

Technical Analysis of EIA Report of
Development of Waterfront at
Mormugao Port, Goa
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INTRODUCTION

The Mormugao port located in North Goa is planning to develop a waterfront (new harbor and breakwater) west of the breakwater at the existing Mormugao port. WAPCOS has prepared the Environment Impact Assessment report for the project. The project has received Terms of Reference (ToR) from the Ministry of Environment and Forests in November 2009. The public hearing of the proposed project is scheduled on November 25, 2012. Cost of the project is Rs 7,210 million (*pg 2-19 of EIA*).

THE MORMUGAO PORT

Mormugao port was commissioned in 1885 and is a major iron ore handling port in India. The major port is located in the centre of River Zuari (*page 1-1 of EIA report*). The major port handles close to 34 million tonnes of iron ore exports per year.

The Mormugao port at present has the following terminals and is managed by the Mormugao Port Trust (MPT) (refer *Figure 1: Satellite image of the Mormugao Port*):

1. General Cargo handling terminal
2. Iron Ore Exporting terminal / Mooring Dolphins
3. Coal importing terminal
4. Steel handling terminal
5. Barrage Unloading terminal
6. Liquid bulk handling terminal
7. Multipurpose terminal
8. Ship repairing yard

Figure 1: Satellite image of the Mormugao Port



Source: *EIA Study for development of Waterfront West of Breakwater at Mormugao Port*, WAPCOS, pg 2-2

WHY THE PROJECT?

The waterfront is proposed to be used as a dedicated iron ore terminal. The addition of the terminal is expected to aid the export of iron ore faster. Rich iron ore production in Bellary and Goa and the subsequent need of the industry to export the iron ore are cited as reasons for the project.

The Mormugao port handles 40 per cent of the country's iron ore exports (*pg. 1-4 of EIA*). In addition to iron ore mines at Goa, about 6 million tonnes of ore also come into Goa from Bellary (Karnataka) for exports. The existing dedicated iron ore terminal at the port only has a capacity of about 12 million tonnes (MT) and the rest of the ore is handled at the anchorage, which is considered unsafe to handle such huge quantity of cargo (*pg. 1-4 of EIA*). During foul weather conditions the port finds difficulties in handling the cargo. The proposed project is expected to provide for safe handling of iron ore throughout the year. Since the project only aims to facilitate the existing iron ore handling, it is not expected to add to the traffic (*pg. 1-4 of EIA*).

CSE comment: It is to be noted that the Shah Commission, which probed into illegal mining in Goa, recommended that the iron ore production in the state should be brought equivalent to 2000-2001 to mitigate the impact of mining on the protected area. Following the report, the state government and the Ministry of Environment and Forests (MoEF) suspended all mining operations in the state till further notice. Hence the production of iron has gone down in the state. In Karnataka, following the orders of the Supreme Court to suspend mining operations, iron ore production has drastically gone down. Thus the reason to set up the project to handle more cargo seems to be a little absurd given the present scenario.

PROJECT LOCATION & LANDUSE

The coordinates of the existing port are 15° 25' North and 73° 47' East (*pg. 1-1 of EIA*). The project area comes under taluka Tiswada of South Goa district (*pg. 3-22 of EIA*). The proposed project will require about 14 hectares (ha) of area of reclaimed land (*pg. 2-1 of EIA*). Area falling under 10 km radius of the project site is considered as the study area. Villages in the 10 km surrounding area of the project: Chicolna, Issorcim, Pale, Sao Jacinto Island, Sao Jorge Island and a part of village Sancoale (*pg. 3-22 of EIA*). Urban areas in the study area of the project: Mormugao and Chicalim. The population of the study area given in the EIA report is 2,24,739 (*pg. 3-22 of EIA*).

The landuse pattern of the study area has been studied using satellite image from National Remote Sensing Agency (Hyderabad) (*page 3-5 of EIA*). Seventy six per cent of the study area is water body, seven per cent is dense vegetation, six per cent each open vegetation and grassland, five per cent built up area and rest is rock (see *Table 1: Landuse Pattern of study area*).

Table 1: Landuse Pattern of study area

Category	Area (in ha)
Dense vegetation	2100
Open vegetation	1836
Grassland	1803
Exposed rock	77
Water body	76
Built-up area	1735
TOTAL	31416

Source: *EIA Study for development of Waterfront West of Breakwater at Mormugao Port*, WAPCOS, pg. 3-22

CSE comment: The coordinates of the proposed project are not mentioned in the EIA report nor has the landuse pattern of the project site been discussed. The year of census is not mentioned in the EIA report so it is difficult to say if the report takes into account appropriate impact on people. The EIA report mentions that there are plans to develop large tracts within the harbour but implementation of the expansion in is difficult as there are encroachments hence this site has been considered (*pg. 1-2 of EIA*). The option of removing these encroachments or what they are and utilizing the site within the boundary is neglected without the discussion in detail.

