INFOCHANGE

agenda

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On the waterfront

India's impoverished and marginalised coastal communities confront the challenges of liberalisation, mechanisation, commercial development and climate change

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Cover photograph by Sudharak Olwe

Editors: Hutokshi Doctor, John Samuel
Production and layout: Gita Vasudevan, Sameer Karmarkar
Infochange team: Anosh Malekar, K C Dwarkanath, Philip Varghese, Rakesh Ganguli, Renu Iyer, Ujwala Samarth, Vijay Narvekar, Vishnu Walje

Rights of coastal communities

FOR MOST PEOPLE living on land, the ocean is largely unknown and uncharted. We know that it is water and it is salty and it covers 70% of our planet. Coastal communities, however, have quite a different relationship with the seas. They have fished these waters for generations. They know the rich diversity of aquatic life — from seaweed and grasses to crustaceans, cephalopods and varieties of fish.

The coasts, a very specific zone between the land and the sea, are a living ecosystem with intricate dynamics sustaining vegetation and both animal and human populations. In this dossier we look at coasts as a source of natural resources on which particular communities have depended for centuries, and the rights of these coastal communities or groups to the resources of the oceans.

The FAO estimates that fisheries and aquaculture provided direct employment and revenue to around 39 million people worldwide in 2002. The highest number of fishers and aquaculture workers was in Asia (87%), followed by Africa (7%). Worldwide, some 12 million people were fulltime fishers while over 120 million people were estimated to depend on fish, the largest wild food harvest, for all or part of their incomes.

The FAO says: "In many developing countries, which have the largest number of fishers, the spouses and families of fishers are occupied in coastal artisanal fisheries and associated activities. Reliable estimates of the number of people engaging in fishing on a part-time or occasional basis, or undertaking rural aquaculture as unpaid family workers, are difficult to obtain. As a consequence, the socio-economic importance of these activities is more difficult to measure, although their contribution to production and income, and to food security for coastal and rural communities, is substantial."

It is in this context that we elaborate on the rights of coastal communities in general and the fish workers in particular, in India.

With a coastline of around 8,129 sq km, an Exclusive Economic Zone (EEZ) stretching 2.02 million sq km, and a continental shelf of 468,000 sq km, India's traditional fisher people number some 13 million (with millions more dependent on them), spread across nine coastal states and six union territories. Our coastline is dotted with 3,937 marine fishing villages whose inhabitants live below the poverty line and are mostly illiterate.

As Thomas Kocherry, a priest and social activist who has been working with fisher people and their movements since 1971, points out in an interview in this issue: "The lives of these fisher people have been organically linked to the coast for centuries... (but) …the aim of multinationals, and some rich local inhabitants, is to transform the coast into a money-making haven. In the name of Special Economic Zones (SEZs) and tourism development, more and more people are being displaced from the coast. And, in the midst of it all, there are natural disasters like tsunamis, cyclones, floods, etc."

Most of India's fisher people have no skills other than catching, processing or distributing fish. In the past, fishing was more a food-gathering activity involving only mature fish. It did not impact the regeneration of resources that were plentiful compared with the small demands of the population. But as human populations increased, fishing graduated from gathering to hunting and from navigational skills and experiential knowledge of hydrology and astronomy to more efficient technologies like mechanised trawlers and GPS systems. Today, fishing in Indian waters has grown beyond what can be supported by the finite resources of the Indian Ocean.

Fish is a renewable resource that is freely harvested. In India, access to fishery resources is free and often referred to as 'open access fishery'. The ocean waters in which this resource exists are therefore treated as 'commons', a term derived from shared grazing systems on the village greens of feudal England. As in the case of common grazing, the absence of a local regulatory authority poses a special problem in the oceans. The natural resource, instead of serving the public good, could be subject to degradation or even destruction from overuse, leading to an impact on the quality of the commons for all — well-known as 'the tragedy of the commons'.

