BEFORE THE NATIONAL GREEN TRIBUNAL SOUTHERN ZONE

AT CHENNAI

O.A. NO. 3 OF 2024

Tribunal on its own motion - SUO MOTU based on the News item published in Dajjiworld Media Network Manglore dt. 30.09.2023 titled "Sea Erosion increases at Uchila Endpoint, houses on verge of getting washed away"

...Petitioner

Vs.

National Centre for Sustainable Coastal Management,
Rep. by its Director, Chennai & Ors., ...Respondents

INDEX

S. NO.	DATE	DESCRIPTION	PAGE NO.
1.	....	Counter Affidavit	1 - 12

DATED AT CHENNAI ON THIS THE 4TH DAY OF JANUARY 2025

COUNSEL FOR 1ST RESPONDENT

(1)

BEFORE THE NATIONAL GREEN TRIBUNAL SOUTHERN ZONE AT CHENNAI

O.A. No. 03 of 2024

Tribunal on its own motion - SUO MOTU based
On the News item Published in Daijiworld Media
Network Mangalore dt. 30.09.2023 titled "Sea erosion
Increases at Uchila Endpoint, houses on verge of getting
Washed away".

...Petitioner

Vs.

National Centre for Sustainable Coastal Management,
Rep. by its Director, Chennai and Ors.

...Respondent

COUNTER AFFIDAVIT FILED ON BEHALF OF THE 1ST RESPONDENT

I, Dr. Purvaja Ramachandran, Daughter of G.V.Ramachandran, aged about 57 years, working in Department of National Centre for Sustainable Coastal Management, having office at Anna University Campus. Chennai -600025 do hereby solemnly affirm and sincerely state as follows:-

1. I am occupying the post of Acting Director in the 1st Respondent National Centre for Sustainable Coastal Management, Chennai-600025 and I am well acquainted with the facts of the case.

2. I submit that the coastline of Karnataka, of length around 310 km, is generally aligned in the north-northwest to south-southeast direction, with the Arabian Sea to the west. The south coast of Karnataka is an extension of the Malabar Coast and is characterized by long sandy beaches interrupted by estuaries and barrier spit

Director
National Centre for Sustainable Coastal Management
Ministry of Environment, Forest and Climate Change
Government of India, Anna University Campus
Chennai - 600 025. India

features. Whereas the northern part of the coast is the Konkan coast and is extending up to the southern part of Maharashtra. It is an indented coastline marked by numerous river mouths and creeks, bays, headlands, promontories, and cliffs. The pocket beaches are formed at bays and inlets of the coastline.

3. I submit that it is a well-known fact that the coast experiences high energetic waves during the southwest monsoon season, which lead to erosion at a few locations along the coast and is significant at the beaches. Although it recovers during fair-weather conditions (northwest monsoon season), a few of the stretches of the coast are not completely recovered with sediments due to various factors. Most of the sediment sources for coastal regions are riverine sediments from the major rivers of Karnataka. In recent years, anthropogenic interventions and activities such as damming over rivers and intensive mining of sand have caused the scarcity of sediments along coastal regions and been one of the major causes of coastal erosion.

4. I submit that Daijiworld Media Network published a news article ***titled "Sea Erosion Escalates at Uchilaa Endpoint, Houses on the Verge of Collapse,"*** in which it was reported that one house stands on the brink of collapsing, and an additional 10 houses are situated within the danger zone due to the severe erosion. The Article also highlights pronounced erosion at the estuary connecting Talapady and Uchilaa Endpoint. In response to these threats, local residents have taken temporary measures to protect their homes by stacking sandbags against the erosion and high waves.

5. I submit that the preliminary analysis of shoreline change (erosion and accretion characteristics) was conducted using satellite and Google Earth images for a 5.06 km stretch (2.5 km on each side of Uchila Endpoint) along the Mangalore coast on short-term timescales (2010–2022). This analysis was performed utilizing the Digital Shoreline Analysis System (DSAS). The details

Director
National Centre for Sustainable Coastal Management
Ministry of Environment, Forest and Climate Change
Government of India, Anna University Campus
Chennai - 600 025. India

of the shoreline change analysis are depicted in **Figure 1,** while their particulars and percentages are detailed in **Table 1.**

6. I submit that the analysis clearly indicates a high erosion rate of approximately 7m/yr observed at Uchilaa Endpoint and its surrounding areas **(Figure 2 and 3)**. The estimated percentage of high erosion and cumulative percentage of erosion are approximately **27.09% and 57.40%,** respectively, along the coastal stretch. Consequently, the Uchila Endpoint area is significantly eroded, which necessitates protection by implementing suitable shore protection interventions by coastal processes and sediment transport surveys and assessments. Additionally, the study shall investigate the root cause(s) of high erosion along the Uchila Endpoint stretch of the Mangalore coast.