SCOPING MATRIX

A scoping matrix is discussed in the EIA report (*pg. 1-7 of EIA*). According to the EIA report, the criteria applied for the selection of important impacts are magnitude of impact, extent, significance and special sensitivity of impact. This matrix is said to have been used as a guideline for collection of baseline data for EIA report (*pg. 1-9 of EIA*).

CSE comment: A general table on impacts is discussed in the EIA report. The table below comprehends how effectively the consultant has used the scoping matrix:

S. No.	Activity	Impact	Discussion in the EIA report
A	Actions affecting coastal marine ecology		
1	Impacts on marine ecology	Reduction in primary productivity	Present primary productivity is measured but the impact of the project is not measured
2	Disposal of dredging spoil in fisheries reproduction zones	Impact on fisheries	Says project will have no impact
3	Disposal of dredging spoil	Loss of fragile/precious marine ecology	Says no threatened species so no impact
4	Oil spill/leakage within terminal area	Damage to marine ecology	Says no threatened species so no impact
5	Disposal of dredging spoil	Impacts on marine ecology	Says no threatened species so no impact
B	Actions affecting Recreational/Resort/Beach along the Coastal Zone		
6	Location of iron ore terminal close to the recreational areas	Visible turbidity or decolouring of beach waters	Not discussed
7	Escape of liquid and solid wastes from the iron ore terminal	Silt deposition along the shoreline	Not discussed

8	Disposal of reclamation material which reaches the shoreline	Waste deposition along shoreline	Not discussed
C	Actions affecting physico-chemical aspects		
9	Ship movement and construction activities	Noise pollution and adverse impacts on aquatic fauna	
		Increase in noise levels to distress to the locals	Not discussed
		Increased chances of spills due to increase in maritime traffic	Says no impact since no additional traffic
10	Groundwater abstraction	Increase in salt water intrusion	Not discussed
11	Disposal of sewage and solid wastes	Water pollution and adverse impacts on marine ecology	Says no impact
12	Increase in vehicular traffic	Air pollution leading to discomfort to the population in the adjoining area	Says no impact
D	Factors affecting the socio-economic environment		
13	Increased ship traffic in the area	Boost to local economy	Not discussed
		Improvement in employment potential	Not discussed
		Up-gradation of infrastructure Facilities	Not discussed
		Occupational health problems	Not discussed
14	Land acquisition	Loss of agricultural land and other properties	Not discussed
		Acquisition of other infrastructural facilities	Not discussed
		Impact on historical/culture/religious monuments/sites, if any	Not discussed
15	Increase in traffic	Traffic congestion Disruption of transit patterns	Says there will be railway lines and other cargoes will be transported through rivers hence no impact

		Pedestrian hazards due to increased traffic movement	Not discussed
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IMPACT ON MARINE ECOLOGY

The marine ecology survey was conducted in March 2008 (*pg. 1-10 of EIA*). Bottom and surface water samples were collected from different sites. The following factors have been discussed in the marine ecology impact assessment:

1. Gross Primary Productivity (GPP) which is the total energy (or nutrients) assimilated by an ecological unit such as an organism, a population, or an entire community
2. Net primary Productivity (NPP) is the total energy (or nutrients) accumulated by an ecological unit
3. Community Respiration
4. Chlorophyll
5. Phaeophytin
6. Oxidisable particulate organic matter
7. Micro flora and Micro Fauna density in sea water.

CSE comment: The baseline data was collected in 2008 while the project is coming up in 2012. In a period of four years, baseline situation could have changed which does not get reflected here.

The determination of the factors considered in the EIA report cannot be accepted as impact predictions. A comparison scenario on what happens if the project gets executed and what if it does not has not been made clear. There are no standards defined for – GPP, community respiration, etc., therefore it is not possible to assess whether these figures are good or bad.

DREDGING

On an average, 4.5 m of dredging will be required involving a volume of 0.7 million cubic meters (*pg. 2-8 of EIA*). This is a two per cent increase than the present dredging done for maintenance at the existing port. It is mentioned in the report that 60 per cent of this dredged material maybe used for back filling while the rest can be dumped (*pg. 4-5 of EIA*). A designated area has been selected for dumping the dredged soil (*pg. 2-8 of EIA*). The filling will be carried out to develop the 14 ha area behind the new water break, which needs about one million m³ of filling material (*pg. 4-6 of EIA*).

