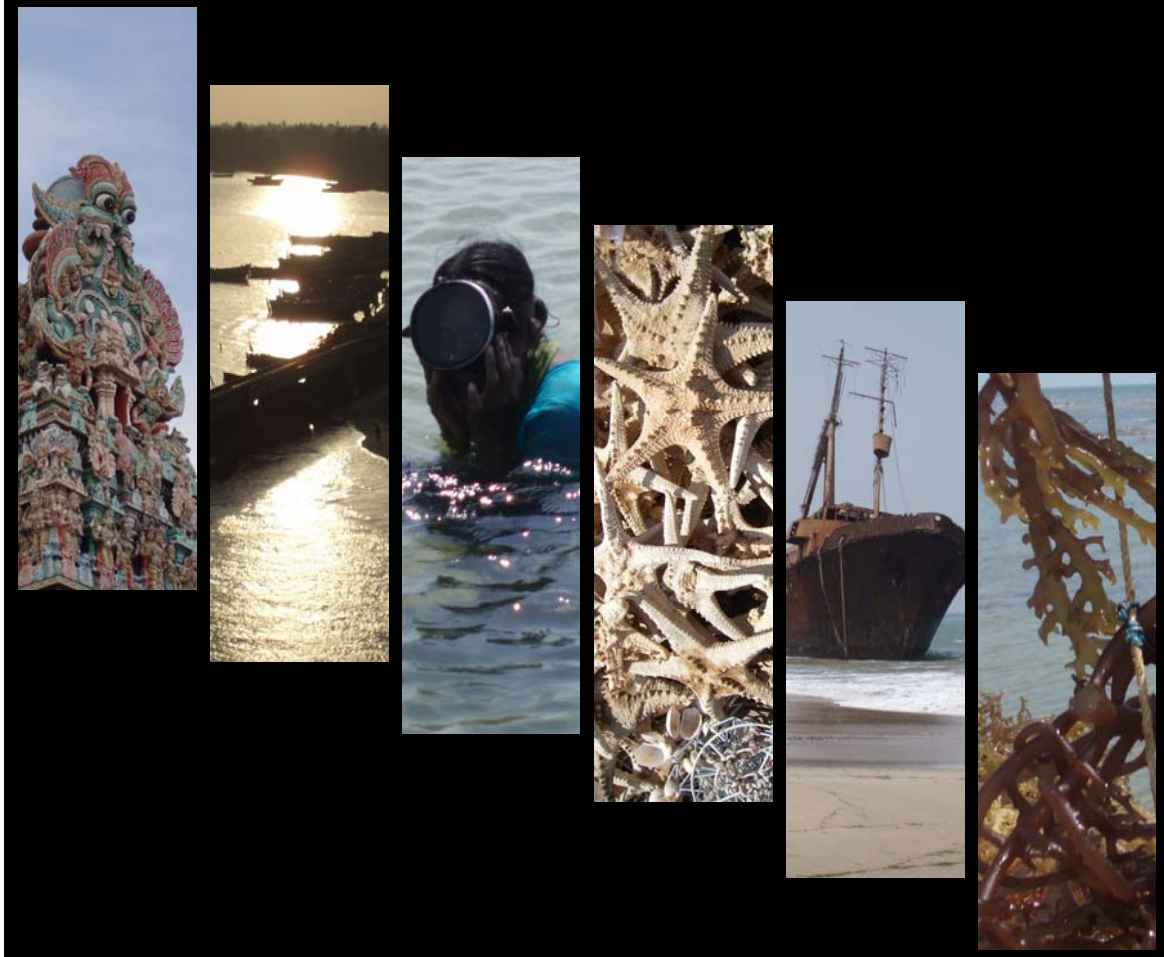
Harboring Trouble- Economic, Social and Environmental Upshot of Port Growth in India.



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2010

Dakshin Foundation

The Social and Environmental Upshot of Port Growth in India

Harbouring Trouble

Sudarshan Rodriguez

2010

Dakshin Foundation

Coastal Land Rights of Fishing Communities

Claims for survival

- Sridhar, A., R. Arthur, D. Goenka, B. Jairaj, T. Mohan, S. Rodriguez and K. Shanker. 2006. ***Review of the Swaminathan Committee Report on the CRZ Notification***, Draft submitted to UNDP, New Delhi.

- Sridhar, A., M. Menon, S. Rodriguez and S. Shenoy. 2008. ***Coastal Management Zone Notification '08 – The Last Nail in the Coffin.*** ATREE, Bangalore.pp 81.

- Rodriguez, S. and A. Sridhar. 2010. ***Harbouring Trouble: The Social and Environmental Upshot of Port Growth in India***. Dakshin Foundation, Bangalore, p 62.

- Rodriguez, S. 2010. ***Claims for Survival: Coastal Land Rights of Fishing Communities.*** Dakshin Foundation, Bangalore, p42.

Introduction

- Currently, there are about 213 notified ports along the coast of mainland India. This would translate to
- Roughly a port every 28 kms of the Indian coastline. Of these at least 69 are proposed for development.
- Besides its own impact, port development is often accompanied by other activities such as the location of industries, power plants, railway lines, highways, hotels, Special Economic Zones, residential complexes and so on. These activities can exacerbate the negative influence of ports through the cumulative impacts on the environment and communities.
- With one fishing hamlet located along every 2 km of the coast and a port proposed every 28 km, the port development trend in India has serious implications and impacts on fishing communities and the environment.

State	MoS website	Dept. of Shipping 2007-8 Annual Reprt	MES/ICMAM to MoEF/2009	Current Study 2010
Gujarat	40	42	40	49
Daman and Diu	2	2	2	2
Goa	5	5	5	5
Maharashtra	53	48	53	48
Karanataka	10	10	10	10
Kerala	13	17	13	17
Lakshadweep	10	10	10	10
Tamil Nadu	15	15	14	20
Pondicherry	1	2	1	2
Andhra Pradesh	12	12	12	13
Orissa	2	13	2	14
West Bengal	1	1	1	1
Andaman & Nicobar Islands	23	23	23	22
TOTAL	**187**	**200**	**186**	**213**

Source	Year	Number of Minor Ports	Functional Ports
Tenth Five Year Plan	2002	184	53
Economic Survey 2001-02	2002	148	NM
TCS Report on Coastal Shipping	2003	185	61
Economic Survey 2003-04	2004	185	61
National Maritime Development Programme (Ports)	2006		45
Economic Survey 2007-08	2007	185	60
MoST Annual Report 2007-8	2008	200	NM
Raja Simham (Business Line)	2009	185	61
Economic Survey 2008-09	2009	200	60
MES/ICMAM study	2009	186	NM
Ministry of Shipping Website	2010*	187	NM
Economic Survey 2009-10	2010	200	66
Current Report	**2010**	**213**	

Table 1: Percentage share of traffic at major ports over the last 48 years.