Table 1: Shoreline change analysis (in terms of erosion and accretion) at Uchilaa Endpoint, Mangalore coast, Karnataka

Shoreline Classification	Length (km)	% of Erosion and Accretion	Cumulative % of Erosion and Accretion
Total Length of Uchila End Point Coast	5.06		
High Erosion Zone	1.37	**27.09**	
Medium Erosion Zone	0.53	10.39	
Low Erosion Zone	1.01	19.91	**57.40**
Artificial Coast (km): Seawalls	1.38	27.21	27.21
Stable Coast	0.78	15.39	15.39

Director
National Centre for Sustainable Coastal Management
Ministry of Environment, Forest and Climate Change
Government of India, Anna University Campus
Chennai - 600 025. India

Figure 1: Shoreline change analysis at Uchila Endpoint, Mangalore coast, Karnataka

Director
National Centre for Sustainable Coastal Management
Ministry of Environment, Forest and Climate Change
Government of India, Anna University Campus
Chennai - 600 025. India

Field visit and survey photographs

Figure 2: Field visit, discussions with officials, and field surveys were conducted along the Batapady coast in February 2024.

Figure 3: Field photographs of the wave action during the monsoon season and existing protection structures (offshore reef implemented previously) along the Batapady coast

Director
National Centre for Sustainable Coastal Management
Ministry of Environment, Forest and Climate Change
Government of India, Anna University Campus
Chennai - 600 025. India

7. I submit that the beach profile survey was carried out on **February 24, 2024 (Figure 2)** using the PPK system, which has an accuracy of ± 0.02 m with a spacing of 100 m in the Uchilaa end point region of Batapady coast along the South Karnataka coast on February 24, 2024. The beach profile locations are shown in **Figure 3**. All the profiles were measured in the normal shore direction from the reference benchmark when the maximum stretch of the beach was exposed. Beach profiles have been measured in the normal direction towards the sea with a resolution of 10 m to the lowest low tide point.

8. I submit that the beach volume estimated from the beach profiles **(P1-P5) (Figure 4)** along the Batapady coast, Mangalore during April 2018 varies from 500 to 1800 cubic meters. Similarly, the beach volume estimated from the beach profiles during February 2024 ranges from 250 to 450 cubic meters. A comparison of beach volume between 2018 and 2024 at Batapady regions clearly indicates a scarcity of sediments, attributed to erosion over the region. The estimated beach volume difference varies from 480 to 1480 cubic meters across the Batapady region. This discrepancy in beach volume clearly indicates the high rate of erosion over the region, regardless of the season. Therefore, it is imperative to implement mitigation measures in the region.

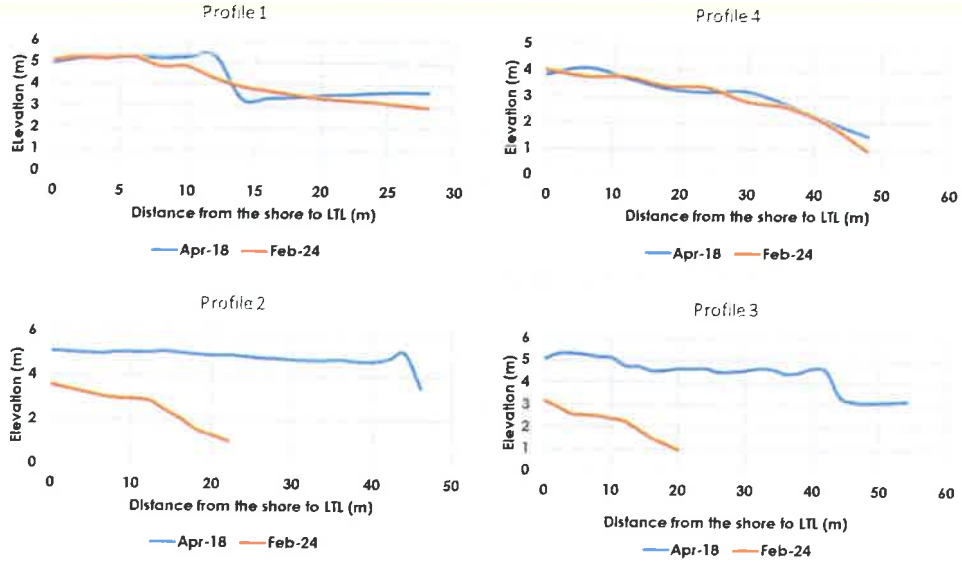

Figure 4: the comparison of beach profiles (1-5) along the Batapady coast between April 2018 and February 2024

