



**UT of Lakshadweep Administration**

# **COASTAL EROSION**

**8th March, 2022**

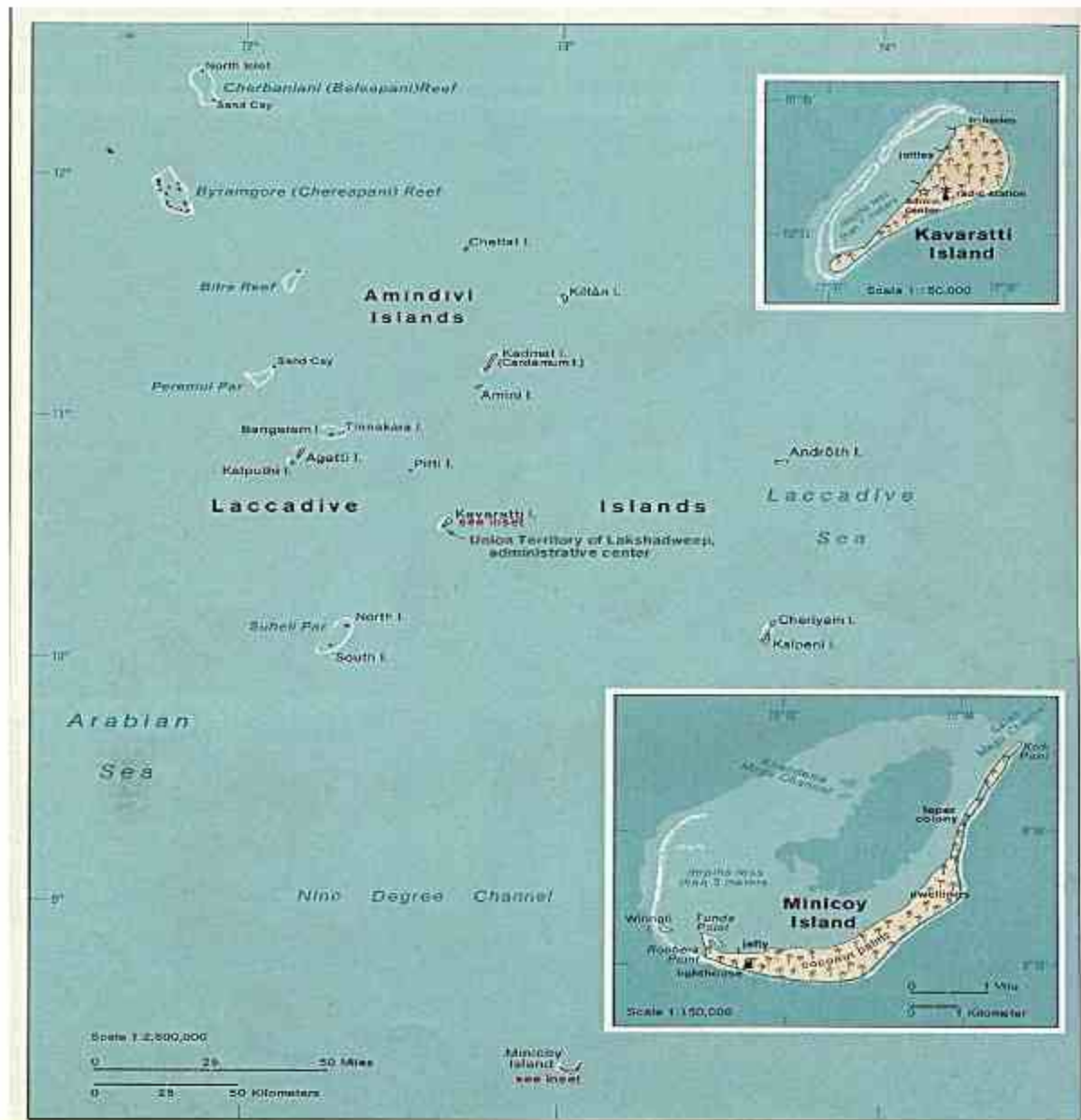


Lakshadweep Archipelago consists of 15 atolls. These atolls contribute 10 inhabited islands, 16 uninhabited islands and 3 submerged reef the total lagoon area for this atoll is 4200 km<sup>2</sup>. The extent of reef flat is 140.1 km<sup>2</sup> (Baldev, 1994)

The Lakshadweep islands are also significant as the only group of coral atolls in India.