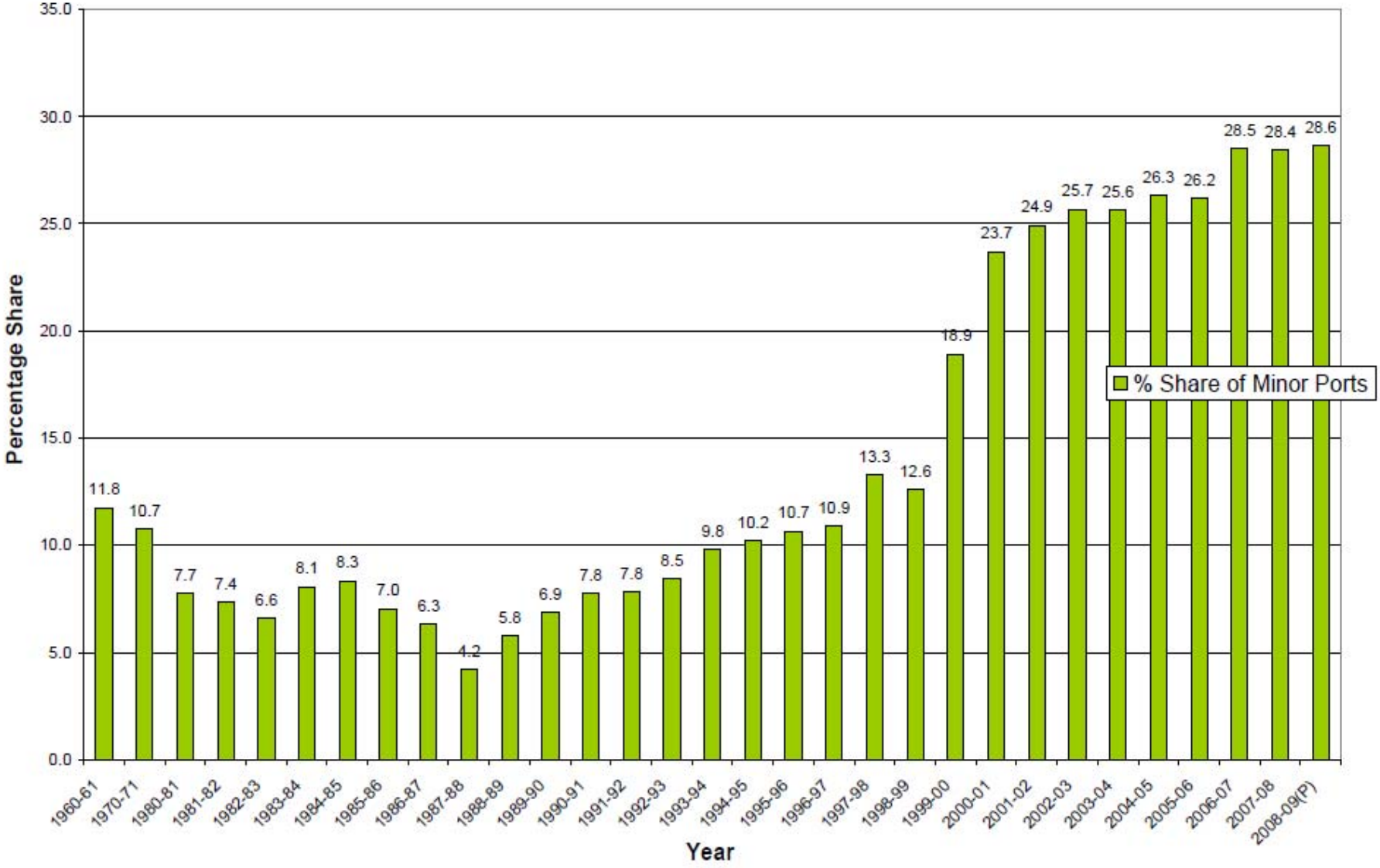

Table 3: Ongoing and proposed investment in minor ports since 2003

State	Ongoing and proposed investment in minor ports since 2003 (in Crore Rs.)
Andaman & Nicobar Islands	Not available
Andhra Pradesh	19,976
Daman and Diu	Not available
Goa	Not available
Gujarat	27,280
Karanataka	6,238
Kerala	10,350
Lakshadweep	Not available
Maharashtra	13,770
Orissa	43,284
Pondicherry	4,216
Tamil Nadu	15,515
West Bengal	Not available
TOTAL	**1,40,629**

Name of State	Coastline (in Kms)	Notified Minor Ports	Major Ports	Port Density Minor Ports/Km	Port Density Total Ports/Km
Gujarat	1214.7	49	1	24.8	24.3
Maharashtra	652.6	48	2	13.6	13.1
Daman and Diu	9.5	2	0	4.8	4.8
Goa	151	5	1	30.2	25.2
Karnataka	280	10	1	28.0	25.5
Kerala	569.7	17	1	33.5	31.7
Tamilnadu	906.9	20	3	45.3	39.4
Andhra Pradesh	973.7	13	1	74.9	69.6
Orissa	476.4	14	1	34.0	31.8
West Bengal	157.5	1	1	157.5	78.8
Pondicherry	30.6	2	0	15.3	15.3
Andaman & Nicobar	1962	22	1	89.2	85.3
Lakshadweep	132	10		13.2	13.2
TOTAL		**213**	**13**		
Full Coastline with Islands	**7516.6**			**35.3**	**33.3**
Mainland Coastline	**5422.6**	**181**		**30.0**	**28.1**

Environmental Issues in Ports

- Port development can create a wide range of impacts on the environment through dredging, construction work, landfills, discharges from ships and waterfront industries, cargo operations, and other port related activities.

- The potential adverse effects of port development include water pollution, contamination of bottom sediments, loss of bottom habitat, damage to marine ecology and fisheries, beach erosion, current pattern changes, waste disposal, oil leakage and spillage, hazardous material emissions, air pollution, noise, vibration, light and visual pollution.

Environmental Issues in Ports

The three major sources of these adverse effects are:

- (a) Site location: The location of the port site will determine the nature and severity of impacts. This could be both environmental (near high erosion areas or turtle nesting areas) as well as social (proximityto fishing settlements or near fishing grounds).

- (b) Construction activities: Construction activities for ports take place both in the offshore waters and on land. The most significant of this is construction of breakwaters or groynes, dredging, disposal of dredged materials, and transport of construction materials.

- (c) Port operation: This includes ship traffic and discharges, cargo handling and storage, and land transport. Port operation consists of ship-related factors such as vessel traffic, ship discharges and emissions, spills and leakage from ships; and cargo-related factors such as cargo handling and storage, handling equipment, hazardous materials, waterfront industry discharges, and land transport to and from the port.

Table 10: Relationship between impact sources and environmental parameters[33]

Source	Port Location	Construction	Port Operation		
Environmental Parameter			**Ship traffic & discharges**	**Cargo, berth & terminal operations**	**Maintenance dredging**
Water quality	Yes	Yes	Yes	Yes	Yes
Coastal hydrology	Yes	Yes	-	-	Yes
Bottom contamination	Yes	Yes	-	Yes	Yes
Marine/coastal ecology	Yes	Yes	Yes	Yes	Yes
Air quality	-	Yes	Yes	Yes	
Noise and vibration	-	Yes	-	Yes	Yes
Waste management	-	Yes	Yes	Yes	Yes
Illumination impacts	Yes	-	-	Yes	
Shoreline impacts	Yes	Yes		Yes	Yes
Direct socio-cultural impact	Yes	-	Yes	Yes	

Bilge and ballast water

- The water discharged during the cleaning of a ship and the discharge of ballast water is a well-known threat to marine ecosystems. In fact the introduction of invasive marine species into new environments (from ballast water, or from organisms attached to ships' hulls and via other vectors) has been identified as one of the four greatest threats to the world's oceans34. In India, black stripped mussel *Mytilopsis sallei* has been reported from Mumbai and Visakhapatnam. This species is native to tropical and sub-tropical Atlantic waters and is reported to have invaded Indian waters sometime during 1960's.
- The east asian green lipped mussel (*Perna viridis*) has been reported in the navy dock at JNPT, Mumbai. Green crab - *Carcinus meanas*, a native of Europe is also reported from the Indian Ocean (Sri Lanka). The molluscs and crustacean population on which this crab preys upon can be affected (Anil *et al*. 2004)

Dredging

- Capital and maintenance dredging -One of the fallouts of this is the marked increase in fine sediment suspension in the waters which results in increasing sediment deposits in marine habitats, and a lowering of light conditions.

