

Cargo and Consequences

A Report on the Social and Environmental Implications
of Shipping on Amba River - National Waterway-10



Partners in Justice Concerns
in collaboration with
Manthan Adhyayan Kendra

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**Avli Verma
Tushar Pathade**

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March 2024

Manthan Adhyayan Kendra

Manthan Adhyayan Kendra is a centre set up to research, analyze, and monitor water and energy issues from the perspective of just, equitable, and sustainable development. Broad components of Manthan Adhyayan Kendra's work include overall monitoring of developments in the water and related sectors, including policies, laws, regulations, projects, and programs; water, growth, and development; rivers, dams, and environmental flows; river basin development, hydropower, and irrigation projects; and privatization, commodification, and reforms in the water sector. Manthan looks at the impacts of these on people's lives, livelihoods, and ecology. Current focus themes include the monitoring and study of inland waterways and impacts of coal on water resources.

Partners in Justice Concerns (PJC)

PJC came up as an organization during the year 1983. A group of social scientists and community leaders from various sectors are the initiators of this national collective. The founding principle of the organization is to improve the socioeconomic and educational standards of marginalized communities. It promotes debate on contemporary issues of the society. PJC's work focuses on community development activities in a holistic manner. It nurtures, facilitates and supports new and emerging people's groups of marginalized communities by promoting youths for study and research work.

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Key insights and recommendations from the report ‘Cargo and Consequences: A Report on the Social and Environmental Implications of Shipping on Amba River - National Waterway -10’

- The 19 km stretch of NW-10 from Arabian Sea till the JSW Dharamtar Port is a Class-VII Waterway i.e. the navigation channel is allowed to be developed for vessels of 2000-8000 tonnes and above. This means that this stretch of the Amba River (NW-10) is being utilized for maximum capacity of vessels classified on inland waters in India. Not only the capacity but in terms of utility also, NW-10 on Amba river is the most utilized river in terms of cargo operations amongst the west flowing rivers.
- Jindal Steel Works (JSW) Plants and Pallonji and Pallonji (PNP) are the two major players whose cargo is being handled on the NW-10, mainly importing Coal and Iron Ore. Besides this, Adani Cementation Ltd. has also gotten the environmental clearance for the construction of a Berthing Jetty and other facilities on NW-10 that can handle a cargo of 5 MMT annually.
- At present, about 39 barges are moved on NW-10 daily, this is estimated to increase to 167 barges daily by 2053 which would carry 116 MMT traffic annually, a gradual increase from 28.54 MMT cargo moved in the year 2022-23.
- The touted environmental friendliness is the reason behind the renewed push for the waterways, however, the development and maintenance of waterways on rivers harm the riverine ecology and riparian communities.
- The operational stretch of National Waterway-10 falls in the tidal estuarine region which has its intrinsic ecological value. It is one of the most productive ecosystems and provides a breeding space for various aquatic flora and fauna.
- Locals alleged that the dredging, the intrusive activity made in the riverbed to deepen and maintain the channel, has been causing destructive impacts on the fish population, mangroves and agricultural lands.
- Fisherpeople said that the movement of heavier barges of 8000 tonnes is not at all conducive to the creek and they create the most disturbances and destructions therein. They urge that larger vessels should be banned from entering the creek in the larger interest of ecological sustainability and their livelihood.
- Although a 100-meter-wide navigational channel has already been allocated, there have been frequent violations of this channel when barges are anchored outside of it. It limits the fishing area and causes the breaking of the fishing net for which no or meagre compensation is given, according to the local fisherfolks.
- The erosion of the riverbank and destruction of mangroves due to dredging and movement of barges lead to a reduction in fish catch and diversity, moreover, the

salinization of agricultural lands and increased noise, water and air pollution are some of the visible ecological impacts along the Dharamtar Creek. It is a testimony to the adverse consequences of cargo operations on waterways.

- The Detailed Project Report prepared for the National Waterway-10 by the Inland Waterways Authority of India falsely claims that there is no fishing activity present in the operational stretch of the Amba Waterway. As against this, Manthan saw the vibrant fishing activities in Dharamtar Creek when we visited in November 2023.
- The dismissal of the existence of fisherpeople in Dharamtar Creek poses fundamental questions on the legitimacy of the National Waterway-10. The proper recognition of the fishing activities in Dharamtar Creek is the prerequisite to the assessment of impacts on livelihoods and other socio-ecological impacts due to interventions for the National Waterway-10.
- After the order of the Bombay High Court in 2014, Mumbai Port Trust (MbPT) has started shifting its coal to Dharamtar Creek considering the environmental hazards it was causing to the people of Mumbai. It means exporting the associated environmental impacts of coal handling from Mumbai to the residents of Dharamtar Creek.
- Imported coal being one of the key commodities transported on the National Waterway-10 raises fundamental questions on the viability of this waterway when the Government of India has been pushing for the utilization of domestic coal rather than the imported one.
- 19 km viable stretch of NW-10 is intensively used for cargo traffic as well as by fishing vessels. As the capacity and number of barges are bound to increase in the area with proposed new infrastructure and plans for expansion, it is important that a robust and independent system to manage the river traffic is implemented that also considers the needs of smaller fishing boats and ensures space, access and safety for them.

Key recommendations of the report are as follows:

1. Comprehensive Environmental Impact Assessment (EIA): There is a need for an extensive and independent Environmental Impact Assessment (EIA) that covers all aspects of the Amba River's National Waterway-10 development, including the impacts of dredging, cargo movement, and port expansions on the river's ecology, aquatic species, and local communities, especially the fisherfolks. This assessment should involve key stakeholders, including local fisherfolk, and be conducted with transparency.
2. Accurate Documentation of Fishing Activities: Contradictions between official reports and the accounts of local fisherpeople highlight the necessity for accurate documentation of fishing activities. The EIA should thoroughly assess the existing fishing practices, cooperatives, and the dependency of local livelihoods on fishing in

the Amba River. Any discrepancies between official reports and ground reality should be addressed.