It is difficult to stop such a tragedy with a regulatory structure that is rendered ineffective, argues Kannan Kasturi in his article which traces the origins of coastal regulations in India to the United Nations Conference on the Human Environment held in Stockholm in June 1972, and details the undermining and violations of the Coastal Regulation Zone (CRZ) notification of 1991. The article also throws light on an abortive bid by the Ministry of Environment and Forests (MoEF) in 2008 to change the coastal regulations, with a brief to "promote development without hampering the environment". The move was opposed by fish workers, environmental groups, governments of coastal states and even a parliamentary committee, and the government was compelled to let the draft Coastal Management Zone (CMZ) notification lapse as of July 2009.

In the past, India's coastal areas and resources were managed within a framework of traditional knowledge accumulated over the centuries. Community groups such as fishers and other coastal populations enjoyed customary or traditional rights to exploit resources and to fish in adjacent coastal areas, including lagoons and coral reefs. How the modern

Sudharak Olwe

state has impacted the customary practices of these communities, and how, without communitarian controls, access to coastal resources is now open to all, giving it a whole new meaning, is illustrated in N P Chekkutty's detailed study on social and communal tensions due to mounting pressures on marine resources along the southwestern coast of India, consisting mainly of Kerala and south Konkan.

Years of 'development', while benefiting a few, have marginalised several others and, as Rahul Goswami argues in his article 'Ocean pollution', the overall burden of economic growth on coastal India is poorly understood. The waste generated by India's coastal cities flows into our seas, endangering the health of millions and threatening the livelihoods of those living in thousands of fishing villages. The attitude of governments — that the sea is a convenient dumping site for the wastes of modern society — has to be changed.

'Coastal refugees' by Richard Mahapatra draws attention to the need for government to acknowledge the threat of rising sea levels. The sea is reportedly rising at the rate of 2.4 millimetres per year; the Intergovernmental Panel on Climate Change warns that a rise of between 15 and 38 cm could displace tens of thousands of people and threaten drinking water sources on the country's main coastline.

In 'The hungry tide', Santadas Ghosh describes the real impact of Cyclone Aila that struck the Sunderbans on May 25, 2009. In a sudden, unforeseen event, almost the entire sweet water ecosystem was washed away, along with sustainable stocks of fish, snakes, rats, earthworms, grass and cattle. "Scientific research has already established that the greatest threat to the future of the Sunderbans is posed by continued global warming and the resultant increases in sea level… Cyclone Aila has shown what this means for the delta," Ghosh writes.

'Perceived conflicts and real solutions', by Sanjiv Gopal looks at the turtle conservation-fisher livelihoods conflict in Orissa. On the one hand, ongoing and large-scale mortalities of Olive Ridley turtles point at poor implementation of conservation and management strategies and laws, while on the other, fishermen still argue against regulations, and traditional fishermen, in particular, face severe economic hardships. "Making things worse is the fact that any approach to resolving this perceived conflict has largely been uni-dimensional, restricted to turtle conservation or, alternatively, to the issue of livelihoods from the fishermen's perspective alone. No serious thought has been given to the larger ecosystem on which both turtles and fishermen depend," says Gopal.

Awareness on the environmental front has meant in the broadest sense that all fishing is environmentally damaging to a greater or lesser degree. The freedom to catch fish, or to use the marine environment without regulation, is no longer absolute. Fisheries have therefore to be managed if they have to be sustained. And some freedoms must be sacrificed to allow continuing use of the marine environment and its resources by present and future generations.

Challenges of marine management

2,374 km of coral reefs, 700,000 hectares of mangrove cover, over 2,500 species of fish, eight species of sea turtles… This backgrounder describes the complexity of India's coastal ecosystems and outlines the challenges to these systems from habitat destruction, ineffective fisheries management, over-exploitation of bio-resources, pollution and weak implementation of laws. It also offers some solutions

SUDARSHAN RODRIGUEZ
AARTHI SRIDHAR

THE INDIAN COASTLINE has been in the news for several reasons, but in the varied imaginations of people from the hinterland it sometimes assumes a description that is flawed. Despite improved media attention to coastal biodiversity issues, despite growing demands from fishworker communities for better coastal governance, and despite (or because of) television, for many people coastal areas still represent 'pristine' beaches and vast stretches of empty government wasteland that are being opportunistically used by the unfamiliar and generally 'backward' fishing community .