- It is likely that the spread of these sediments is dependent on a combination of particle size, local current patterns and weather conditions. The penumbra of influence of the dredging operations is likely to extend far beyond the dredging zone itself, and may increase the sediment and nutrient loads in nearby marine systems (see section 4 in Rodriguez et al. 2007; UNESCAP 1992).

Mechanisms of sand transportation along Coastline

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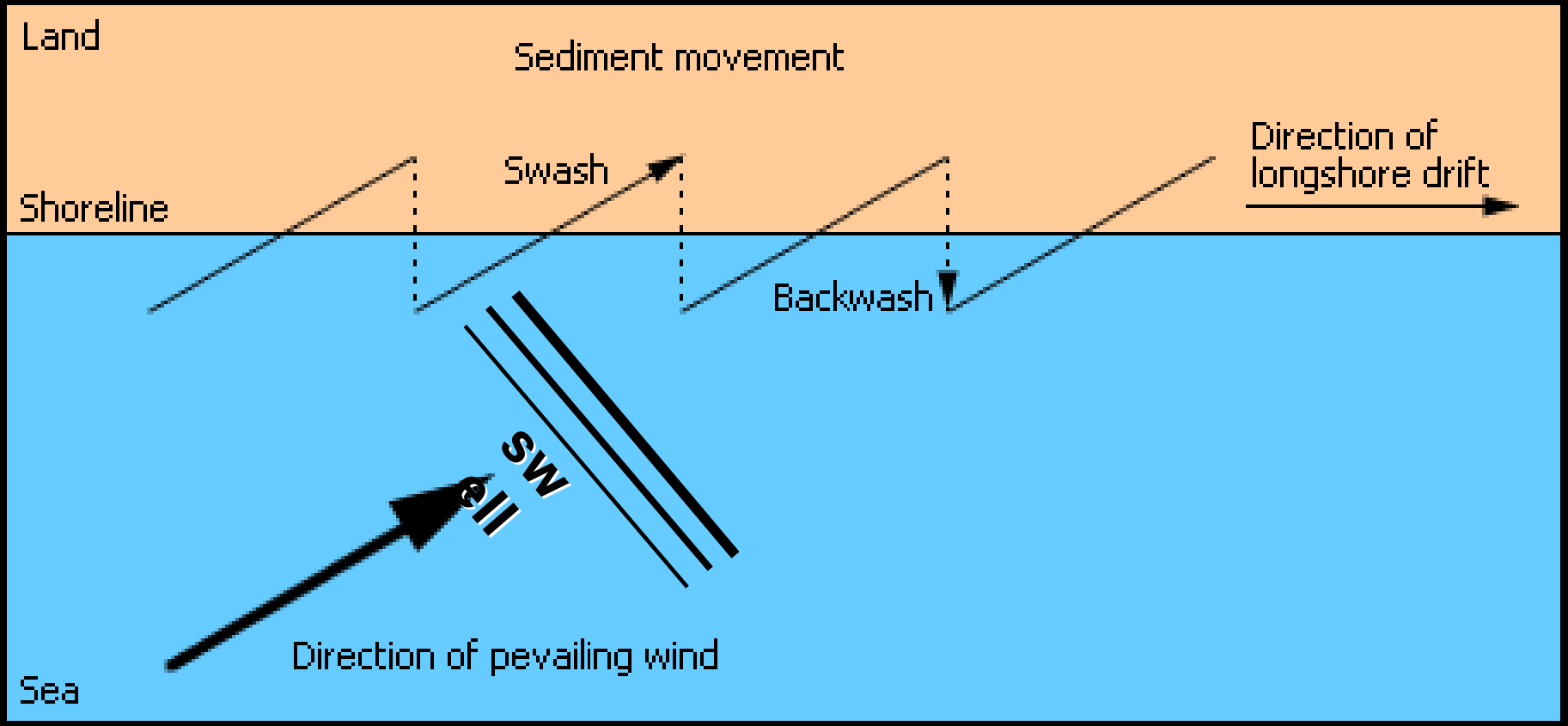
Direction of sand movement

Image: source Google Earth

Mechanisms of sand transportation along Coastline



Images: source Google Earth

Mechanisms of sand transportation along Coastline

During SW Monsoon (9 months):

6,00,000 cu.m sand move North

During NE monsoon (3 months):