3. **Monitoring and Regulation of Dredging Activities:** Dredging activities, especially their impact on fish habitats, agricultural lands, and mangroves, need stringent monitoring and regulation. The EIA should scrutinize the proposed dredging activities, including maintenance and capital dredging, and recommend measures to mitigate their adverse effects on the river ecosystem and local communities. The local communities can be included in the monitoring and regulation of dredging activities including monitoring the disposal of dredged material.
4. **Responsible Disposal of Dredged Material:** The disposal of dredged material must adhere to environmental regulations. The EIA should assess the impact of current disposal practices on the river ecosystem and recommend measures to ensure responsible disposal, such as predetermined dumping sites, periodic studies, and coordination with relevant authorities.
5. **Limitations on Barge Capacity:** The introduction of heavier barges (8000 tonnes) has raised concerns among fisherfolk. The EIA should evaluate the ecological and safety implications of using such heavy barges and recommend an optimal capacity limit that ensures minimal disruption to the river ecosystem and fishing activities.
6. **Strict Enforcement of Anchoring Regulations:** Anchoring of barges outside the designated navigational channel poses risks to fishing activities. The EIA should propose strict enforcement measures to ensure that barges anchor only within the demarcated navigational channel, preventing further restrictions on fishing areas.
7. **Safety Measures and Traffic Management:** Given the safety concerns raised by fisherfolk, the implementation of a robust River Information System (RIS) is recommended. This should be integrated into the overall safety measures, including the proposed National Coastal Grid, to effectively manage the increasing traffic on the waterway and ensure the safety of all vessels, including smaller fishing crafts.
8. **Community Engagement and Consultation:** The EIA process for assessment of impacts, and the design and implementation of mitigation measures should prioritize community engagement and consultation with local stakeholders, including fisherfolk, to incorporate their perspectives, concerns, and traditional knowledge into the decision-making process. This can contribute to the development of sustainable and inclusive policies for National Waterway-10.
9. **Periodic Review and Adaptation:** Recognizing the dynamic nature of ecosystems, policies related to National Waterway-10 should undergo periodic review and adaptation. Regular assessments, informed by scientific research and community feedback and participation, will ensure that the policies remain effective and responsive to changing environmental and social conditions.

Full report is available on www.manthan-india.org

Table of Contents

Introduction	1
Impacts on Fishing and Fisherfolks	8
Impacts due to Dredging	11
Impacts on Mangroves and Agricultural Activities	12
Disposal of Dredged Material	13
Movement of Heavier Barges of 8000 Tonnes	14
Anchoring Barges Outside the Navigational Channel	15
Coal Movement on NW-10 to Keep Mumbai Clean	16
Safety Concerns	18
Conclusion and Recommendations	19
Recommendations	20

Introduction

About 45 km of Amba river from Arabian Sea, Dharamtar Creek near village Revas to a Bridge near Nagothane ST Stand is declared as National Waterway-10 with National Waterways Act, 2016¹. Even before the declaration of this stretch of river as a National Waterway (NW) in 2016, in 2001, Maharashtra Maritime Board had declared the Amba river as a navigational waterway for cargo transportation using 300 DWT (Dead Weight Tonnage) vessels². Hence, NW-10 on Amba river was an already operational waterway even before the enforcement of National Waterways Act, 2016.

The 19 km stretch of NW-10 from Arabian Sea till the JSW Dharamtar Port is a Class-VII Waterway i.e. the navigation channel is allowed to be developed for vessels of 2000-8000 tonnes and above. This means that this stretch of the Amba River (NW-10) is being utilized for maximum capacity of vessels classified on inland waters in India. Not only the capacity but in terms of utility also, NW-10 on Amba river is the most utilized river in terms of cargo operations amongst the west flowing rivers³. At present, barges of 2700 tonne, 3700 tonne and 6000-8000 tonnes capacity move on the NW-10 with the help of tide.

National Waterways situated in the state of Maharashtra contributed 50% to the overall traffic of all cargo moved on all National Waterways in India in 2022-23⁴. Out of all cargo traffic on National Waterways in India (126 Million Metric Tonnes MMT) in 2022-23, 23 % (28.54 MMT) was contributed by NW-10 (Amba river). 14% of all cargo moved on the National Waterways in India is handled between Dharamtar and Jaigad Jetty in Maharashtra.

Intensive use of the Amba Waterway in the 19 km stretch is because of the presence of Jindal Steel Works plants, cargo for which is handled on the JSW Dharamtar port on the right bank of the River, and also port operations by PNP (Pallonji and Pallonji) Maritime Services Limited⁵ on the left bank of the river. Both these ports are operational non-major ports, mainly handling imported coal and iron ore predominantly from Mumbai Port Trust anchorage and Jawaharlal Nehru Port Trust.

Besides these two private players, Adani Cementation Limited has also gotten Environment Clearance in November 2023⁶ for construction of the 'Berthing Jetty, Conveyor Corridor with Backup Storage Facilities and Approach Road to Cement Grinding Unit & Fly ash/Slag Processing Unit which will be handling cargo upto 5 Million Tonnes per annum.

¹ National Waterways Act, 2016, https://iwai.nic.in/sites/default/files/4638891330NWACT2016_0.pdf

² Executive Summary of proposed captive jetty facility at village Kharmachela, Taluka Pen, District Raigad, Maharashtra in Dharamtar Creek, JSW Infrastructure Limited, (undated) (p 4) https://www.mpcb.gov.in/sites/default/files/public_hearing/exe_summary/2019-12/JSW_INFRASTRUCTURE_LIMITED_Executive_SummaryEnglish.pdf

³ Detailed Project Report -Amba River (44.971km) NW-10, Inland Waterways Authority of India, 2019 (p 286/415) https://iwai.nic.in/sites/default/files/8199066810NW-10%20Final%20DPR_Amba.pdf