Director
National Centre for Sustainable Coastal Management
Ministry of Environment, Forest and Climate Change
Government of India, Anna University Campus
Chennai - 600 025. India

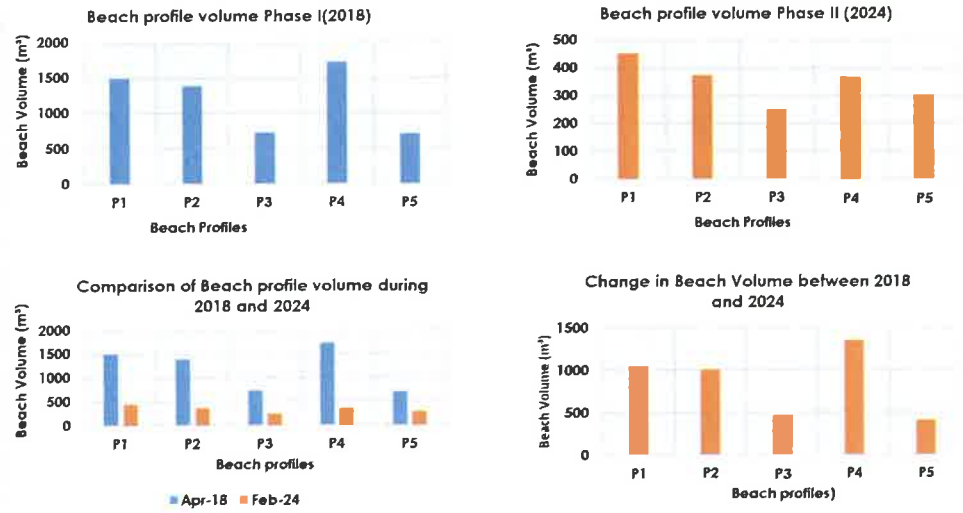

Figure 5: Estimated beach volume along the Batapadi coast between 2018 and 2024.

9. I submit that the Hydrodynamic environmental parameters of the Batapady region, such as wind speed, significant wave height and direction, current magnitude and direction, and tidal amplitude, were analysed using the coastal process data of **May 2018 (Figure 6).** These datasets were used to simulate hydrodynamic, wave, and sediment transport models to assess water movement, wave dynamics, and sediment budget across the region.

10. I submit that the wind speed varies approximately 8 m/s in the westward direction. Similarly, significant wave height and current speed vary in the southwest and westward directions, while the current flows northward with magnitudes of 2m and 0.4 m/s, respectively. Tidal amplitude was also observed relative to Mean Sea Level (MSL), varying between 0.5 m and -0.5 m along the Batapady region.

11. I submit that the various environmental data as given above were used in numerical modelling studies to understand coastal processes along the Batapady region. The model predictions revealed that wave action is very high (2-3 m) in the Batapady region, which is one of the reasons causing erosion at the Uchilaa endpoint.

Director
National Centre for Sustainable Coastal Management
Ministry of Environment, Forest and Climate Change
Government of India, Anna University Campus
Chennai - 600 025. India

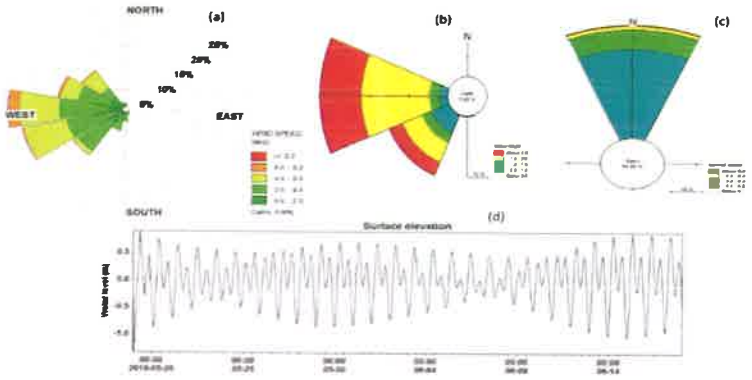

Figure 6: Environmental parameters (includes metrological wind and coastal process data) over the Batapdy region during May 2018.