Lakshadweep coral reef ecosystems and their associated biodiversity also support the country's two main industries: tourism and fisheries

# Geographical view of Lakshadweep



# Major Challenges for Lakshadweep

- ❑ **Fragile ecosystems**
- ❑ **Highly vulnerable for climate change**
- ❑ **Remoteness**
- ❑ **Livelihood based on natural resources**



## Community Income – Nature based

Copra production



Fishing



Tourism



# Coastal Erosion

- Shoreline changes induced by erosion and accretion are natural processes that take place over a range of time scales.
- Natural or coastal processes or human-induced influences.
- Natural processes - winds, waves, and currents.
- Human influences - seawalls, groins, jet ties etc
- Natural disasters - storm surges, cyclone, tsunamis, and flooding.
- Lakshadweep- Erosion in eastern coast and accretion in western coast.

# Impact of Coastal Erosion

- Economic impacts - Loss of property, impact on fisheries and tourism sector.
- Environmental impacts - destruction of animal habitats.
- Coastal features like dunes and mangroves provide a natural defense against several hazards, including tsunamis and storm surges, so their loss due to erosion may signal an increase in vulnerability from these hazards.
- Disaster induced erosion will cause rapid erosion equating years of non-disaster linked erosion in a s

# Integrated Island Management Plan (IIMP)

*IIMPs applies on entire Lakshadweep Archipelago including the aquatic area up to 12 NM.*

- **Conserve and protect** of Islands unique environment and its marine areas
- Provide **livelihood security** to the local communities
- Promote **sustainable development** based on scientific principles taking into account the dangers of natural hazards, sea level rise due to global warming

## Classification IIMPs

**Preservation zone:** *inner and outer reef, reef crest, reef slope, seagrass beds in the lagoon and the sea, turtle nesting areas and other zones that will be declared by Island Administration as and when existence of endangered/rare/vulnerable species of plants and animals are found.*

**Conservation Zone:** *Water part of Lagoon except seagrass areas and setback area (No Development Zone - NDZ)*

**Regulated Development Zone I:** *It includes beach (outside setback area -NDZ) and land part of the island which is densely/ moderately populated*

**Regulated Development Zone II:** *It includes undeveloped and sparsely populated land areas of the Islands*



# IIMP for Kavaratti Island, Lakshadweep



## Status on the steps taken for foreshore protection in Lakshadweep

- ✓ As per the notified IIMPs, UTL in consultation with reputed scientific institutions such as CWPRS/NCSCM shall undertake erosion control measures in the identified eroding stretches by deploying submerged soft structures (e.g. geo-tubes, artificial reefs) in the coastal region.
- ✓ In the high eroding sites identified by NCSCM, where such soft structures may not be suitable, hard shore protection structures such as tetra pods / groins may be erected based on micro-level scientific studies with main emphasis on protection of corals
- ✓ IIMPs also recommends to have plan on immediate and long time intervention in respect to coastal erosion
- ✓ As an intermediate intervention UTLA has made series of consultation with NCSCM/NIOT/IIT Chennai, and obtained expert opinion (with design methodology and construction methodology) on quick remedial measure for critically eroded location
- ✓ Mean time a long-term (1972–2015) and short-term (2000–2015) shore line change analyses of ten inhabited Lakshadweep Islands were done by NCSCM, Chennai

## Problem to addressed

- ✓ The islands of Lakshadweep formed out of atolls that have extensive lagoon formation bordering the deep sea.
- ✓ Extensive formation of corals that exist in the form of polyps which secrete calcareous materials around them to form as reefs
- ✓ The coral formations in the island play a vital role of protecting the island landmass from storm surges and erosion due to strong sea waves
- ✓ Satellite based analysis made by NCSCM revealed prevalence of erosion at various levels in all the 10 inhabited islands
- ✓ Data clearly indicate that erosion in the islands have become severe due to which out of 118.96 km long coast, 33% is still facing erosion
- ✓ 51.47 km coast eroded in the past has been protected with coastal protection measures like seawalls

Long-term shoreline change statistics of Lakshadweep islands

	Erosion		Artificial coast		Accretion		Total length (km)
	Length (km)	% of coast	Length (km)	% of coast	Length (km)	% of coast	
Agatti	4.46	27.19	4.03	24.58	7.91	48.23	16.41
Amini	2.69	36.72	4.36	59.49	0.28	3.79	7.33
Androth	2.27	21.07	8.21	76.19	0.29	2.73	10.77
Bitra	1.05	60.00	0.30	17.31	0.40	22.69	1.75
Chetlat	3.17	50.05	1.29	20.34	1.88	29.61	6.33
Kadmat	5.64	28.16	10.13	50.56	4.26	21.27	20.03
Kalpeni	4.04	32.97	6.38	52.03	1.84	15.00	12.25
Kavaratti	1.13	9.22	9.68	79.04	1.44	11.73	12.25
Kiltan	4.84	59.67	2.57	31.63	0.70	8.69	8.11
Minicoy	10.47	44.13	4.52	19.07	8.73	36.81	23.73
<b>Total</b>	<b>39.76</b>	<b>33.42</b>	<b>51.47</b>	<b>43.27</b>	<b>27.73</b>	<b>23.31</b>	<b>118.96</b>