⁴ <https://iwaicargoportal.nic.in/web/home/dashboard>

⁵ <https://iwaicargoportal.nic.in/web/home/dashboard>

⁶ https://parivesh.nic.in/utildoc/27084420_1700973003532.pdf

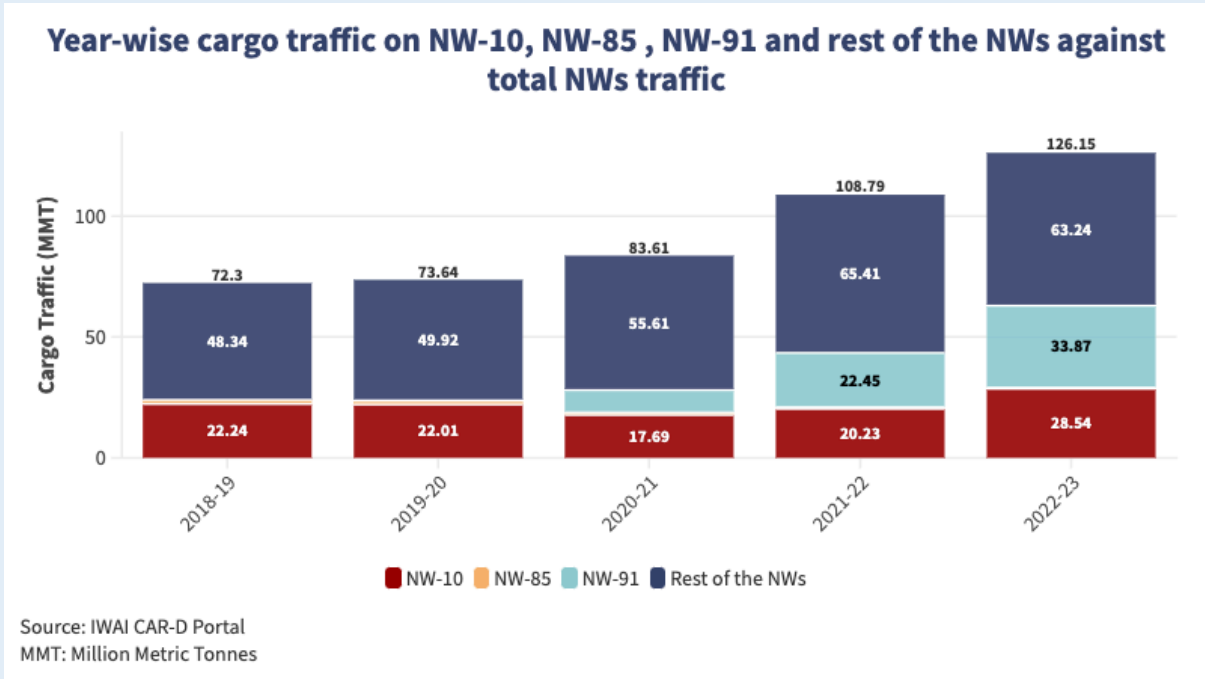


Figure-1: Yearwise Cargo traffic (MMT) of Operational National Waterways of Maharashtra: NW-10 (Amba river), NW-85 (Kundalika river), and NW-91 (Jaigarh creek-Savitri river) vs Cargo traffic of rest of the National Waterways from 2018-19 till 2022-23

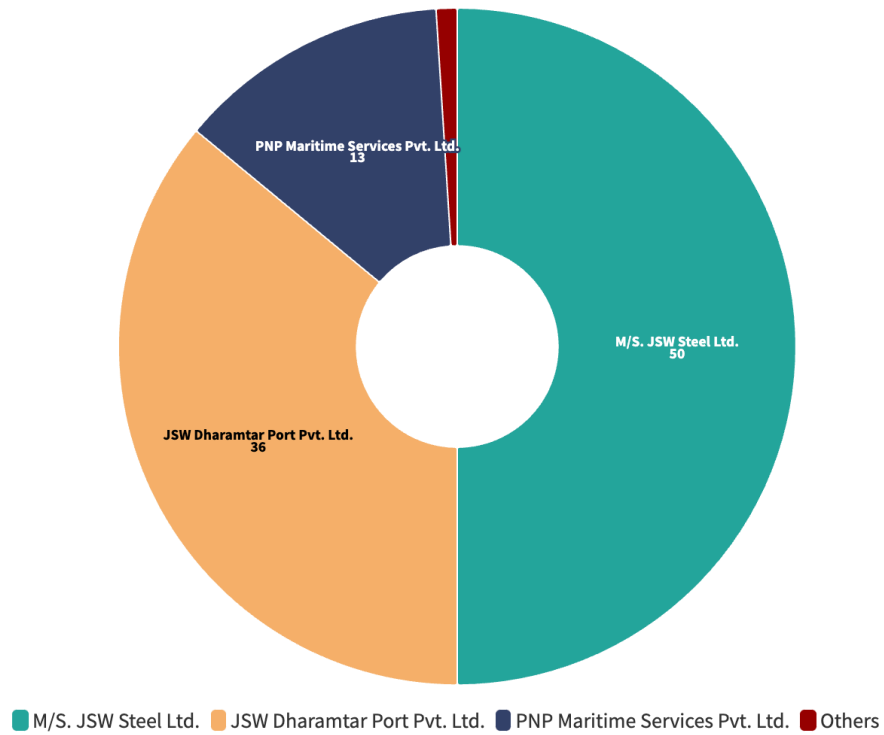
Hence, three private players - JSW, PNP Maritime Services and Adani Cementation Limited (with the proposed Cement plant and berthing jetty), along with the Maharashtra Maritime Board are the key agencies involved in the development and operations on the 19 km stretch of National Waterway -10. Inland Waterways Authority of India is the statutory body responsible for development of National Waterways in India including NW-10 since the declaration of Amba Waterway as a National Waterway with the National Waterways Act, 2016.

At present, about 39 barges are moved on the NW-10 daily⁷. By 2053, 116 MT traffic is expected to be moved on NW-10 by 2053 with 167 vessels moving per day on NW-10⁸. Out of the 116 MT of cargo proposed on NW-10, coal and iron ore would be 42.7 MT and 45.2 MT respectively by 2053.

⁷<https://iwai.nic.in/system/tdf/uploads/tender-archives/RFP%20for%20Maintenance%20Dredging%20on%20NW-10.pdf?file=1&type=node&id=139279&force=0>

⁸<https://iwai.nic.in/system/tdf/uploads/tender-archives/RFP%20for%20Maintenance%20Dredging%20on%20NW-10.pdf?file=1&type=node&id=139279&force=0>

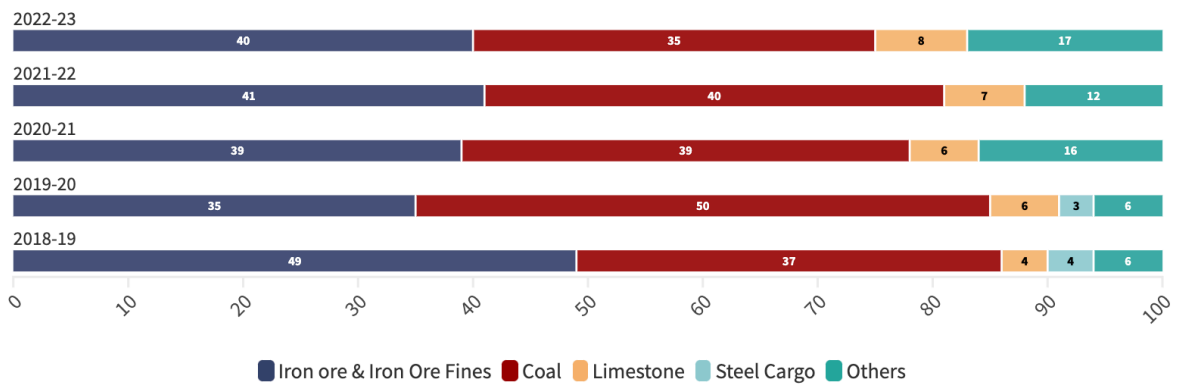
Vessel operators and their % share on NW-10 in FY23



Source: IWAI Car-D portal

Figure 2: Vessel Operators and their percentage share on NW-10 (Amba River) in 2022-23

Commodity Share (%) on NW-10 Amba River from FY19 to FY23



Source: IWAI CAR-D Portal

Figure 3: Commodity Share in percentage on NW-10 from 2018-19 till 2022-23



Figure 4: Google Earth Map of Amba Waterway -NW-10 showing proposed and current major infrastructure (jetties, ports, Steel and Cement plants)⁹