The EIA report states that removal of material from the seabed may result in removal of animals and benthic organisms living on and in the sediments (*pg. 4-6 of EIA*). The EIA report states that since there are no endangered, rare or threatened organisms found at the site, it will not have any impact of marine ecology.

CSE comment: The designated site for dumping the dredged soil has not been mentioned in the EIA report. The EIA report merely states that there will be no marine

ecology impact without giving details on what organisms were found or not. Also, just because the organisms found at the site do not fall in the rare, endangered or threatened categories does not imply that it will not have any effect on marine ecology. There needs to be a more detailed study.

A study by the National Institute of Oceanography for the existing Mormugao port says that there is a reduction in the macro fauna by 60-70 per cent because of dredging¹. Thus this needs to be taken seriously and further analysis needs to be carried out before making generalized statements.

Food and Safety organization (FAO) of UN says that before deciding on the method of disposal, the dredged sediments must be first classified according to their potential to contaminate the environment where they are due to be deposited. Sediments may be classified under one of three classes:

- Class 1 – clean material, allowable for placing in any type of open water disposal site (open placement on sea bed);
- Class 2 – slightly contaminated, allowable for placing in certain open water disposal sites but requiring careful placing (inside a pit or depression of the sea bed); and
- Class 3 – contaminated material, in principle, not suitable for open water disposal but to be confined in either very strict or well-controlled disposal sites (capped atolls or reclamation).

The method of removal also has many potentially negative impacts and careful planning is required prior to mobilizing equipment². The method of removal/dredging procedure is not discussed in the EIA report.

WATER

The present water consumption of the port is 3000 m³ per day (*pg. 2-11 of EIA*). proposed project requires water/day. The Public works department of Goa supplies 1500 – 1800 m³/day of water from Selaulim Dam (*pg. 2-11 of EIA*). The rest of the water demand is being met from the wells of the MPT. The proposed project would source the remaining water through bore wells.

Water requirement for the project during construction phase is estimated to be 60 m³/day (*pg. 4-3 of EIA*). The estimate sewage is given as 48 m³/day during the construction phase. It is proposed to construct septic tanks to treat sewage with a cost of Rs 0.13 crore (*pg. 5-2 of EIA*).

¹ Vijaykumar Rathod (2011) *“Physical and Biological Impact on Marine Benthic Polychaetes due to dredging in the Mormugao Harbour, Goa and its restoration after dredging”*, Journal of the Bombay Natural History Society, 108(1), Goa

² <http://www.fao.org/docrep/013/i1883e/i1883e06.pdf> as viewed on Nov 12, 2012

The EIA report acknowledges that discharge from ships could be a source of water pollution (*pg. 4-5 of EIA*). It also states that there is no possibility of chemicals or metals being leached into water (*pg. 4-9 of EIA*). It is proposed to build a settling tank for water from the iron ore stockyard for which an amount of Rs 0.1 crore has been set aside (*pg. 5-13 of EIA*).

CSE comment: Water requirement for the proposed expansion has not been discussed. Already there is a shortfall in the water requirement then how will the increased water demand be met has not been discussed. Also, the impact of abstracting groundwater has not been discussed. Abstraction of fresh water through bore wells along the coast may lead to intrusion of seawater that needs to be kept in mind. Mormugao is a Schedule-1 area as per The Goa Groundwater Regulations Act, 2002, which implies it is a groundwater, stressed area³. Also water usage will definitely generate wastewater but there is no mention about this in the EIA report.

CSE has visited the existing port facility earlier this year and had found immense fugitive emission at the points of loading unloading since this was being carried out in the open. Also the ore was being loaded onto the barges from a height causing the ore to fly and deposit onto the water surface thus this assumption of no water pollution is not correct and renders the EIA incomplete. It is important to recognize this and have closed/pneumatic loading system to prevent such water pollution. There is a mention of using dust suppression systems for the stockpiles (*pg. 5-13 of EIA*).

Although a settling tank is proposed to be built, no specifications like the capacity of the same, the duration for which water will be left in it and what will happen to the water afterwards is given.

POWER

The project is proposed to be supplied with 5.5 MW power by Reliance Industries Ltd (*pg. 2-10 of EIA*).

AMBIENT AIR QUALITY

The ambient air quality survey has been carried out from December 2007 – March 2008 (*pg. 1-11 of EIA*). Monitoring was done for twice a week for 12 consecutive weeks (*pg. 1-11 of EIA*). Suspended Particulate matter (SPM), Repairable Particulate Matter (RPM), SO_x and NO_x has been monitored. Air quality monitoring has been carried out at four locations (*pg. 3-5 of EIA*).