Far from being just an easy entry for terrorists or a space to set up tourist resorts and infrastructure projects, coastal ecosystems are dynamic social, cultural and ecological spaces. And although some people may consider this article a little too basic, we hope we can convey a more correct impression of our country's coastal areas.

India's coastline extends to around 8,000 km and an Exclusive Economic Zone (EEZ) of 2.02 million sq km adjoining the continental regions and offshore islands. There are 53 coastal districts in the maritime states and union territories, including the Andaman, Nicobar and Lakshadweep groups of islands. Nearly 25% of the country's population resides in these areas; about 340 communities are primarily occupied in marine and coastal fisheries. The wide range of important ecosystems characterising the coast includes estuaries, lagoons, mangroves, backwaters, salt marshes, rocky coasts, sandy stretches, and coral reefs.

Mangroves are an assemblage of different flowering plants that are able to grow in saline or brackish water along estuaries, deltas, backwaters, creeks, etc. In India, mangroves occur in habitats as varied as deltas, estuaries, backwaters and sheltered insular bays. The great river deltas of the Ganga, Brahmaputra (Sunderbans, West Bengal), Mahanadi (Bhitar Kanika, Orissa), Godavari and Krishna (Andhra Pradesh), Pichavaram and Gulf of Mannar (Tamil Nadu) feature mangrove formations along the east coast.

India's total mangrove cover is approximately 700,000 hectares. There are 59 mangrove species belonging to 41 genera and 29 families present along the entire coast. The east coast mangroves afford a slightly better picture than the west coast mangroves, both in species composition and area covered. The west coast harbours 34 species, whereas 46 species exist along the east coast. The east coast, including the Andaman and Nicobar Islands, contributes about 82%, while the west coast supports about 18% of India's mangroves.

The Indian Ocean region harbours some of the most diverse and extensive reefs, many of which are among the least scientifically known. In India, coral reefs are distributed along the east and west coasts, and all three major coral reef types (atoll, fringing and barrier) occur. The total area of coral reefs in India is estimated to be 2,374.9 sq km. The country's mainland coast has two widely separated areas containing reefs: the Gulf of Kutch in the northwest, which has some of the most northerly reefs in the world, and Palk Bay and the Gulf of Mannar in the southeast. The absence of major reefs in the Bay of Bengal is attributed to the immense quantity of freshwater and silt brought down by rivers like the Ganga, Krishna and Godavari. The Andaman and Nicobars have fringing reefs around many islands, and a long barrier reef (329 km) along the west coast. The Lakshadweep has extensive atoll reefs but these are poorly researched; they may well prove to be the most diverse in India, and in the best condition. A recent study conducted by the Zoological Survey of India (Chennai), at Port Blair, reveals that the total number of species of scleractinian coral could be as high as 265 species.

Marine mammals include members of five different groups categorised under cetaceans (whales, dolphins, porpoises) and sirenians (manatees and dugongs). Of the 78 cetaceans and five sirenian species identified globally, 29 and one, respectively, exist in India.

Marine reptiles found in coastal and marine areas of India include sea turtles, crocodiles and sea snakes. Of the eight species of sea turtle, five are found along the Indian coastline — *Dermochelys coriacea* (leatherback sea turtle), *Chelonia mydas* (green turtle), *Eretmochelys imbricata* (hawksbill), *Caretta caretta* (loggerhead sea turtle) and *Lepidochelys olivacea* (Olive Ridley). Three species of crocodile are found on the subcontinent — saltwater crocodile (*Crocodylus porosus*), mugger (*Crocodylus palustris*) and gharial (*Gavialis gangeticus*). Twenty-five

Pankaj Sekhsaria

A green sea turtle heads back to the sea after nesting, in South Sentinel

species of sea snakes, belonging to three families and five sub-families, have been documented in Indian waters.

Birds both feed and breed near the sea. There are two main groups of birds along the Indian coast — sea birds and water birds. Although somewhat arbitrary — in this context sea birds are those that use marine waters as a food source for most of the year, while water birds are those that feed on or over inter-tidal areas, often for only part of the year — the sea is important to both these groups. About 177 bird species are found in the mangrove forests of India. Kingfishers, herons, storks, sea eagles, kites, etc, are the dominant species observed in these systems.