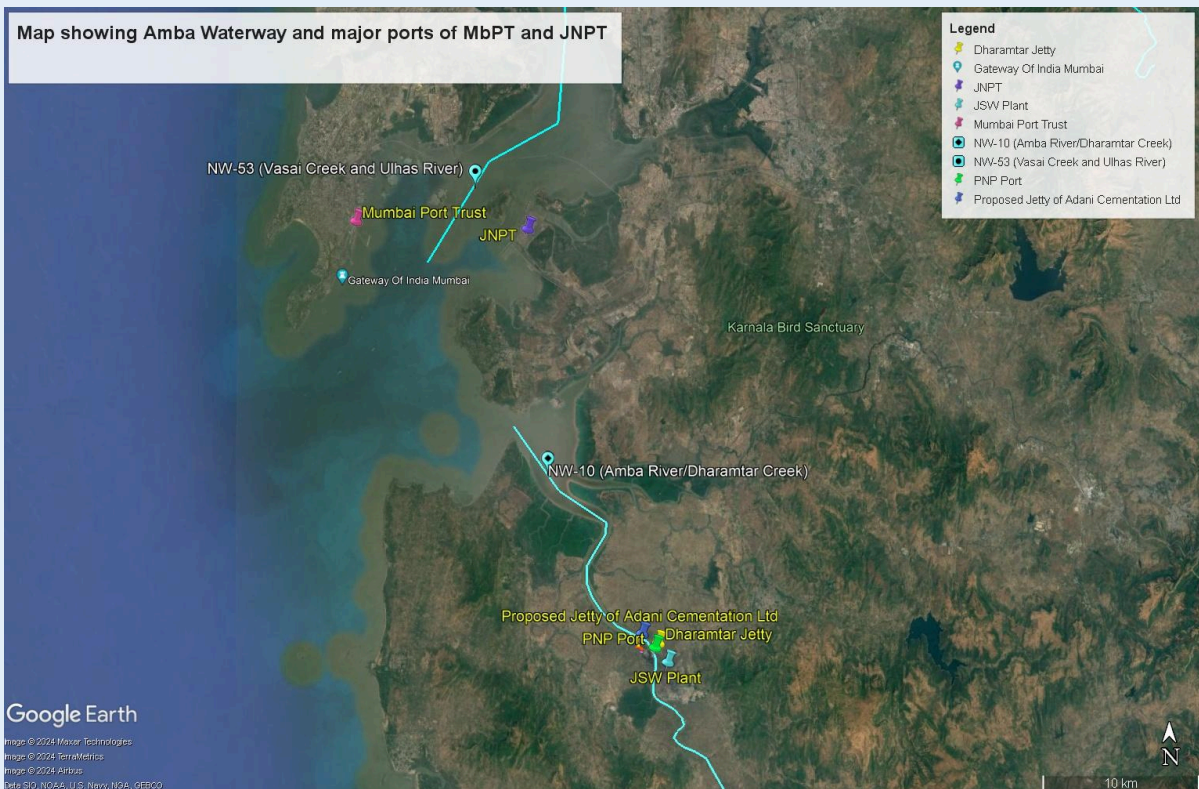


Figure 5: An overview of the NW-10 and Major Ports of MbPT and JNPT along with NW-53 shows the economic significance of the region. Google Earth Map prepared by Manthan Adhyayan Kendra.

⁹ Proposed lay-out for Adani Cementation Limited taken from data uploaded for the project on PARIVESH.

Hence, it is clear that heavy cargo movement is currently operational on NW-10 and more intensive usage of cargo movement with heavier barges for transportation of coal and iron ore is proposed on NW-10 in the coming years.

While the above paragraphs give information on the utility of the Amba river with regards to cargo movement and development of the river as a National Inland Waterway, it is important to outline that the Amba river is also a river which has ecological value, is a habitat to aquatic species and a source of livelihood for the local fisherfolks, among other things. The operational stretch of the Amba waterway is also known as the Dharamtar creek which is a tidal estuary. Tidal estuaries are considered one of the most productive ecosystems with various ecological functions.

With the [National Waterways Act 2016](#), 106 new National Waterways were declared on Indian rivers/canals/estuaries for developing these river stretches into navigable channels for commercial shipping and navigation. With the addition of these National Waterways to the existing earlier declared five National Waterways, India has a total of 111 National Waterways in the country. The renewed push for developing the National Inland Waterways in India is driven by the claims that inland Waterways are the most energy efficient, environment friendly and cost-effective mode of transport for bulk and hazardous cargo¹⁰. There are advantages of transporting the bulk - or over dimensional cargo through inland waterways due to low specific energy consumption as compared with other modes of transport¹¹. Hence, low fuel consumption, compared with other modes of transport, is the basis of advantages of the use of inland navigation in terms of air pollution and fuel cost savings.

However, there are challenges and adverse impacts on the riverine ecosystem as rivers are converted into navigable channels requiring changes in hydrological and geo-morphological regime of the rivers to ensure suitable water depth and safe navigation. Water Pollution due to water discharges from the vessels including oil and lubricants, dredging activities, pollution from terminals while handling and storing cargo, accidental spills and leakages, and erosion of river banks could lead to adverse changes in river ecology including impacts on local population and river dependent fishing communities. These challenges exacerbated with the increased pressure on river commons and climate change related impacts could add more uncertainty necessitating new approaches in further development of these projects.

¹⁰ <https://iwai.nic.in/sites/default/files/1013443659FAQ%20JMVP%20Final%20PDF.pdf>

¹¹ Némethy, Sándor A., Anna Ternell, Lennart Bornmalm, Bosse Lagerqvist, and László Szemethy. "Environmental Viability Analysis of Connected European Inland–Marine Waterways and Their Services in View of Climate Change." *Atmosphere* 13, no. 6 (2022): 951.



Figure 6: Emissions observed from vessels of JSW in front of the JSW Dharamtar port. Photograph by Manthan Adhyayan Kendra.

The report '*Cargo and Consequences: A Comprehensive Report on the Social and Environmental Implications of Shipping on Amba River - National Waterway-10*' is an attempt to understand the social and environmental impacts of intensive movement of coal and iron ore on Indian rivers through National Waterways in India. This report is based on official documents of Ministry of Ports, Shipping and Waterways, Statistics of Inland Water Transport Annual Reports, Detailed Project Reports done for Inland Waterways Authority of India, Environmental Impact Assessments Reports of proposed and ongoing projects, relevant Submissions/orders of the National Green Tribunal, and observations and discussions done by Manthan during the field visit done on Dharamtar creek (National Waterway -10) in Pen, Maharashtra in November 2023.

Since there is a continuous push to develop the National Waterways in the country, there is also a need to document and bring forth the hidden and less discussed concerns of developing the National Waterways on Indian rivers. Given this background, the report aims to contribute to improving policies, laws, and regulations for inland waterways governance and strengthening the agencies for their implementation, with particular emphasis on emerging ecological and environmental issues and concerns of the fisherfolks in the areas adjoining the Amba waterway in Maharashtra.