Minor air quality impacts are expected during construction phase of the project (*pg. 5-6 of EIA*). The Gaussian plume model of air pollution during the construction phase for the SO_x pollution has been discussed in the EIA report. SO_x emission from different vehicles used in construction phase are taken into count for the calculation.

CSE comment: The baseline data was generated in the year 2008, which again presents the problem of a gap of four years during which baselines could have changed drastically. It is to be noted that the Expert Appraisal Committee granted ToRs to the same port trust for a fishing jetty in October 2007. So there is a possibility that the same air quality monitoring data from 2008 has been used, which may have been prepared for the fishing jetty. It is important to note that after the fishing jetty a coal terminal is under construction in the Mormugao area, hence the 2008 data does not suffice as baseline for the present environmental scenario. Also, the EIA report does not mention the four locations where the monitoring for ambient air quality was done.

NOISE IMPACT

Noise was monitored during the day and night in March 2008 (*pg. 1-11 of EIA*). The EIA report has assumed the noise levels of equipment and says “Modeling studies were conducted to assess the increase in noise level due to operation of various construction equipment” (*pg. 4-3 of EIA*).

CSE comment: But details on what model was used are not made clear in the EIA report. And the noise to be generated by the ships and ore handling has not been discussed.

IMPACT ON FISHERIES

The EIA report recognizes that due to high turbidity fishes may asphyxiate and die and changes in food chain maybe introduced. It also states “since the fishes are free swimming they very well avoid such areas and move to safer areas. Once the turbidity is over due to currents, they come back to the area. Due to this capability of the fishes there is no significant adverse impact on fishes and fisheries is expected on fisheries as a result of dredging.”

A fishing centre is planned opposite berths 10 and 11 of the Mormugao port (*pg. 3-12 of EIA*). The fish land at this point is estimated to be about 20,000/year and main species are mackerels, oil sardines, soles, prawns, etc.

CSE comment: Parking of mechanized vessels/ships along the coast would decrease the interface for the fishing community in the area and may also affect fish catch. Very little information provided in the EIA report and without any concrete study is a matter of concern. Also, there is no primary evidence to support the movement of fish from high turbidity region to lower ones as a natural succession so this assumption needs to be backed by a study. What will be the impact of the proposed project on the planned fishing centre is not discussed in the EIA report either.

ENVIRONMENT MONITORING PLAN

The proposed project envisages to monitor the following parameters⁴:

Parameter	Cost earmarked in million rupees/year	Monitoring Time Frame
Air Quality	0.76	during construction phase
Noise	0.08	construction and operation
Marine Ecology	1.58	construction phase
Air Quality	0.36	During operation phase
TOTAL	2.78	

ENVIRONMENT MANAGEMENT PLAN

Rs 0.926 crore has been earmarked as the cost of implementing the Environment Management Plan⁵.

TABLE-7.1

Summary of cost estimate for implementing Environmental Management Plan (EMP)

S. No.	Parameter	Cost (Rs. million)
1.	Sanitary facilities at labour camps	1.30
2.	Covered truck for transportation of solid waste	2.00
3.	Health facilities during construction phase	1.86
4.	Control of air pollution	1.38
5.	Treatment of effluent from Coal Stackyard	1.00
6.	Greenbelt development	0.30
7.	Purchase of noise meter	0.08
8.	Implementation of Environmental Monitoring Programme during construction phase (Refer Table-7.2)	2.34
	Total	9.26

CSE comment: The Environment Management Plan discusses the ways to minimize the effects of the project only during the construction phase. The EIA report does not discuss the plan to minimize the effects during the operational phase of the project.

EIA REPORT FAILS TO DISCUSS

COASTAL EROSION

The construction of breakwaters and capital dredging may cause changes in sea current patterns and littoral drifts. The change of littoral drifts may lead to erosion or

⁴ EIA Study for development of Waterfront West of Breakwater at Mormugao Port, WAPCOs, pg. 6-4,6-5,7-1

⁵ ibid

accretion in shore zones⁶. A study on likely changes in littoral drift and sediment transport due to the project activity should be taken up through modeling. But the EIA report has not discussed any coastal erosion phenomenon.

CUMULATIVE IMPACT

Western Shipyard, Mormugao Adani Terminal are other ports along the coast have not been taken into account. Vasco Da Gama area in Goa which has the Mormugao port has a 7 km coastline interface with the sea of which at present 3 km is occupied by these shipping yards. On allowing expansion further the coastline area would decline.

⁶ www.unescap.org/ttdw/publications/tfs_pubs/.../pub_1234_ch2.pdf as viewed on Nov12, 2012