1,00,000 cu.m sand move South

Mechanisms of sand transportation along Coastline

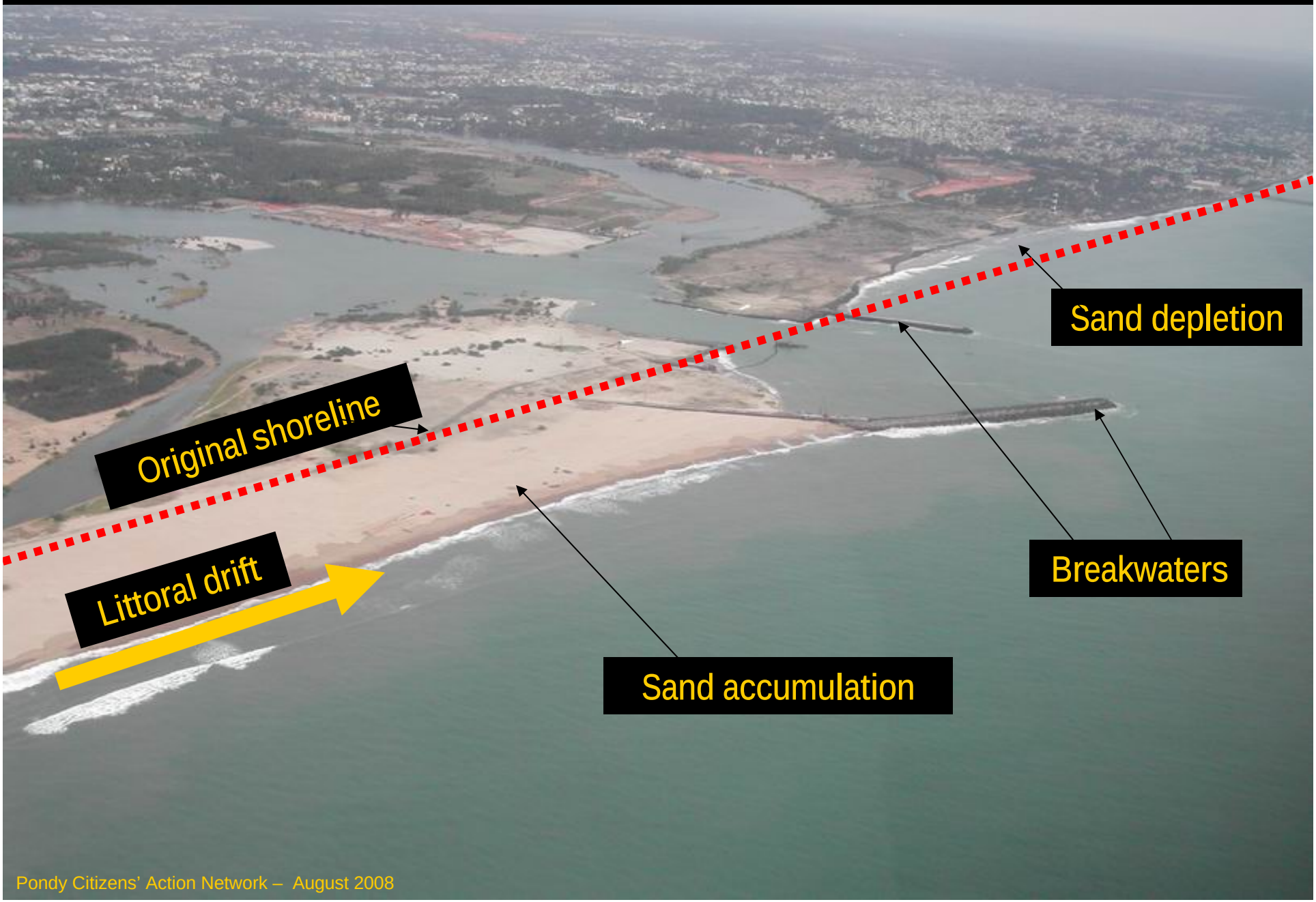
Net long-shore drift =

6,00,000 cu.m (North - SW)

- 1,00,000 cu.m (South - NE)