A total of 2,546 fish species belonging to 969 genera, 254 families and 40 orders have been reported/recorded so far. Indian fish populations represent 11.72% of the world's species, 23.96% of genera, 57% of families, and 80% of orders. India's marine capture fish production was 1.10 million tonnes in 1970. With mechanisation, it reached 2.27 million tonnes in 1995-96, and showed signs of levelling off immediately thereafter, with annual growth rates oscillating between ± 5%. The working group constituted in 2000 by the Government of India to revalidate the potential of India's marine fishery resources estimated the potential yield as 3.93 million tonnes.

Management of marine resources is inextricably linked to fisheries management. Revenue earned from marine and coastal systems, only in terms of fisheries, places India third largest as a producer of fish and the seventh largest fisheries exporter globally, with exports alone touching over Rs 7,000 crore (Department of Animal Husbandry, Dairying and Fisheries, GoI 2006). Therefore, marine biodiversity initiatives, or the use of non-fisheries resources, must take into account their impact on the country's overall fisheries industry.

Fishing communities

As an occupation, fishing is said to pre-date settled agriculture, and, in the Indian context (by and large), it has been the occupation of a single caste dominating either village or region, unlike agriculture which has multi-caste structures and is based on hierarchy. Over 10 million fisherfolk inhabit India's coastal regions — around 3,000 hamlets on the mainland, with an average of one village dotting the coast every two kilometres.

Fishing communities are organised and governed along caste lines and have traditional governance structures such as the caste panchayats in Tamil Nadu. The single caste demography has meant considerable autonomy and self-governance; fishing communities are therefore highly organised and controlled internally. Traditional fishing community institutions are responsible for maintaining village discipline by organising/presiding over social and religious events, dispensing justice, maintaining accounts, and serving as a bridge to the outside world. They resolve conflicts both within the village as well as between villages. They are also instrumental in governing commons (resources, social, cultural and economic).

Very little anthropological and ethnographic research and documentation has been carried out on India's fishing castes and communities; most of what has been done has been geographically focused or caste-specific (for example, in Tamil Nadu, Kerala and small bits in Orissa). Fishing communities have shown a tremendous capacity to adapt and change their structure and functioning. Their traditional governance institutions (especially in Nagapattinam) displayed remarkable resilience during tsunami relief operations and the subsequent rehabilitation.

Fish workers have also organised under various social welfare and commercial associations. However, these communities have always been considered backward and have historically been denied the same degree of citizenship that communities on the hinterland enjoy. Education and awareness levels are fairly low among the active fisherfolk, although in the past few decades they have been mobilised and organised to demand their rights from the state and to protect their resources and access to the same.

Conservation measures have led to various conflicts with fishing communities as they are often based on terrestrial models that have negative implications on the livelihoods of the fisherfolk.

The challenges of conservation

Marine and coastal ecosystems are some of the most dynamic and complex systems. Furthermore, they encompass multiple-use land, adding to their complexity. These are also much larger ecosystems and are often contiguous. What's more, our understanding of them is weak compared to other ecosystems.

Coastal ecosystems face several conservation and management challenges:

Habitat destruction: The driving force behind coastal degradation has been large development and infrastructure projects along the coast as well as unplanned and unregulated growth in coastal areas. Ecosystems and critical habitats that are constantly being challenged are mangrove forests, estuaries, mud-flats, coral reefs, small island ecosystems, coastal headlands and cliffs, coastal wetlands, sand dunes, etc. Studies indicate a number of threats to marine habitats, especially the sea bed, from fishing methods such as bottom-trawling. The marine species affected are, consequently, soft-bottom communities, demersal fisheries, sea grass ecosystems, and corals. The 'bycatch' in fisheries, including marine mammals and sea turtles, has steadily increased. Land is scarce, and despite the 2004 tsunami coastal lands are being coveted by non-coastal communities. Non-traditional occupations have moved to

the coast often taking recourse to legal modifications (such as IT industries, cement bagging plants, etc). Aquaculture, which was introduced as an *ex-situ* measure for harvesting marine species, especially prawns, is solely responsible for destroying large tracts of productive coastal land and mangroves.