12. I submit that the GenCADE model has been configured over the Batapady region to assess the rate of shoreline change under two conditions:

- In the absence of shore protection measures and
- With existing protection measures **(Figure 7).**

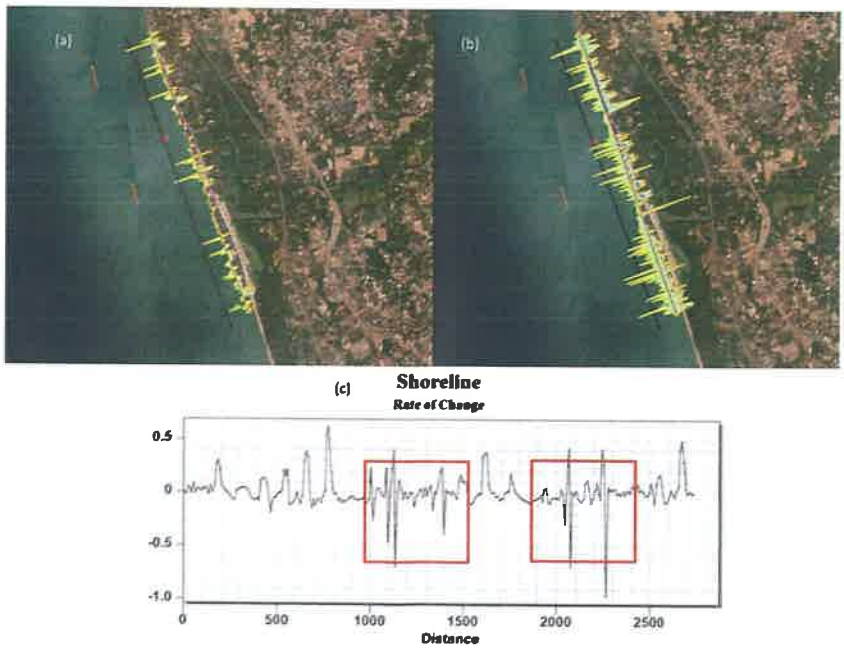

Figure 7: Assessment of shoreline changes with measured wave data of 2018: a) Without existing structures; b)With existing structures such as offshore reef, seawall, and groynes; c) Rate of shoreline change along the Batapady coast (highlighting erosion areas with red colour)

Director
National Centre for Sustainable Coastal Management
Ministry of Environment, Forest and Climate Change
Government of India, Anna University Campus
Chennai - 600 025. India

13. I submit that the Model simulations were conducted using field-measured tide, wave, and coastal current datasets. The predictions from these simulations clearly indicate that erosion is seasonal in the absence of shore protection measures, whereas erosion is high in the adjacent regions with existing shore protection measures.

14. I submit that the erosion is notably observed in the Uchila endpoint region, as predicted by the GenCADE model, due to a combination of existing protection measures and high wave action in the area. This suggests that while the existing protection measures may mitigate erosion to some extent, they are not entirely effective in preventing erosion, particularly in areas with intense wave activity like the Uchila endpoint region.

15. I submit that the Analysis of field survey data and GenCADE model predictions clearly indicate high erosion at the Uchilaa endpoint along the Batapady region. To mitigate erosion at the Uchilaa endpoint, numerical modeling studies were conducted using conceptual shore protection measures such as T-Groynes in conjunction with a seawall and offshore detached reef (the dimensions of T-Groynes and offshore detached reef are shown in Figure 8 implemented in the model simulations.

16. I submit that the implemented shore protection measures seem appropriate to reduce erosion at the Uchilaa endpoint with minimal impact on the adjacent shore. However, these protection measures need to be tested in the physical laboratory **(wave plume studies)** and simulated under different seasonal wave conditions and other environmental parameters to ensure their effectiveness.

17. I submit that it is assessed that coastal erosion along the Uchila End Point coast, Karnataka exceeds 84%, including stretches already protected by seawalls due to erosion. I further submit that the Specifically, along the Batapady coast, the

Director
National Centre for Sustainable Coastal Management
Ministry of Environment, Forest and Climate Change
Government of India, Anna University Campus
Chennai - 600 025. India

(10)

Uchilaa endpoint experiences high erosion rates compared to other stretches, with approximately 8 meters of erosion per year.