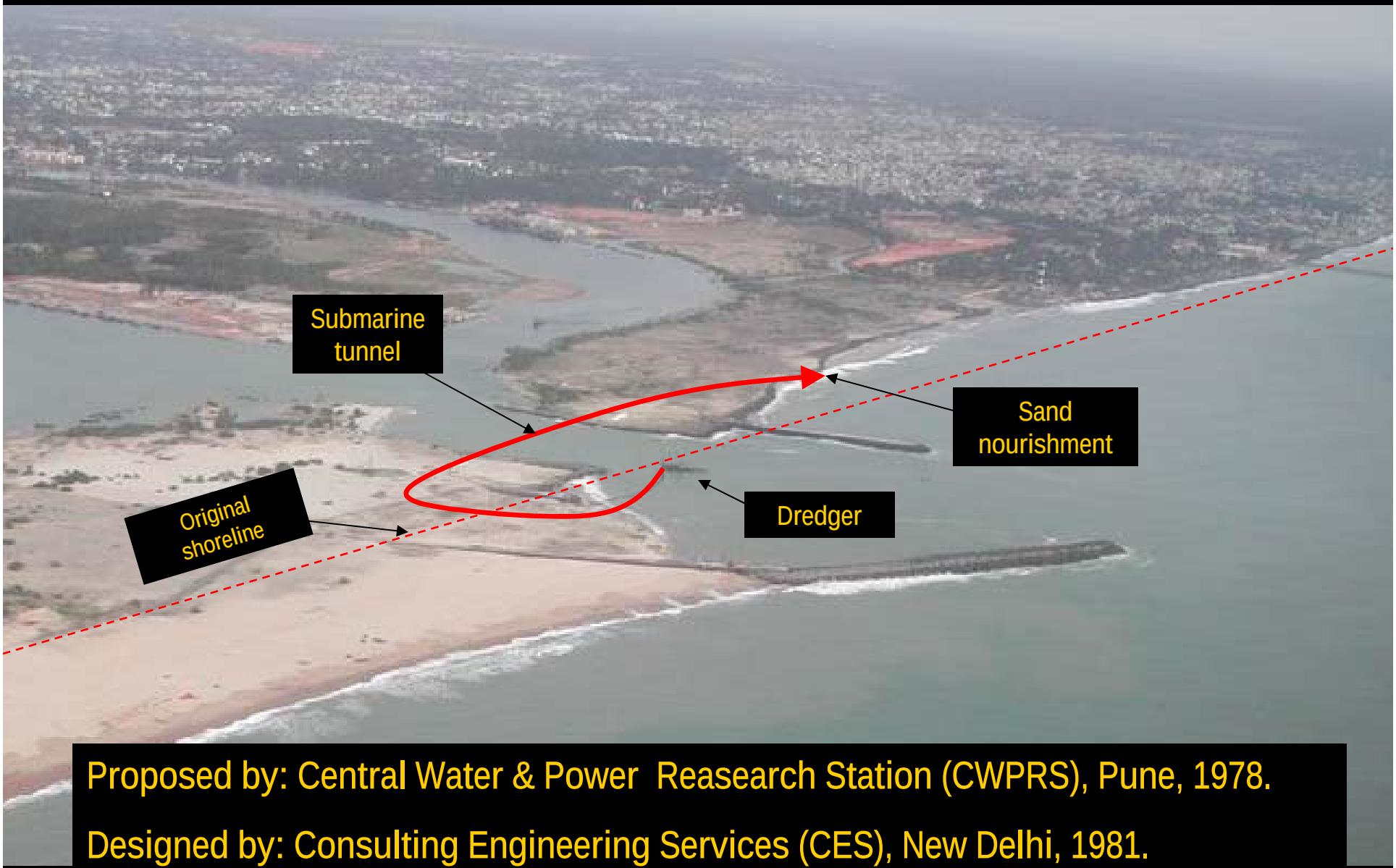
= 5,00,000 cu.m move North each year

Breakwaters obstruct littoral drift



DÉJÀ VU – Chennai harbour

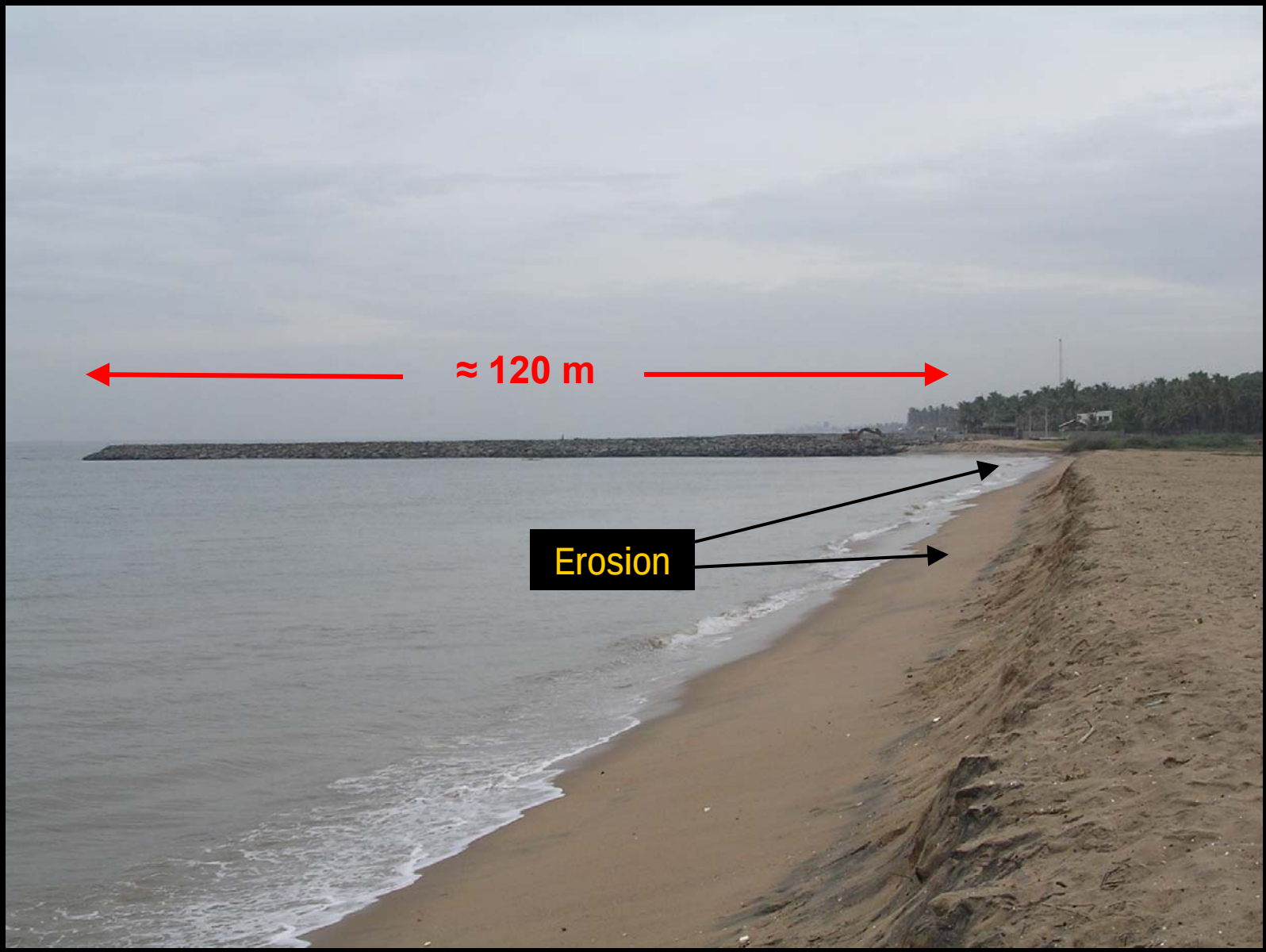
Existing sand by-pass system at Pondy harbour



Proposed by: Central Water & Power Reasearch Station (CWPRS), Pune, 1978.

Designed by: Consulting Engineering Services (CES), New Delhi, 1981.

Groyne built North of Thandiyankuppam Village in Tamil Nadu May 2007



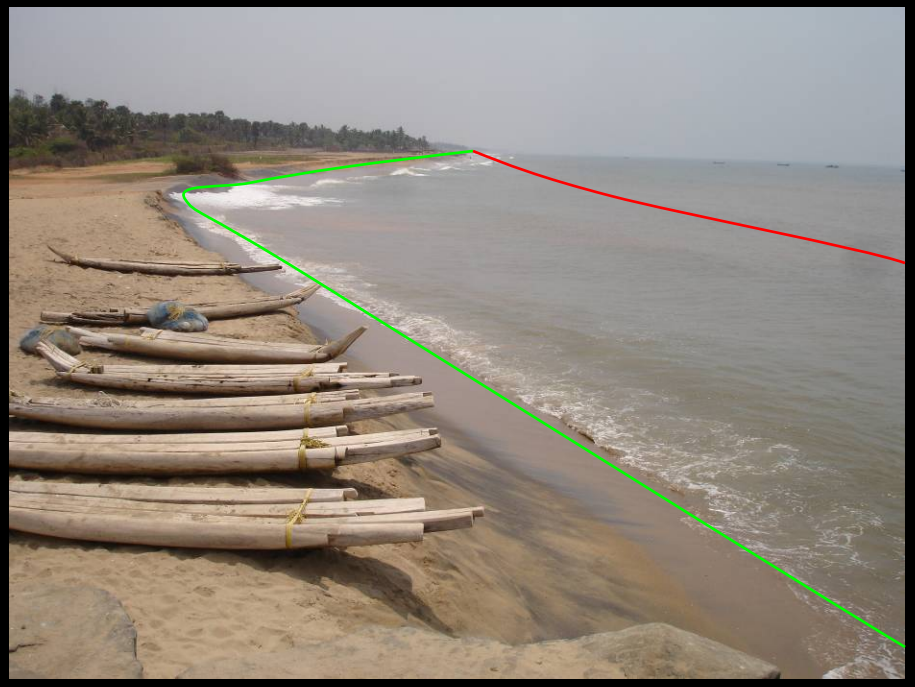
Erosion at Quiet Beach, Thandhirayankuppam, TN as a result of groyne construction