Ineffective fisheries management: Large-scale mechanisation in the fisheries sector, introduced nearly 50 years ago, has had a huge impact on fish resources. Bottom-trawling has impacted lower fauna, hence the overall health of the ecosystem. Trawlers often operate near the shore due to poor enforcement and monitoring by the fisheries department, in spite of legislation being in place.

Over-exploitation of bio-resources: Living bio-resources found in the coastal zone are heavily exploited, and often the exploitation is unsustainable. This includes banned species such as sea cucumbers, molluscs and sea horses. There is practically no data available on the exploitation of any of these species.

Pollution: The coastal zone receives waste generated by a number of point and non-point sources, especially sewage, industrial effluents, sediment, and agricultural chemicals, notably fertilisers and pesticides. These contribute to the degradation of the quality of coastal waters. There is very poor monitoring and management of marine pollution. In most coastal cities, sewage is released into the sea untreated. There are no effective/appropriate seawater quality and emission standards.

Weak implementation of laws: Over 25 amendments were made to the Coastal Regulation Zone (CRZ) notification, most of which have considerably undermined its efficacy resulting in threats to coastal biodiversity and habitats. One such example is permission to allow Special Economic Zones (SEZs) in the 'no development zone' of CRZ 3, thereby allowing "information technology, beach resorts and related recreational facilities in these regions". IT parks do not require a shorefront; this is clear evidence of misutilisation of coastal resources. There has been a lot of construction activity along the coast, much of it completely illegal. And there has been no stock-taking of these violations in most states. Many of the constructions were carried out through habitat reclamation and destruction. Sand mining is also a grey area in CRZ implementation — even where legal permission has been obtained, clearance criteria have not been adhered to and are rarely monitored. Unplanned and unregulated tourism is also taking a heavy toll on coastal ecosystems.

There is poor integration of marine and coastal biodiversity concerns in the Environment Impact Assessment Notification, 2006, and lack of awareness and sensitivity towards the issue of marine and coastal biodiversity among the judiciary, policymakers, decision-makers and administrators. These gaps extend to laws that govern conservation and management — such as the CRZ — which many of these stakeholders are in charge of implementing at the state or district level. Moreover, current legislation and institutional mechanisms for protected area conservation and fisheries are inadequate and do not accommodate contextual models and frameworks for fisheries management and marine conservation.

Knowledge and awareness: There are huge gaps in our knowledge and understanding of many aspects of marine and coastal biodiversity such as sea grasses, corals, impacts of climate change, etc. There are also gaps in documentation of the anthropological, socio–economic, indigenous knowledge and practices of coastal communities. Moreover, there is no single stakeholder or platform that provides coordination and knowledge-networking.

The way ahead

Several urgent requirements that stem from the above-mentioned issues need to be met to address the challenges of marine and coastal management.

Institutional capacity needs

Government departments that deal with the subject of fisheries, aquaculture, forests, environment, town planning, etc, as well as specialised agencies like the coastguard, shipping companies and port authorities, need to be brought into the capacity-building fold. Each of these institutions has its own capabilities, and mechanisms must be devised to enable them to share skills and information. For example, capacity-building in the fisheries department and research institutions to improve the quality and visibility of fisheries research, focusing on resource and stock assessment and management. The emphasis must be on integration of biodiversity and ecological elements in fisheries research. In addition, avenues should be created to properly use the information and strengths of government-supported research organisations as well as non-governmental researchers in biodiversity conservation and sustainable use. Another crucial need is a system to manage marine and coastal pollution, with sustained programmes to monitor marine pollution and study the impact of the pollution on marine organisms and ecosystem health.

Systemic capacity needs

In many development-related laws there is very little incorporation of the value of marine and coastal conservation/biodiversity. The most important of all systemic needs is for the country to reinforce its commitment towards the conservation and sustainable management of resources through bold changes and reforms in its current conservation and environmental laws. The past few years have witnessed a dismantling of environmental safeguards;

one can only hope that ignorance is what has driven these changes. There is a strong case to review policies relating to coastal and marine ecosystems, as well as to ensure that the mechanisms in place to implement these are robust and foolproof. This may involve having to rescind earlier amendments aimed at diluting these laws.