Impacts on Fishing and Fisherfolks

The DPR of development of NW-10 (Amba river), Environment Impact Assessment (EIA) Report for expansion of PNP and EIA done for proposed jetty by Adani Cementation Limited outline that impacts due to interventions required for developing the waterways are minimal or non-existent on fishing communities as fishing doesn't take place in Amba river.

The Detailed Project Report (DPR) of the Amba Waterways by the IWAI (2019) negates the existence of fishing activity in the Amba river in the operational stretch of the NW-10. It mentions, *“It is observed that inland **fishing activity does not take place in Amba River. As Amba River is used for cargo handling purposes, encouraging fishing activity here may not prove fruitful.**”¹²* (Emphasis supplied).

Not only the DPR by IWAI, the Environment Impact Assessment Report prepared for the proposed Adani's 'Berthing Jetty, Conveyor Corridor with Backup Storage Facilities and Approach Road to Cement Grinding Unit & Fly ash/Slag Processing Unit' on Amba river states, *“As there is no fishing hamlet or intensive fishing activity in the vicinity of the proposed site, livelihoods of fishers are not under threat. The low intensity of fishing operation using stake net, cast and gill nets in the area harvest insignificant fish catch. Hence, the impact in the area of jetty construction will be nominal leading to insignificant economic loss to the fishermen.”*¹³

Manthan engaged in discussions with the 50-60 fisherpeople in November 2023 from the nearby villages who still fish in the river but have been adversely impacted due to the low fish catch, and decline in the fish diversity. They were appalled to hear that the Detailed Project Report of the Amba River had mentioned the absence of fishing activity in the creek. They informed Manthan that there are 18 fishing cooperatives in the 19 km stretch of this creek which has an average of 250-300 members each.

¹² Detailed Project Report - Amba River (44.97 km) NW-10 dated 30.04.2019, Inland Waterways Authority of India, https://iwai.nic.in/sites/default/files/8199066810NW-10%20Final%20DPR_Amba.pdf(p 102/415)

¹³ Environment Impact Assessment Report for 'Berthing Jetty, Conveyor Corridor with Backup Storage Facilities and Approach Road to Cement Grinding Unit & Fly ash/Slag Processing Unit by Adani Cementation Limited Pg 50/72



Figure 7: Fishing boat and nets seen on the operational stretch of NW-10 (Amba river) in November 2023.

Photo: Manthan Adhyayan Kendra

Arun Shivkar, a local activist of Dharamtar Khadi Bhachao Kruti Samiti, says that fisherpeople would never come empty-handed from the river but that is not the case anymore. He mentioned that he had been searching for the Bodhya (an endemic seasonal fish of the Dharamtar Creek) for over a month but had not found any traces. He enumerated the different seasonal fishes of the river like Bodhya, Nivtya and Kharbya which have vanished gradually after the establishment of the factory. He asked, “What are the reasons for the vanishment of these fish species? If we had them 20-30 years back before the establishment of the factory then what is the reason for the decline?”. Govardhan Patil, a local fisherman from the village Shirki Chaal which is situated on the banks of Dharamtar Creek in Pen Taluka, furthered the concern that fish diversity has reduced, he told us that there were 35-40 people who used to catch Paala/ Bhingi (a local seasonal fish) which would fetch them 1.5-2 lacs in a couple of months before the Ganpati festival but they are not finding it even for their household consumption, he succinctly put it “aata jevayala pan paala milat nahi”.

In fact, the Assistant Commissioner of Fisheries in a report submitted to the National Green Tribunal in 2022¹⁴ outlined the dependence of local livelihoods on fishing activities on Dharamtar creek. Amba river. It is noted in his submission that, *“there are 11 fisheries cooperative societies near Dharamtar creek in Raigad District. These organizations depend on fishing in Dharamtar creek.”*

The National Green Tribunal in an ongoing case (OA 165/2022, Western Bench) asked the Joint Committee (constituting members from Ministry of Environment, Forest and Climate Change, Central Pollution Control Board, IIT Bombay, Maharashtra Pollution Control Board, District Magistrate, Raigad) to, among other things, look into the issue of loss in fish catch/productivity due to navigation of ships in the Dharamtar creek. The Joint Committee Report¹⁵ submitted by Central Pollution Control Board in this matter on 30.01.2023 mentions that total revenue generation in eight out of eleven fisheries co-operative societies near Dharamtar creek in Raigad District declined during 2015-16 to 2019-20. Whereas, revenue generation in three out of eleven fisheries co-operative societies have progressively and slightly increased during 2015-16 to 2019-20. However, the committee submitted that, *“a definite cause in the decline of fish availability in the remaining eight out of eleven fisheries co-operative societies couldn't be ascertained - as to whether it is due to pollution from companies or movement of ships/barges or any other reason.”* It was reported in the same affidavit of the same NGT case that due to lack of funds, the assessment of the committee has not been completed. This NGT case is now listed for hearing in March 2024. So far there is no assessment available in the public domain on impacts on fishing and livelihoods of fisherfolks due to navigational interventions -ongoing or proposed on NW-10.

IWAI in January 2024 has released a tender for ‘Consultancy Services for Environmental and Social Impact Assessment (EIA-EMP & SIA) studies in 5 National Waterways’ which covers dredging as the prime activity for five NWs including the NW-10¹⁶. However, this tender document also does not include impacts on fishing activities as the prime mandate of the scope of work.

There appears to be a discrepancy between the official reports and the actual situation on the ground. The local fisherpeople's accounts and the Assistant Commissioner's submission to the NGT suggest that fishing activities are indeed extensive in the Amba river, contrary to what the official reports claim. This emphasizes the need for a more thorough and accurate evaluation of the potential impacts on the fishing communities in the region.

¹⁴[https://greentribunal.gov.in/sites/default/files/news_updates/REPORT%20BY%20CPCB%20IN%20OA%20N.O.%20165%20of%202020%20\[Earlier%20OA%20No.%20122%20of%202015%20WZ\]%20\(Samita%20Rajendra%20Patil%20Vs%20Jindal%20Steel%20Works%20Ltd..%20&%20Ors\).pdf](https://greentribunal.gov.in/sites/default/files/news_updates/REPORT%20BY%20CPCB%20IN%20OA%20N.O.%20165%20of%202020%20[Earlier%20OA%20No.%20122%20of%202015%20WZ]%20(Samita%20Rajendra%20Patil%20Vs%20Jindal%20Steel%20Works%20Ltd..%20&%20Ors).pdf)

¹⁵[https://greentribunal.gov.in/sites/default/files/news_updates/REPORT%20BY%20CPCB%20IN%20OA%20N.O.%20165%20of%202020%20\[Earlier%20OA%20No.%20122%20of%202015%20WZ\]%20\(Samita%20Rajendra%20Patil%20Vs%20Jindal%20Steel%20Works%20Ltd..%20&%20Ors\).pdf](https://greentribunal.gov.in/sites/default/files/news_updates/REPORT%20BY%20CPCB%20IN%20OA%20N.O.%20165%20of%202020%20[Earlier%20OA%20No.%20122%20of%202015%20WZ]%20(Samita%20Rajendra%20Patil%20Vs%20Jindal%20Steel%20Works%20Ltd..%20&%20Ors).pdf)

¹⁶https://iwai.nic.in/system/tdf/uploads/tender-archives/Tenderdocument_16_01_2024.pdf?file=1&type=node&id=139446&force=0

Impacts due to Dredging

As rivers do not have a uniform depth necessary for the movement of barges, dredging is employed to remove the sediments from the river to increase the depth of the navigation channel for safe navigability of vessels. Dredging is dependent on the capacity of vessels and the natural draft available in the river.

