging in your lavish home on the Mumbai seashore, enjoying the view of the sea on a monsoon morning. Suddenly, the waves swell and start getting dangerously close to the streets, surpassing the tripods. Before you know, its crashing on the streets, and now its now your doorway. As you sit up and take notice of your beautiful morning turning into an ominously fatal painting, things start getting worse.

Reels just like one of those movies like 2012, right? However, this is not fiction. As Mumbai grapples with its unprecedented population burst, it has stood out as a severely threatened city along the western coast of India. Why? The bulk of the coastal zones around the financial capital have witnessed the highest amount of erosion as revealed after the Union Environment Ministry presented stunning statistics on ecological challenges impacting India's coastal regions before the Rajya Sabha earlier this month.

The National Centre for Sustainable Coastal Management, Chennai had undertaken shoreline change studies using satellite data from the past 38 years, identifying locations badly impacted by erosion. In Mumbai, the coastline along the Mahal village towards the eastern suburbs shrank by 146.16 metres (the most for any location across Maharashtra).

### SHRINKING SPACES BY 2050 IN MUMBAI

Taking it a step further, increased erosion puts infrastructure in jeopardy and when paired with the prospect of rising sea levels, it becomes much more so. According to a study conducted by Neida-based IT consulting firm RMSI (based on Intergovernmental Panel on Climate Change reports) for six major coastal cities in India, by 2050, a large portion of the people, property and infrastructure would be at risk of submergence due to rising sea levels. Rising sea levels may drown portions of Mumbai's essential road and infrastructure



The Mumbai Municipal Corporation, with the help of the forest department, plans to identify barren land along the city's shore, increase green cover for mangrove planting, and strengthen a 'green wall' surrounding the city as a buffer against coastal inundation through MCAP

In March this year, to limit the risk of erosion and sea-level rise. In addition, the plan, over the next eight years, calls for improving data monitoring and consistency to close gaps in local weather forecasting and tidal changes for sea-level rise, planning and implementing climate-proofing infrastructure, and, most importantly, empowering vulnerable communities to better understand and integrate early warning systems.

### THREE PRONGED APPROACH NEEDED BEFORE IT'S TOO LATE

In view of the increased sea-level rise projections for 2050, RMSI has proposed that the Centre launch a project to create a new shoreline, inundation mapping, and disaster preparedness throughout the whole Indian coastline. All locations to the left of the new coastline (towards the ocean), whether residential, industrial, or infrastructural, must be moved once the new coastline mapping is ready. All the data should be included in a Decision Support System (DSS) to assist planners in relocating assets to the left of the new shoreline, planning new buildings in light of the latest flood risk maps, and determining depth levels, basements, and other issues.

This DSS will also help predict the dangers of heavy rains and cyclones. In addition, all rivers and streams should have their water levels modelled, and locations at risk of permanent submergence marked. With this new reality, inundation mapping for Mumbai and other cities in danger from increasing sea levels becomes a top concern.

THE VIEWS EXPRESSED BY THE AUTHOR ARE PERSONAL



The Maharashtra Shoreline Management Plan (MSMP) 2017, a document that looked at the extent of coastal erosion, could be amended this year as per government sources to account for new changes (due to erosion) throughout the state's 720-kilometre coastline

The MSMP evaluates natural coastal processes, land use, and environmental details for coastal developments, and this time will include the direct effects of sea-level rise

TO READ FULL ARTICLE Scan the code Or visit [www.firstindia.co.in](http://www.firstindia.co.in)



by 2050, including parts of the Western Express Highway, the Bandra-Worli Sea-Link, and the Mumbai Coastal Road Phases I and II, which are currently being developed.

### THE CRZ CONUNDRUM

The Coastal Regulation Zone (CRZ) notice was issued by the Ministry of Environment and Forests in 1989 under the Environmental Protection Act, 1986, to regulate activities in India's coastal zones. The legislation has been revised multiple times since then, most recently with the CRZ 2019 notification.

As highlighted by Mum-

bai-based group Conservation Action Trust, CZMP maps for Mumbai city and suburbs produced recently failed to include all CRZ 1A categories, and there is no distinction between mangroves and mudflats.