# Short-term Shoreline Change Status due to Erosion/Accretion for Agatti Island



**Legend**

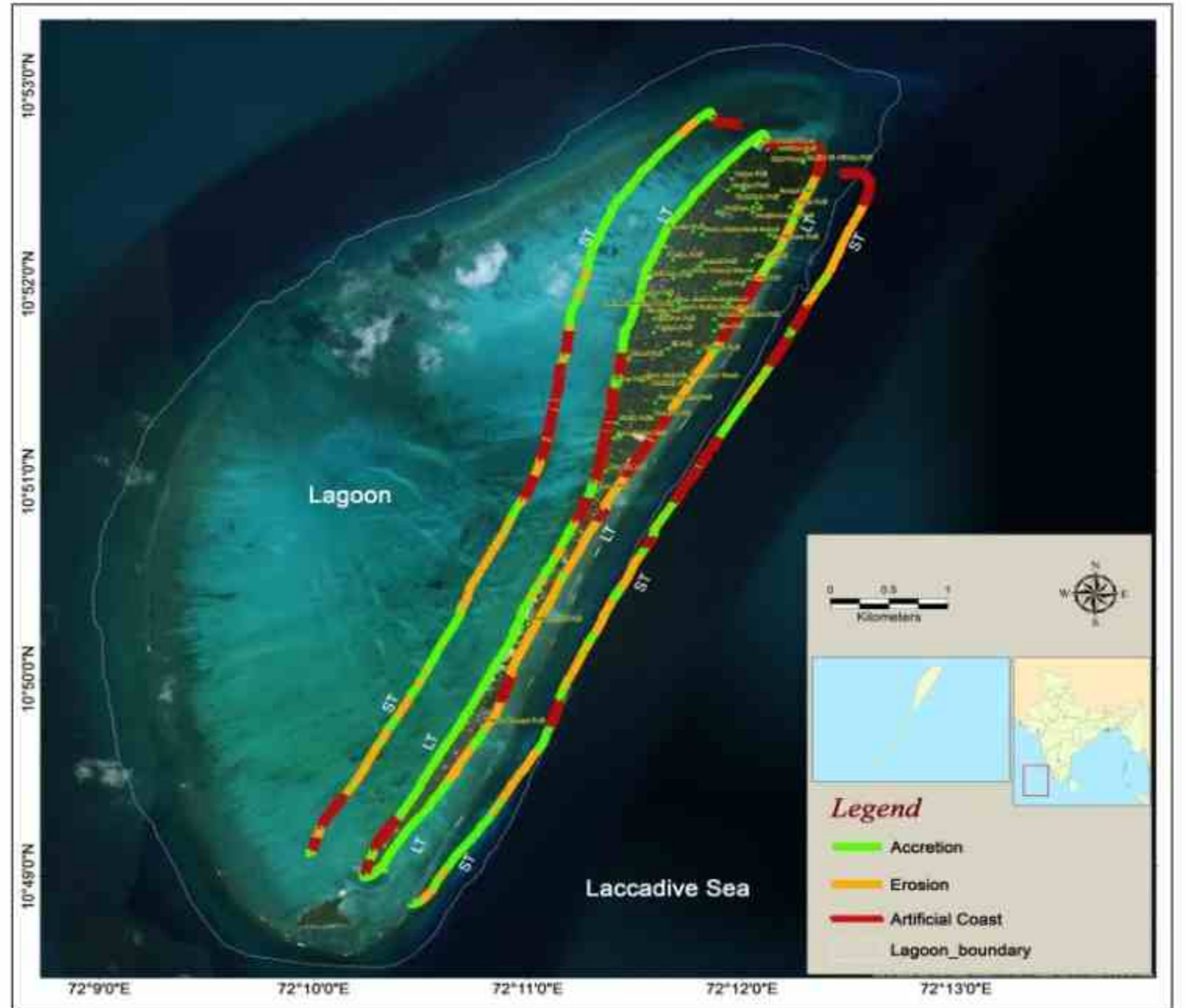
**Zone of Erosion & Accretion**

- High Accretion
- Medium Accretion
- Low Accretion
- High Erosion
- Medium Erosion
- Low Erosion
- Stable Coast
- Artificial Coast
- Jetty
- Rate of Erosion (m/yr)
- Rate of Accretion (m/yr)