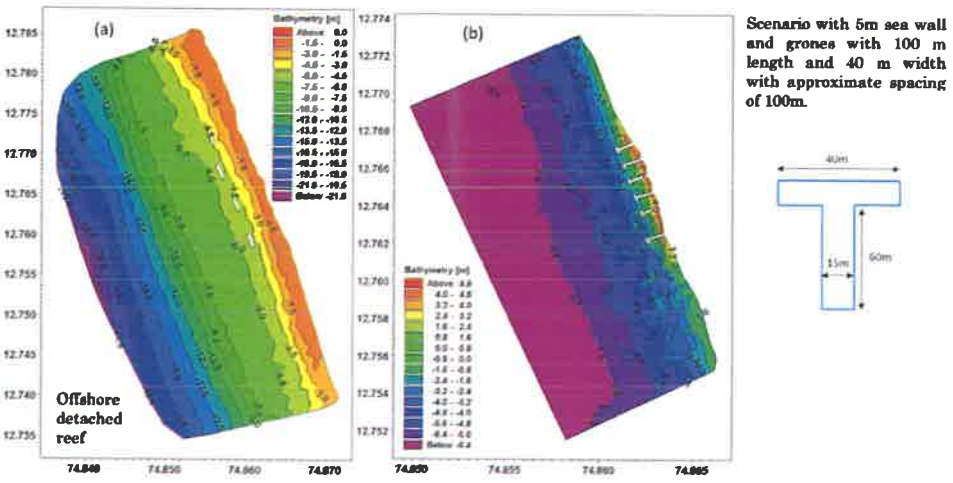

Figure 8: conceptual shore protection measures:

a) Offshore detached reef.

b) T-groynes with associated Seawall.

18. I submit that the recent field visits and survey data clearly indicate that erosion will intensify in the future if proper shore protection measures are not implemented. I further submit that The National Centre for Sustainable Coastal Management (NCSCM) (1st Respondent herein) has conducted a preliminary survey at the eroding site and assessed the seasonal impact of existing structures through numerical modelling studies.

19. I submit that these studies concluded that high monsoonal wave action, combined with heavy flooding during the monsoon season, contributes significantly to erosion at the Batapady coast. The **NCSCM** (1st Respondent herein) through its modelling studies considering conceptual shore protection measures, such as T-Groynes along the seawall and offshore detached reefs, to control erosion.

20. I submit that these conceptual mitigation measures seem promising in protecting the coast against further erosion. The Selection of the most

Director
National Centre for Sustainable Coastal Management
Ministry of Environment, Forest and Climate Change
Government of India, Anna University Campus

appropriate mitigation measure from the tested concepts and consider proper design and cost-effectiveness through third party engagement to ensure the effective protection of the area.

PRAYER:

In view of the submissions made the Hon'ble National Green Tribunal may kindly dismiss the above Application and pass such further or other orders that as this Hon'ble Tribunal may deems fit and proper in the interest of the case and thus render justice.

Director
National Centre for Sustainable ... gement
Ministry of Environment, Forest ... Change
Government of India, Anna University Campus
Chennai - 600 025. India

Solemnly affirmed at Chennai on
This the 4th day of JAN 2025 and
Signed his name in my presence
After reading the contents herein

BEFORE ME,
Moshika. MS/2577/23 (J.MOSHIKA)
NO.366, Law Chambers, Highcourt buildings, ch-104
ADVOCATE, CHENNAI

(12)

BEFORE THE NATIONAL GREEN TRIBUNAL SOUTHERN ZONE AT CHENNAI

O.A. No. 03 of 2024

SUO MOTU based On the News item Published in Daijiworld Media Network Mangalore dt. 30.09.2023 titled "Sea erosion Increases at Uchila Endpoint, houses on verge of getting Washed away".

...Petitioner

Vs.

National Centre for Sustainable Coastal Management, Rep. by its Director, Chennai and Ors.

...Respondents

COUNTER AFFIDAVIT
ON BEHALF OF 1ST RESPONDENT

S. JANARTHANAM (877/91)
COUNSEL FOR 1ST RESPONDENT
9444088828/9943492251

BEFORE THE NATIONAL GREEN TRIBUNAL
SOUTHERN ZONE

AT CHENNAI

O.A. NO. 3 OF 2024

Tribunal on its own motion – SUO MOTU based on the News item published in Dajjiworld Media Network Manglore dt. 30.09.2023 titled "Sea Erosion increases at Uchila Endpoint, houses on verge of getting washed away"

...Petitioner

Vs.

National Centre for Sustainable Coastal Management,
Rep. by its Director, Chennai & Ors.,

...Respondents

INDEX

S. JANARTHANAM(877/91)
COUNSEL FOR 1ST RESPONDENT