April 2007

9th May 2007

Erosion at Quiet Beach, Thandhirayankuppam, TN

April 2007



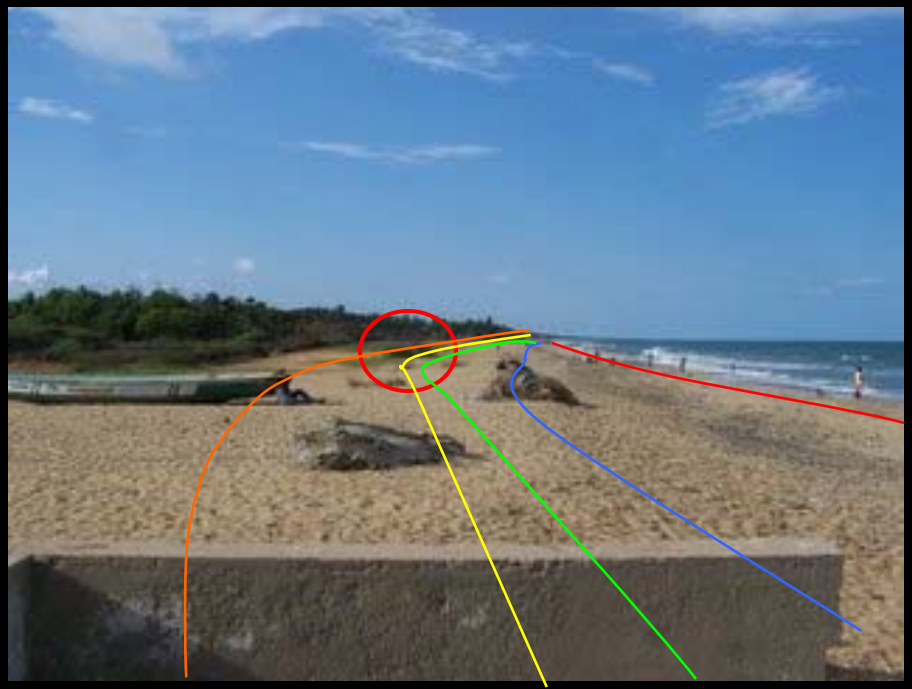
6th June 2007

Erosion at Quiet Beach, Thandhirayankuppam, TN

April 2007

28th June 2007

Erosion at Quiet Beach, Thandhirayankuppam, TN

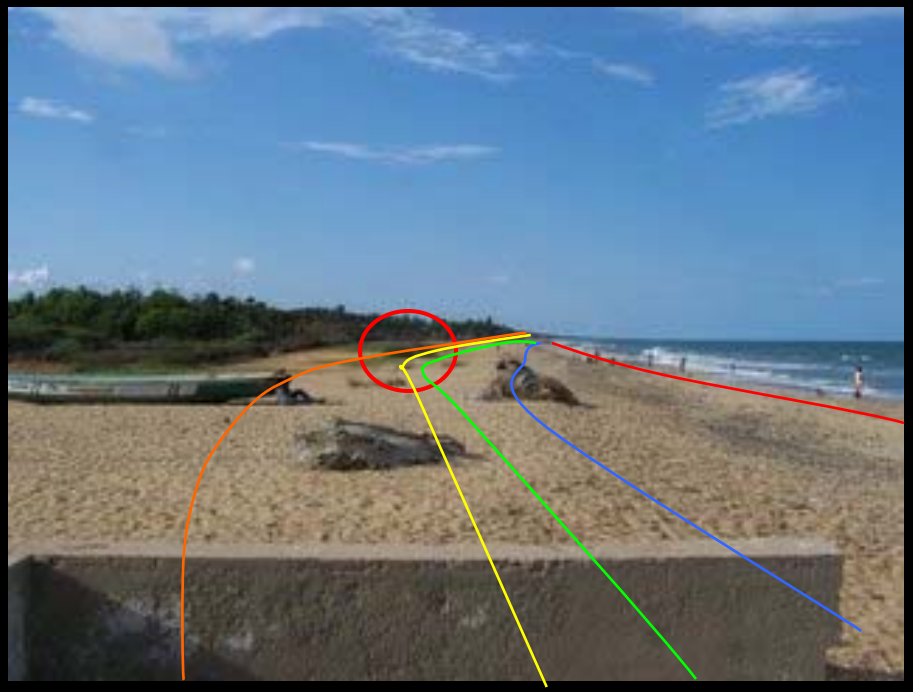


April 2007

18th July 2007

Erosion at Quiet Beach, Thandhirayankuppam, TN

Erosion in 3 month's time



Social Impacts

- There is very little documentation of social impacts of port construction and operation other than from media reports. In most states, there have been conflicts recorded over port development plans between the state government and local fishing communities (Sridhar & Parthasarathy 2003).

- The most significant and direct impact is the displacement of communities through land acquisition (where community land rights exist) or simply displacement of settlement without any compensation either. There are numerous indirect social costs of port development

- **Displacement and poor rehabilitation**
- **Restrictions of access**
- **Ship traffic**
- **Impact of loss of beaches due to shoreline impact of ports**

Legislation

International Association of Ports and Harbours
‘Guidelines for Port Planning and Design, 2001’

‘Ports are areas where several modes of transport come together and where industrial activities take place. This means that in port areas, the environmental components such as water, air, soil are at risk of being contaminated as a result of a large number of activities occurring within a relatively small area. In the decision making process, the environmental must be considered alongside economic aspects.’

Other legislations that govern port operations are:

- Manufacture, Storage and import of Hazardous Chemical Rules, 1989
- Hazardous Wastes (Management and Handling) Rules, 1989
- Rules for the Manufacture, Use, Import, Export and Storage of Hazardous Micro Organisms, Genetically Engineered Organisms or Cells, 1989
- The Territorial Waters, Continental Shelf, Exclusive Economic Zone and Other Maritime Zones Act, 1976
- Merchant Shipping Act, 1958

Other specific legislation that depend on the site and location of the port are:

- Ancient Monuments and Archaeological Sites and Remains Act, 1958
- Offshore Minerals (Development and Regulation) Act, 2002
- Forest (Conservation) Act, 1988
- Wild Life (Protection) Act, 1972, with amendments of 1983,1986 and1991

Many national specifications and regulations relating to loading and safety at sea are largely based on international agreements and conventions. International regulations relevant to ports and harbours are:

- International Convention for the Prevention of Pollution from ships (MARPOL)39
- International Maritime Dangerous Goods Code (IMDG-code)40
- United Nations Convention on the Law of the Sea (UNCLOS)41

Legislation

- Environmental clearance for a port project also attracts provisions of other environment-related laws such as the Water and Air Acts38, which seek to offer special protection to particular components of the ecosystem.

- Under the Environmental Impact Assessment (EIA) Notification of 199442, however, minor ports were exempt from the environmental clearance process. The 2006 version incorporates all ports (both major and minor).

- Although exempt under the EIA 1994 notification, minor port projects were required to conduct certain assessments and seek environmental clearance under another law – the Coastal Regulation Zone (CRZ) Notification, 199143 as the sites fell within the coastal regulation zone.

- Therefore, though the minor port projects of this time did undergo some environmental scrutiny, they missed out on the dedicated coverage of an impact assessment law. For instance, unlike the EIA Notification, 1994, the CRZ Notification does not require public hearings as part of the clearance process

- The second gap in the environment clearance came from an amendment on July 9, 1997 to the CRZ Notification which transferred the powers and responsibility of according environmental clearance to port projects from the Ministry of Environment and Forests (MoEF) to the Ministry of Surface Transport (MoST).

- Writ Petition was filed in the Delhi High Court [CWP 4198/97] where the petitioner stated that the delegation of powers from MoEF to MoST was an abuse of the delegated power of the Central Government and was *utravires* of the Business Allocation Rules 1961.

- However, finally in light of the Writ Petition [CWP 4198/97], the amendment to the CRZ dated April 12, 2001 withdrew the delegation of powers to accord clearances to the MoST.

- Though the transfer of power was reversed the earlier clearances given in this period were held valid.

Public Hearing and Social Concerns

- The absence of a clear public participation and consultation element from the clearance procedure till 2006 was a setback for several communities and citizens who would be impacted by port construction.
- It did not allow local coastal communities living in the vicinity or fisherfolk using these waters an opportunity to express their viewpoints and participate in the environmental decision-making process.
- Public hearings are often the only formal window for communities to address socio-economic concerns and impacts within the legal framework.

Public Hearing and Social Concerns

- EIAs are controversial in India and is a function of poor participatory democracy in the formulation and implementation of environmental legislation (Thapliayal 2010).
- The MoEF has made many attempts to remove participation and public hearing from projects over the last 5-6 years, some of which have been successful (Kerdeman 2009).
- Even if public hearings are taken in the spirit of participatory democracy and decision-making, one wonders if the MoEF is the correct agency to address such issues or if they have the capacity and mandate to evaluate and review such concerns.

EIA, Guidelines & Practice

EIA quality

- The EIA quality in most projects are found wanting with many gaps.

Lack of monitoring and mitigation measures adopted by ports

- A common gap in EIAs in all sectors is that they do not mention in detail the cost of implementation of their Environment Management Plan (EMP), or the responsibility and time period of implementation (Paliwal 2006).
- In many cases the EMP is not implemented or followed and this is also coupled by weak enforcement by the regulatory agencies providing no motivation to the proponent to comply.

NIOT Guidelines for Ports and Harbours

Under the MoEF project 'Environment Management and *Capacity* Building" funded by the World Bank, '*EIA Guidelines* for *Ports and Harbours*' was developed by the National Institute of Ocean Technology in 2003.