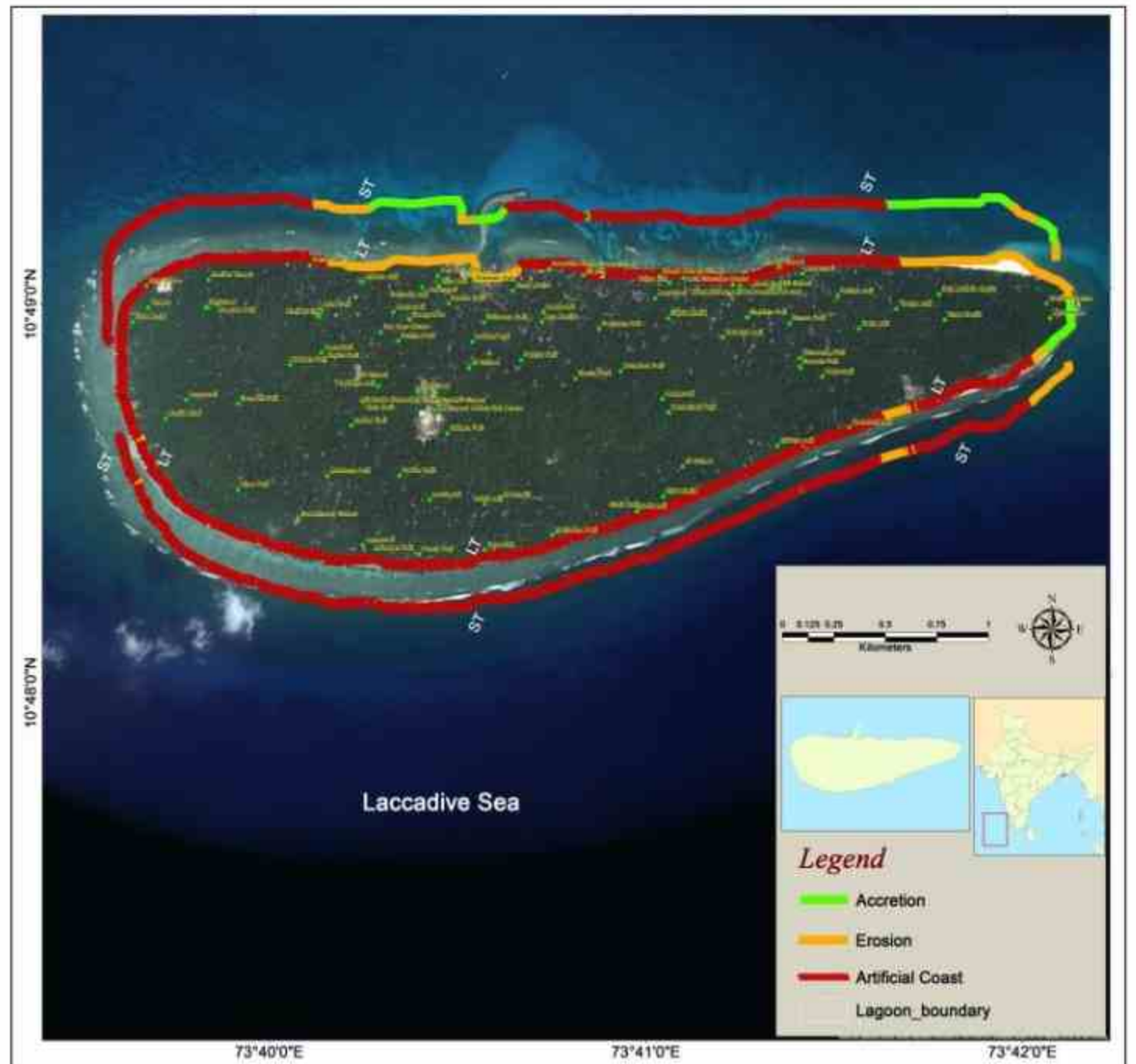
Prepared By

**National Centre for Sustainable Coastal Management**  
Ministry of Environment, Forest & Climate Change  
Government of India

Erosion/accretion pattern in Lakshadweep island of Agatti between 1972–2015 and 2000–2015



Erosion/accretion pattern in Lakshadweep island of Andrott between 1972–2015 and 2000–2015



Hard shore protection structures  
in Coastal beaches of  
Lakshadweep







# Thank You

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