The political will and commitment to India's biodiversity should be reflected in her laws and her programmes. Currently, both are inadequate, if not unsatisfactory, considering our natural resource wealth. Furthermore, there is a need for economic evaluation and ecological economics of marine, coastal biodiversity and ecosystem services and training and capacity-building of key institutions across the country. The programme must include tools and methodologies for the above, and also have an extensive outreach strategy for the public and decision-makers, administrators, government officials, etc.

Initiatives

Certain targeted initiatives must ensure the future conservation of coastal and marine systems. They include:

• *Review of marine protected areas:* An urgent review based on field data is required to assess the benefits of this *in-situ* measure for local people and their rights over resources in these regions.

• *Community-based fisheries monitoring:* Community-based fisheries monitoring programmes must be encouraged in various types of fisheries such as open seas, enclosed habitats like lagoons, coral reefs and estuaries, sea grass beds, and specialised fisheries like shark fisheries.

• *Community-based sea turtle conservation:* Efforts are already underway in many areas to support community efforts in turtle conservation. However, these efforts need to be recognised with proper economic and other incentives. In many instances, merely recognising initiatives by the state and allowing them to go on is sufficient; in other areas economic incentives might be called for.

• *Studies on diversification of fisheries:* Particularly for the trawling industry and purse-seine, ring-seine (in Kerala) and shark fisheries, where local people have expressed an interest in diversification, socio-economic studies must be carried out.

• *Legal review of coastal and marine conservation and biodiversity policies:* Such reviews must look at past implementation, current issues, and initiatives towards reform. They must also suggest possible mechanisms, processes and timeframes to enhance India's legal regime for protection of her coastal and marine biodiversity. Such reviews should be accompanied by widespread public consultations.

• *Taxonomic projects:* There is a dearth of basic taxonomic information on a large number of marine organisms including crabs, soft-bottom communities, mangrove associates and coral reef associates.

• *Data reliability:* Fisheries departments must be trained to use internationally recognised methodologies for data collection. This data must be made available to the public through the electronic and print media.

• *Data-sharing:* Research institutions should be supported to make reports and data available on public websites. This is an important requirement and could prevent a lot of ecological destruction through informed action.

• *Assessment of restoration projects and* ex-situ *projects:* Projects such as mangrove restoration, coastal bio-shields and other related programmes must be subject to independent review and assessment. These should be made mandatory through policy requirements.

• *Judicial training:* There is poor understanding of marine and coastal biodiversity issues and laws in the Indian judicial system. Programmes should be introduced to plug capacity gaps in the judiciary as there is a dire need for sensitisation, orientation and training in this group.

• *Guidance cell to assist in awareness programmes:* A lot of money is spent on awareness programmes in our country. However, the government as well as independent NGOs must be encouraged to evaluate their awareness and educational programmes and develop guidance programmes to enhance communication.

• *Support to community and NGO initiatives:* NGOs and local communities often have the expertise, the contacts, and better persuasive skills than government departments. The government should support the production of newsletters, posters and other communication media by NGOs and community organisations. The government should also concentrate on putting as much information as possible in the public realm.

(The information contained in this article has been summarised from the National Capacity Self-Assessment Thematic Assessment Report on Biodiversity Final Report, 2007, prepared by ATREE, UNDP and MoEF)

Sudarshan Rodriguez heads the Programme on Communities, Networks and Conservation at Dakshin Foundation. His work focuses on trans-disciplinary action research, traditional governance institutions, community sovereignty, and commons. He is engaged in advocacy and networking with various stakeholders on the coast involved with coastal-marine conservation, rights and livelihoods

Aarthi Sridhar heads the Law and Environment Programme at Dakshin Foundation. Her work involves research and advocacy with coastal communities around issues of rights to natural resources and ideas of social and environmental justice

Ocean pollution

Nearly 250 million people live within 50 km of India's 8,000 km coastline. Eighty-seven cities and towns located in these coastal areas together dump 5.5 billion litres of wastewater into the sea every day. Less than a tenth of this water is treated, making the scale of pollution of our coastal ecosystems daunting

RAHUL GOSWAMI

JUST AS IT IS WITH WORLDWIDE species diversity, so it is with India's coastal ecosystems and habitats — the growth in knowledge and understanding of both runs simultaneous with their destruction. Only from the early-1990s, when the oceanographic sciences became stronger in the country's scientific matrix, and when multi-sectored studies and research began to be attempted as a means — perhaps the only way — of figuring out complex problems, has there been a general understanding of the large-scale dynamics of coastal circulation in the Arabian Sea and the Bay of Bengal.