In the 19 km operational stretch of Amba Waterway, IWAI has estimated 34 lakh cubic metrics of maintenance dredging to ensure 5.5m depth and 110m wide navigational channel on NW-10 in the DPR for maintaining the navigational channel¹⁷. IWAI has released a tender inviting bids for this work in September 2023¹⁸. IWAI is to ensure a depth of 5.5 m to suit the requirement of 8000 tonne capacity barges for JSW¹⁹. In addition to this, Adani Cementation Limited will be undertaking capital dredging²⁰ of 60,000 m³ for entire berthing area of their upcoming jetty on the NW-10²¹. Maintenance dredging of up to 30,000 m³ will be taken up by Adani Cementation Ltd. in case of any siltation in future in the proposed berthing area.

According to local fisherpeople, dredging and movement of barges have contributed most to the loss of fish. Arun Shivkar said that dredging impacts the natural breeding, hiding and resting places of the fish. Fisherpeople said that dredging happens throughout the day and night for three to four months and they cannot go fishing during that period since the intensity of the noise and waves does not provide any privacy to fish. They also accused the company of resorting to chemical blasting during dredging.

Tejas Patil, a local fisherman, lamented that *“the depth of the creek has increased due to dredging and so they have increased the speed and capacity of the barges. Earlier it used to be three hours but now it covers the same distance in one hour only. So how will the fishes be in the creek ?”*

¹⁷ Detailed Project Report - Amba River (44.97 km) NW-10 dated 30.04.2019, Inland Waterways Authority of India, p 265/415

¹⁸ https://iwai.nic.in/sites/default/files/uploads/tender-archives/NW-10%20Maintenance%20Dredging_draft%20Contract_.pdf

¹⁹ Detailed Project Report - Amba River (44.97 km) NW-10 dated 30.04.2019, Inland Waterways Authority of India, p 140/415

²⁰ Capital dredging is intervention in the water channel which involves the removal of hard strata and sediments to create and deepen the navigation channel. Maintenance dredging is done periodically to maintain the already dredged river channel to ensure safe navigation in the channel.

²¹ Marine EIA Study for Berthing Jetty, Conveyor Corridor with Backup Storage Facilities and Approach Road to Cement Grinding Unit & Fly ash/Slag Processing Unit of Adani Cementation Limited at Amba River, Shahbaj & Shahpur Village, Alibag Taluka, Raigad District, Maharashtra

Impacts on Mangroves and Agricultural Activities

Apart from its impacts on fishing, the dredging and movement of the barges have also affected agriculture and mangroves in the area.

Locals informed Manthan about the increase in salt level in the land and it is adversely impacting the fertility of the agricultural fields near the NW-10. Bandhs locally known in the region as 'Kharbandisti bandhs' protect the agricultural fields from brackish water of the Amba river in the Dharamtar creek.

"When the saline water of the creek enters the farm, we cannot grow rice for three years," said Arun Shivkar. Locals inform that it is due to dredging and movement of barges that these bandhs are damaged. They explained that bank erosion and damage to the kharbandisti bands is due to increased pressure on the banks created by wave action with the movement of barges. They also alleged that dredging increases the depth in the creek which gets filled with the sediments from the river banks and bandhs. The saline water then enters the agricultural land making it infertile for years.

Mangroves/kandalvan are found to be located on both banks of the Amba River -all along the proposed waterway stretch. Mangroves are important ecological features of the tidal estuaries. Mangroves, according to the fisherpeople, are also useful for reproduction of the fishing activities and controlling the creek water entering the agricultural area. Fisherpeople also alleged that JSW had refused to take any responsibility for the loss of the mangrove cover due to bank erosion and hence did not construct the wall, although their dredging and barges were solely responsible for it. The creek has gradually widened and deepened as a result. Govardhan Patil said that the average increase in the width of the creek due to bank erosion is 100-150 meters but at places like Tamsi Bandar, its extent has widened by more than 500 meters. However, the DPR refuses to admit the impacts due to bank erosion and destruction of mangroves as a result of dredging, *"In the stretch, up to ch 19.64 km, there is no such location with any Bank Protection requirement. However, the proposed Dredging activity may have nominal morphological disturbance, which in turn may lead to the vulnerability of Bank erosion"*.

The fisherfolk and locals also informed Manthan about the wider set of environmental and social adverse impacts due to pollution from the operational industrial units in the vicinity of the Amba river (NW-10). Because Manthan has not studied those impacts in detail, they are not addressed in this report.

Disposal of Dredged Material

So far the dredging has been done by JSW and PNP ports for their cargo operations and jetty expansion with permission from the Maharashtra Maritime Board. Dredging is almost a recurrent activity in the Amba Waterway. Fisherpeople told Manthan that dredged material should be dumped near the Khanderi (a place in the sea few kilometers away from Karanja port) but the contractor does not adhere to the guidelines and dumps it in the middle of the creek to save the diesel. According to them the dumping spot near Khanderi was allocated by the Maharashtra Maritime Board.

This suggests that there was a regulatory framework in place for the disposal of dredged material in Maharashtra, particularly in the Amba Waterway (NW-10) development project. However, the office Memorandum released by the Ministry of Environment, Forest and Climate Change in 2017 exempted the requirement of prior Environment Clearance maintenance dredging in all inland waterways subject to implementation of 29 environment safety measures. Out of these 29 safety measures, the following are significant for disposal of dredged material

1. Shoreline shall not be disturbed due to dumping. Periodical study on shoreline changes shall be conducted and mitigation carried out, if necessary
2. Disposal places of dredged sediments needs to be predetermined, along the shore by assessment of suitability, which will not affect the shoreline (erosion) and also causing impacts during monsoon and flooding.
3. As much as possible, it shall not be disposed off in the river itself, and the site should be such that dispersion is quicker by undertaking modelling studies.
4. All safety measures are to be implemented in coordination with respective state government departments such as State Forest Department, Public Works Departments, State Pollution Control Board etc.