### RESTRICT CONSTRUCTION IN MUMBAI'S LOW-LYING AREAS

Low-lying locations, in comparison to high places, would see a direct and immediate impact, according to RMSI's research. Building in Mumbai's low-lying regions should be suspended immediately, according to the MCAP launched

## Online Coverage:

**Hindustan Times:** [Key infra in Mumbai, other coastal cities may submerge by 2050 | Latest News India - Hindustan Times](#)

**MSN:** [Key infra in Mumbai, other coastal cities may submerge by 2050 \(msn.com\)](#)

**Mint:** [Mumbai To Chennai: These Coastal Cities That May Drown By 2050 | Mint \(livemint.com\)](#)

**Dainik Bhaskar:** <https://www.bhaskar.com/national/news/mumbai-submerged-2050-these-indian-cities-likely-to-go-underwater-129629513.html>

**Deccan Herald:** <https://www.deccanherald.com/national/indias-coastal-cities-may-be-inundated-by-2050-report-1098840.html>

**The Quint:** <https://www.thequint.com/news/world/india-mumbai-chennai-kerala-haji-ali-bandra-worli-sea-level-rise-submerge-2050>

**The Pioneer:** <https://www.dailypioneer.com/2022/columnists/going-under.html>

**Wion News:** [Key infrastructure in Indian coastal cities may submerge by 2050 - India News News \(wionews.com\)](#)

**The Hans India:** <https://www.thehansindia.com/andhra-pradesh/is-vizag-going-to-be-inundated-by-2050-737305>

**India TV:** <https://www.indiatv.in/india/national/6-cities-of-the-country-will-be-submerged-by-2050-2022-04-09-843891>

**Free Press Journal:** <https://www.freepressjournal.in/mumbai/mumbai-haji-ali-bandra-worli-sea-link-at-risk-of-submergence-by-2050>

**Metro Mumbai:** [Key infrastructure in Indian coastal cities may submerge by 2050 - India News News \(metromumbailive.com\)](#)

**HT Bangla:** <https://bangla.hindustantimes.com/lifestyle/kolkata-mumbai-and-other-coastal-cities-of-india-may-submerge-by-2050/amp-31649404847685.html>

**Prothom Kolkata:** [সাবধান, আসছে ভয়াবহ দিন! জলের তলায় চলে যাবে ভারতের বড় বড় শহর - Prothom Kolkata](#)

**Wion News :** <https://www.wionews.com/india-news/key-infrastructure-in-indian-coastal-cities-may-submerge-by-2050-469338/amp>

**Divya Bhaskar :** <https://www.divyabhaskar.co.in/amp/national/news/cities-like-mumbai-kochi-will-be-affected-by-temperature-and-hurricane-haji-ali-and-worli-sea-link-will-be-submerged-in-the-sea-129629986.html>

**Mumbai Live :** <https://metromumbailive.com/haji-ali-worli-sealink-haji-ali-and-worli-sea-link-will-drown-in-the-sea/>

**Hindustan Times Bangla :** <https://bangla.hindustantimes.com/lifestyle/kolkata-mumbai-and-other-coastal-cities-of-india-may-submerge-by-2050/amp-31649404847685.html>

**Latestly Marathi :** <https://marathi.latestly.com/maharashtra/mumbai-haji-ali-bandra-worli-sea-link-in-danger-of-going-under-water-by-2050-new-report-raises-concerns-of-mumbaikars-349312.html/amp>

**Prothom Kolkata :** <https://prothomkolkata.com/182746/beware-terrible-days-are-coming-the-big-cities-of-india-will-go-under-water/>

**News 18 Kannada :** <https://kannada.news18.com/amp/news/national-international/report-says-mangalore-mumbai-kolkata-to-be-danger-in-2050-ach-752285.html>

**Divya Bhaskar:** <https://www.divyabhaskar.co.in/amp/national/news/cities-like-mumbai-kochi-will-be-affected-by-temperature-and-hurricane-haji-ali-and-worli-sea-link-will-be-submerged-in-the-sea-129629986.html>

**Hindu Tamil:** <https://www.hindutamil.in/news/environment/790712-coastline-of-kochithiruvananthapuram-may-be-under-water-by-2050.html>

**India Times:** <https://www.indiatimes.com/explainers/news/india-coastlines-are-shrinking-and-bengal-suffers-the-most-erosion-566858.html>

**The Federal:** <https://thefederal.com/news/land-erosion-has-eaten-into-one-third-of-indias-coastline-from-1990-2018-govt-data/>

**The Hans India:** <https://www.thehansindia.com/andhra-pradesh/is-vizag-going-to-be-inundated-by-2050-737305>

## **Second Coverage**

**The Hindu Business Line:** [Coastal parts of Chennai, Thiruvananthapuram, Kochi, Vizag, Mangaluru risk inundation by 2050, says consultancy RMSI - The Hindu BusinessLine](#)