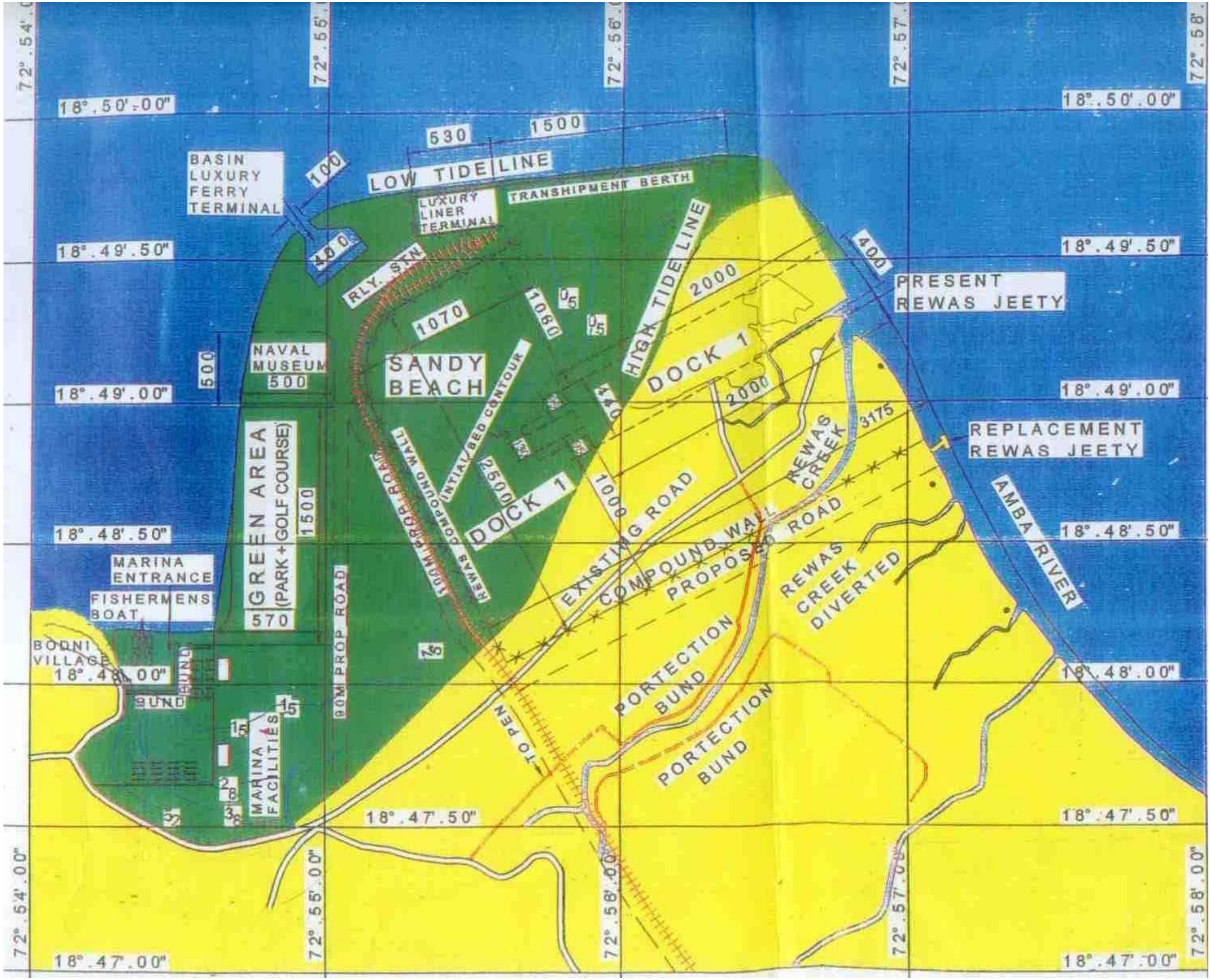
- MOEF just launched new EIA guidelines for Ports in May 2010

	Category A: Requiring central clearance	Category B: (B1 , B2) Requiring state clearance
Ports and Harbours	Ports with more than 5 million TPA of cargo handling capacity (excluding fishing harbours)	Ports or harbours having less than 5 million TPA of cargo handling capacity Harbours having 10,000 TPA of fish handling capacity

- In 2006, the MoEF replaced the EIA Notification, 1994
- Category A requires clearance from the central government level while category B1 and B2 from state government. Only categories A and B1 require public hearings. Category B2 Category 'B2' and do not require an Environment Impact Assessment report.

- In the current EIA legislation, the guidelines as to what constitutes B1 and B2 categories are not clear and it would be seem that currently it is left to the arbitrary discretion of the state government. (B1 and B2 fall into category "B' of projects requiring clearance by a respective state government with the latter not requiring an EIA at all).

- Another important omission in the current EIA legislation of 2006, given the type of impacts that ports, jetties and harbours have (especially on shorelines) is that ports and harbours less than <10,000 TPA of handling capacity are exempt for the clearance process.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BASIN
LUXURY
FERRY
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530
1500
LOW TIDE LINE
LUXURY
LINER
TERMINAL
TRANSHIPMENT BERTH
400
RLY. SKN
1070
1080
NAVAL
MUSEUM
500
SANDY
BEACH
INTIAL BED CONTOUR
HIGH TIDE LINE
2000
DOCK 1
PRESENT
REWAS JEETY
500
GREEN AREA
(PARK + GOLF COURSE)
1500
2500
DOCK 1
REWAS
CREEK
3175
REPLACEMENT
REWAS JEETY
AMBA RIVER
EXISTING ROAD
COMPOUND WALL
PROPOSED ROAD
REWAS
CREEK
DIVERTED
MARINA
ENTRANCE
FISHERMENS
BOAT
570
BOUNDARY WALL
BOUNDARY ROAD
BOM PROP ROAD
BOUNI
VILLAGE
BUND
MARINA
FACILITIES
TO PEN
PORTECTION
BUND
PORTECTION
BUND

MoEF Port Moratorium

- Definition of ecologically sensitive areas is missing- ‘estuaries and lagoons’ not used.
- No definition of ‘water bodies of high-biodiversity value’ (where ports are prohibited according to Section 5c).
- Why is there no mention of the Dhamra port close to Gahirmatha? (no locations identified within 10 km on either side of the eco-sensitive areas categorised as CRZ-I(i))
- The MoEF memo in effect tries to locate ports (known to create shoreline changes) in places that didn’t have any existing shoreline changes (listed by the ICMAM study).
- Even if port developers aren’t keen on locating in high-erosion areas, the MoEF appears to be okay with permitting ports even in areas that have shoreline changes. [See point 5 B].

MoEF Port Moratorium

- The conditions suggest that all new port projects need to conduct comprehensive EIAs only if they are within these high erosion areas. This suggests that other projects can be satisfied with rapid EIAs.
- While the MoES report states that no project would be located within 5 km of areas with high erosion listed in its report, the MoEF Office Memo states that no projects would be located in areas where erosion is above one meter per year.
- It is not clear what the need is to locate ports in areas of high erosion in the first place.
- No mention of the fact that even in non-eroding areas, ports can result in erosion and shorelines impacts. Neither is it recognised that ports do not usually factor in their EMPs any remedial measures or implement these.