These measures, though not foolproof as the regulatory mechanism for their monitoring and further assessment of impacts is not spelled out, are important to note the significance of prior selection of disposal sites, periodical studies and monitoring, and coordination required amongst the different departments/institutions for safe and effective management of disposal of dredged material. Ongoing initiatives, such as the consultancy services tender for EIA studies, demonstrate intention to maintain environmental standards in dredging and disposal of dredged material on-paper but in absence of independent monitoring and assessment of impacts are detrimental to sustainability of the river ecosystem and the dependent livelihoods.

Movement of Heavier Barges of 8000 Tonnes

Fisherfolks told Manthan's team in November 2023 that, *"We are facing serious problems in our fishing activities. Earlier there used to be barges of 2000-3700 DWT capacity but now JSW has introduced heavier 8000 tonnes barges."*

Fisherpeople say that huge vessels of eight and ten thousand tonnes are not at all conducive for this creek and they create the most disturbances and destructions therein. According to them, *"movement of heavier barges of 8000 tonnes in the creek could damage bunds."*



Figure 8: 8000 DWT barge traveling towards the JSW Dharamtar Port on National Waterway -10. Photographed on 23.11.2023. Photo credit: Manthan Adhyayan Kendra

The fisherfolks recommended that the cargo operations should take place with the capacity of utmost 3700 tonne capacity of barges. They urged to ban the heavier barges of 8000 tonne from entering the creek in the interest of larger sustainability of the ecosystem and their livelihoods.

Anchoring Barges Outside the Navigational Channel

The Environment Compliance submitted by JSW mentions that the barges navigate only through the demarcated channel and hence there are no impacts on fishing²². However, during Manthan's field visit to the Dharamtar Creek -operational stretch of the National Waterway -10, it was found that the barges were anchored beyond the marked navigational channel where fishing is allowed.



Figure 9: Barges anchored outside the Navigation Channel on Amba Waterway. Photo Credit: Manthan Adhyayan Kendra

The local fisherfolk informed Manthan's team that such incidents are common, the barges are anchored beyond the navigational channel. The fisherfolks can't fish in the navigational channel of 110m width in the middle of the river demarcated with navigational buoys. Anchoring of barges outside the navigational channel further restricts the area of fishing for the fisherfolk. Fishing nets frequently get broken due to encroachment of the fishing channel by the barges, and the company settles the issue by giving meagre compensation to the people and many times they do not get any, claims local fisherpeople.

²²<https://www.jsw.in/sites/default/files/assets/downloads/infrastructure/Dharamtar/EC%20Compliance%20-%20Dec%202021%20to%20June%202022.pdf>

Coal Movement on NW-10 to Keep Mumbai Clean

Viability of the inland water transport depends, among other things, on the assurance of cargo to be moved on the waterway. Coal and iron are the predominant commodities currently moved on NW-10. As mentioned in the above section, these are going to be the key commodities driving the traffic on NW-10. Regarding the movement of coal, the DPR states that

*“Coal from Mumbai Port has to be **shifted to keep the city clean**. Amba River and the non-major ports in Amba, predominantly PNP are likely to be the largest recipient of this shifted cargo. High court has also given its ruling to shift coal by the year 2020. Iron & Steel, which is transported using roadways, also possess potential to get evacuated using waterways from Mumbai Port.²³” (Emphasis supplied)*



Figure 10: Coal dust on Amba Waterway downstream of PNP port on NW-10. Photograph: Manthan Adhyayan Kendra

Bombay High Court in October 2014²⁴ asked Mumbai Port Trust to consider the impacts of coal movement on citizens’ health due to air pollution and also due to destruction of mangroves due to coal depots in the city. In 2016, Mumbai Port Trust started moving all remaining coal to Dharamtar Port in the ‘larger interest of the (Mumbai) city.’ Shifting of

²³Detailed Project Report - Amba River (44.97 km) NW-10 dated 30.04.2019, Inland Waterways Authority of India, p121 /415

²⁴ https://www.gem.wiki/Haji_Bunder_Port

coal to the non-major ports of Dharamtar also means shifting of the adverse environmental impacts due to coal handling to Dharamtar creek and the adjoining villages.



Figure 11: Fishing vessel in front of PNP terminal handling coal on the left bank (looking downstream) of the Amba river. Photo: Manthan Adhyayan Kendra

The locals with whom Manthan met in November 2023 informed that there are severe impacts being faced by them due to increased handling of coal through the JSW and PNP ports on NW-10. Many of them said that coal dust can not only be found on the Amba river but also on their roofs and hampers rain water harvesting which used to be an important means of storing fresh water as the water in the river is brackish with high salinity. The similar impacts as faced by the mangroves in Mumbai are also possible on the mangroves of Amba river.

Moreover, as the DPR also states there remains a risk on the viability of the waterway with imported coal being the key commodity for movement on the NW-10 as the Government of India pushes for utilization of domestic coal rather than imported coal. Hence, the question remains whether the waterway would remain viable in case there is a restriction on importing coal, which is the key commodity to be transported on NW-10.

Safety Concerns

According to the EIA Report prepared for Adani Cementation Ltd., there were 851 ship calls at the ports including one foreign vessel and the rest coastal vessels in 2019-20. Apart from the ships, 36 barges operate in these ports bringing bulk cargo from the mother ships anchored offshore at the Mumbai Port. About 20 -30 barges operate daily in the area.

The report further mentions that small fishing crafts also operate in the area for fishing purposes. According to the Department of Fisheries, Alibag, Government of Maharashtra mentioned as source in the report, These country crafts include 122 mechanized and 282 non-mechanised boats.

The fisherfolks Manthan interacted with explained how unsafe it becomes for the smaller fishing vessels to traverse the river when heavy barges are moving on the river. “Small fishermen also cannot travel from one bank to another due to the high speed of the vessel,” lamented Govardhan Patil. The fisherfolks also complained that when there is fog, barges often get stuck on the mangroves because of low visibility.

The NW-10 till the 19 km viable stretch is intensively used for cargo traffic as well as by fishing vessels. As the capacity and number of barges are bound to increase in the area with proposed new infrastructure and plans for expansion, it is important that a robust and independent system to manage the river traffic is implemented that also considers the needs of smaller fishing boats and ensures space, access and safety for them.

The DPR of the Amba Waterway suggests that the Ministry of Ports, Shipping and Waterways is planning for a National Coastal Grid of Vessel Traffic Management System. This proposal is from the strategic safety point of view and is expected to take some more time. However, to save cost and since traffic is heavy on the waterway, River information System is recommended instead of a Vessel Traffic Management System in the DPR. However, the Port Inspector, a Maharashtra Maritime Board official located at the Dharamtar Port informed us that JSW manages its traffic through their own Vessel Traffic Management System. He informed that IWAI was neither informed nor consulted regarding the safety or any other provisions of the DPR. in fact, he was unaware that there exists a DPR prepared for Inland Waterways Authority of India or there is an ongoing tender for maintenance dredging released by IWAI.