Planning and Rationalization

- Their geographical location, favourable environment, access to sea or river and hinterland connectivity are advantages that cannot be easily duplicated and hence lends them their monopolistic character.
- Wilder and Pender have defined the market structure of port services as `differentiated oligopoly' with spatial considerations of particular importance, suggesting that ports, in general, exhibit the characteristics of a `partial monopoly' (Paul 2005).
- Increase in number of competing ports would lead to duplication and raise the cost structures (i-maritime 2003).
- Some experts believe that with the current policy and planning trend, from a purely commercial point of view, competition and markets will eventually stabilise the market and some ports will eventually die out and some could be merged

Planning and Rationalization

- This raises questions about the manner in which the government maintains checks and balances for port development and planning as well as of the extent of private sector involvement. The debate on the behaviour and the nature of port services (monopolistic behaviour and free competition), the public policy on ports and planning, should encompass an optimum balance of the following aspects - social and environment considerations, macro-economic development objectives and considerations of business and enterprise-level efficiency (public, private and PPP).

- Some experts are of the view that another 10 ports are required in addition to the existing 12 major ports considering the growth prospects of the economy and the projected growth of foreign trade (Paul 2005).

- A more appropriate approach in the context of international shipping is not the number of ports, but how much handling capacity is needed (S.N. Srikanth, pers. comm., 2010).

Planning and Rationalization

- Given the social and environmental impacts of ports, many of which are permanent and irreversible (such as impacts on shoreline and subsequently livelihoods) the optimal number of ports must be centrally planned and not left to state governments to decide.
- Continuing in the present vein will only result in a mushrooming of such facilities all along the coastline with cumulative and continuous social and environmental implications.
- Thus from a combined environmental and economic point of view, there is generally a unanimous view among experts on the need for rationalizing port planning at a central level, particularly on the question of the location of ports.

	Port	Adjacent port	Distance between the two (in km)
1	Gangavaram	Vishakapattinam	14
2	Jatadhar (POSCO port)	Paradip	14
3	Karaikal	Nagapattinam	14
4	Karaikal	Cuddalore	80
5	Kattupali	Ennore	15
6	Pondicherry	Cuddalore	24
7	Thirukkadaiyur	Karaikal	15
8	Thirukkadaiyur	Cuddalore	70
9	Thirukkadaiyur	Nagapattinam	29
10	Honnavar	Tadri	27
11	Tadri	Belekeri	23
12	Belekeri	Karwar	26
13	Karwar	Mormugao	71
14	Okha	Positra	14
15	Posita	Salaya	45
16	Salaya	Sikka	24

- In addition to the drivers of port development mentioned earlier (cheap land, possibility to conduct non-port activities and projects within port limits) the table above suggests that there is no market saturation and the business of port development continues.

- Outdated studies for notification. Some states dated back to 1990s even prior to 80s. Did not cover environmental and social aspects in site identification

- There is need to formulate a series of interventions, programmes and policy changes both at the central and state levels to incorporate these systemic issues into structures and processes of regulation and planning

- The focus should be based on optimisation and rationalisation of port development through central planning of port sites (major and non-major) in terms of numbers, location, sizes, type (captive/ multi-user, coastal/non-coastal shipping) and capacity. Here, profitability, economic and technical viability, and issues of environmental and social equity need to play a continuous and equally important role.

- State governments can continue to earn revenues from minor ports that are planned in this manner.

	Name of the Port In Orissa	Type	District	Status
1	Dhamra	Minor captive	Bhadrak	Being developed under the Joint Venture of L&T & Tata Steel.
2	Kirtania	Minor all weather	Balasore	MOU signed between state government and Creative Port Development Company ltd., Chennai
3	Palur	Minor	Ganjam	State Government plans to develop minor port
4	Bali-Harichandi	14 million tonne cargo handling capacity all-weather port	Puri	Kolkata-based Shyam-Century Group of Industries has submitted proposal
5	Astarang	Minor port of 15 million tonne capacity	Puri	Navyug Engineering, a Hyderabad-based company submitted proposal in Apr 2007
6	Bahuda muhan		Ganjam	Chennai-based Good Earth Maritime Limited shown interest (June 2007)
7	Chudamani / Chandabali?	Minor	Bhadrak	Essel Mining and Industries Ltd, an Aditya Birla group company is waiting for approval
8	Inchuri	Intended major	Balasore	No proposals yet
9	Chandipur		Balasore	No proposals yet
10	Bahabalpur		Balasore	No proposals yet
11	POSCO (Mahanadi mouth)	Minor captive	Jagatsinghpur	Facing opposition from locals. Prep work to start from oct end
12	Gopalpur	From fair weather to all weather	Ganjam	Has been decided to develop Gopalpur port into an all-weather port by Orissa Stevedore

- Poor science & Planning - in Economic Aspects EIAs, and Environmental Planning

- Its not about a single project and its impact, but impacts of ancillary development as well as cumulative impacts of other projects and coastal development. Need for Regional EIAs

Recommendations

- There is an immediate need for a public port authority that could be considered at the central level with a mechanism for coordination with the state governments as a means to increase focus on areas such as long-term planning, infrastructure development, asset management, and regulatory functions such as maritime safety, environment protection, social concerns and fair competition

- The MoEF should assess and develop very clear guidelines and terms of reference (ToR) for identifying ecologically sensitive and important socio-cultural areas in the coastal zone. Once this is done, a buffer ‘no development’ zone for at least a 10-25 km radius around these areas may be demarcated.

- All states should carry out pre-feasibility and environmental and social due diligence studies on ports site identification and planning. The Central Government (Planning Commission, MoES and MoEF) should first develop guidelines, protocols and ToRs for such studies.

Recommendations

- Guideline and manual on EIAs for ports and harbours should be developed and mademandatory for adoption by all project proponents as per law.

- Carrying capacity assessments as well as comprehensive cumulative and individual assessments should be the basis for planning and providing safeguards to ensure that such projects are not located in the vicinity of sensitive areas.

- Comprehensive EIAs and public hearings should be mandatory for all categories of ports (including captive port projects within minor port limits), harbours and jetty projects.

Recommendations

- Regional EIA (comprehensive) for all proposed ports above a certain threshold, be made mandatory.

- Land acquired by port developers should be used only for port related activities and expansion.

- A framework and process to address social and livelihood concerns of communities in port based projects should be developed and adopted as part of the national port development policy

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The latest CAG report of 2009-201035 on major ports performance pointed many environment pollution related issues in major ports:

- **At Mumbai port - one of the highest POL cargo handlers in India, marine pollution equipment procured at Rs. 2.63 crore between 1991 and 1995 was not being utilised properly due to the absence of trained staff and proper maintenance. Non-removal of old pipelines also constituted safety hazards.**

- **At Tuticorin, there was no oil spill response equipment.**

- **No scuppers36 structures were found installed at Kolkata, although significant oil handling was occurring at jetties outside the dock systems. In the absence of these, the oil jetties and installations at Kolkata remained greasy.**

- **There was no ballast37 facility at the berths at Cochin.**

- **At Mumbai, the Pollution Control Cell was inadequately manned, there was poor maintenance of pollution control equipment and the air quality was not being adequately monitored.**

- **New Mangalore indicated high levels of pollution at bulk handling berths like ore and coal berths. Although the port put in place all the requisite measures, the NITK reports revealed high dust pollution within the port premises in two out of the three months surveyed by them. Critical parameters like SPM and RPM were beyond tolerance limits.**