Conclusion and Recommendations

The stretch of 45 km of Amba river from Arabian Sea, Dharamtar Creek near village Revas to a Bridge near Nagothane ST Stand is declared as NW-10 with National Waterways Act, 2016. Even prior to the declaration of the Amba waterway (NW-10), the 19 km stretch of the river from Arabian Sea, Dharamtar creek till the Dharamtar port (now JSW Dharamtar Port) is being intensively utilized by the private players - JSW and PNP for the movement of cargo - mainly coal and iron ore. Cargo handled on the JSW and PNP ports is lighterage cargo transported to JSW Dharamtar Port and PNP port using the barges of 2000- 2700, 3700 and 8000 DWT capacity barges. Adani Cementation Limited has also proposed a berthing jetty and a cement plant which would also be transporting coal, fly ash, slag and cement on the waterway in the coming years. To ensure the navigability of these barges and the berthing area of the jetties, maintenance dredging is done to maintain the fairway by private players. IWAI has also proposed maintenance dredging to ensure the navigability in the waterway for the operations of the private players.

Three private players - JSW, PNP Maritime Services and Adani Cementation Limited (with the proposed Cement plant and berthing jetty), along with the Maharashtra Maritime Board are the key agencies involved in the development and operations on the 19 km stretch of National Waterway-10. Inland Waterways Authority of India is the statutory body responsible for development of National Waterways in India including NW-10 since the declaration of Amba Waterway as a National Waterway with the National Waterways Act, 2016.

In conclusion, the report highlights that this waterway, particularly the 19 km operational stretch from the Arabian Sea to JSW Dharamtar Port, plays a crucial role in cargo operations, primarily handled by JSW, PNP Maritime Services, and recently Adani Cementation Limited. The report underscores the significance of NW-10 in Maharashtra, contributing a significant percentage to the overall cargo traffic on National Waterways in India.

Despite its economic importance, the report emphasizes the ecological value of the Amba River, serving as a habitat for aquatic species and a source of livelihood for local fisherfolk. The document reveals discrepancies between official reports, which downplay the impact on fishing activities, and the accounts of local communities, who report adverse effects on fish catch, fish diversity, and livelihoods.

The key findings address the environmental consequences of intensive cargo movement, specifically the impacts of dredging, disposal of dredged material, and the use of heavier barges. Concerns include disruptions to fishing activities, damage to agricultural lands and mangroves, and the potential shift of adverse environmental impacts from Mumbai to Dharamtar creek due to coal handling.

The report advocates for a comprehensive evaluation of social and environmental impacts, emphasizing the need for accurate assessments of fishing activities, monitoring of dredging and disposal practices, and the reconsideration of the use of heavier barges. It also calls

attention to safety concerns, urging the implementation of effective traffic management systems on the waterway.

Ultimately, the report aims to contribute to informed decision-making, advocating for a balanced approach that considers both economic development and the preservation of the ecological and social fabric of the Amba River.

Recommendations

1. **Comprehensive Environmental Impact Assessment (EIA):** There is a need for an extensive and independent Environmental Impact Assessment (EIA) that covers all aspects of the Amba River's National Waterway-10 development, including the impacts of dredging, cargo movement, and port expansions on the river's ecology, aquatic species, and local communities, especially the fisherfolks. This assessment should involve key stakeholders, including local fisherfolk, and be conducted with transparency.
2. **Accurate Documentation of Fishing Activities:** Contradictions between official reports and the accounts of local fisherpeople highlight the necessity for accurate documentation of fishing activities. The EIA should thoroughly assess the existing fishing practices, cooperatives, and the dependency of local livelihoods on fishing in the Amba River. Any discrepancies between official reports and ground reality should be addressed.
3. **Monitoring and Regulation of Dredging Activities:** Dredging activities, especially their impact on fish habitats, agricultural lands, and mangroves, need stringent monitoring and regulation. The EIA should scrutinize the proposed dredging activities, including maintenance and capital dredging, and recommend measures to mitigate their adverse effects on the river ecosystem and local communities. The local communities can be included in the monitoring and regulation of dredging activities including monitoring the disposal of dredged material.
4. **Responsible Disposal of Dredged Material:** The disposal of dredged material must adhere to environmental regulations. The EIA should assess the impact of current disposal practices on the river ecosystem and recommend measures to ensure responsible disposal, such as predetermined dumping sites, periodic studies, and coordination with relevant authorities.
5. **Limitations on Barge Capacity:** The introduction of heavier barges (8000 tonnes) has raised concerns among fisherfolk. The EIA should evaluate the ecological and safety implications of using such heavy barges and recommend an optimal capacity limit

that ensures minimal disruption to the river ecosystem and fishing activities.

6. **Strict Enforcement of Anchoring Regulations:** Anchoring of barges outside the designated navigational channel poses risks to fishing activities. The EIA should propose strict enforcement measures to ensure that barges anchor only within the demarcated navigational channel, preventing further restrictions on fishing areas.
7. **Safety Measures and Traffic Management:** Given the safety concerns raised by fisherfolk, the implementation of a robust River Information System (RIS) is recommended. This should be integrated into the overall safety measures, including the proposed National Coastal Grid, to effectively manage the increasing traffic on the waterway and ensure the safety of all vessels, including smaller fishing crafts.
8. **Community Engagement and Consultation:** The EIA process for assessment of impacts and the design and implementation of mitigation measures should prioritize community engagement and consultation with local stakeholders, including fisherfolk, to incorporate their perspectives, concerns, and traditional knowledge into the decision-making process. This can contribute to the development of sustainable and inclusive policies for National Waterway-10.
9. **Periodic Review and Adaptation:** Recognizing the dynamic nature of ecosystems, policies related to National Waterway-10 should undergo periodic review and adaptation. Regular assessments, informed by scientific research and community feedback and participation, will ensure that the policies remain effective and responsive to changing environmental and social conditions.

In 2016, the National Waterways Act announced the addition of 106 new National Waterways (NWs) in the country, bringing the total to 111, including the previously declared 5 NWs. NW-10, popularly known as Amba Waterway/Dharamtar Creek, had been operational prior to its official designation under the aforementioned act. The NW-10 holds a significant percentage in the overall cargo movement on National Waterways in India. In the fiscal year 2022-23, it contributed 22.65% to the total cargo traffic transported on National Waterways, underscoring its importance to the National Waterways project.

Inland Waterways Authority of India (the nodal agency for developing and maintaining National Waterways in India) has anticipated a substantial increase in this traffic, rising from 28.54 MMT in 2022-23 to 116 MMT by 2052-53. From Rewas Port to Dharamtar Jetty, a 19.42 km operational stretch of the Amba River is a tidal estuary providing a rich breeding habitat for the diverse aquatic flora and fauna. The riverine waters also provide a livelihood for thousands of fisherpeople residing along the banks of the Amba River. Against this backdrop, this report attempts to understand the challenges and socio-ecological impacts of cargo operations on NW-10.