To understand our coasts, the physical sciences combine with social sciences. Both work together: the anthropocentric social science view of global change complements the geocentric natural sciences view. Coastal zones are important for both, and it is in the last decade that such a convergence of understanding has begun to be explained. The trouble is, this understanding has come at a time of widespread economic growth and industrial expansion, so that as knowledge of India's coasts (and our human impact on them) increases so too does the intensity and scale of the impact.

The scale is daunting. Most of India's 8,000-km-long coastal regions are low-lying and densely populated, with nearly 250 million people living within 50 km of the coast, many of them in the 130 cities and towns that together form the engine of India's economy, including Mumbai, Kolkata, Chennai, Goa, Surat, and Thiruvananthapuram (see map). Between 20-60% of the population in these individual settlement zones live in slums where they pursue their livelihood, and this section is automatically located in areas most vulnerable to natural disasters; areas that are already subject to periodic flooding.

Ravi Khemka

At the same time, they are surrounded by a web of infrastructure that is becoming denser and more valuable every year: transport and freight networks, road and rail corridors, industrial zones and parks, maritime and port facilities, petroleum industries and refineries, import-based industrial and commercial domains — all located in coastal areas and competing for land and water with villages that have long depended on coastal resources for survival. That survival has always been relatively easy since coastal regions are home to a rich and varied biodiversity, they have had abundant rain-fed and groundwater resources, and they depended commercially on old trading centres. As the settlement mix changed, and as land use did too, India's coastal talukas, tehsils and blocks either merged with a creeping mantle of urbanisation or warred with it. Either way, complex coastal ecosystems suffered.

For those who observe and measure and catalogue our physical coastal world — the legion of scientists who have long warned us of the biophysical debit that is mounting — there are a small set of fundamental questions that must be asked every season and answered every season: what are we putting in? What must we find out about, and what should we do with what we find? What problems stand in our way and how do we rid ourselves of these? The answers, iterated before and after every monsoon, with ever-gloomier consequences, are as follows. We who live along the coasts are moving material (nitrogen, phosphorous, wastes) into coastal spaces at rates far greater than nature did. It is in these coastal spaces that nutrients are often recycled (benefiting fisheries). It is because that happens that we need to understand the processes of carbon and nutrient cycling and the national and global significance of coastal seas to the carbon cycle.

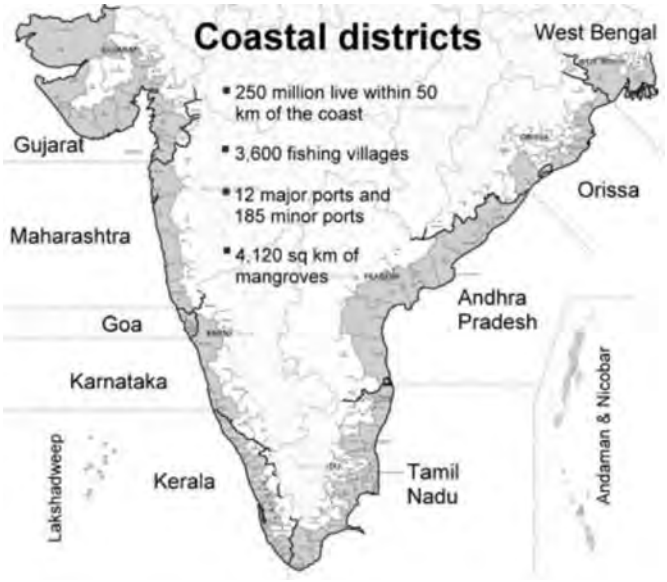
That is why we need to be able to predict the evolution of coastal ecosystems for different change scenarios. When change comes, what will happen to our social and economic activities and how can we improvise strategies for the sustainable management of coastal resources? Finding answers to help us find routes through the problem is far more difficult for our coastal habitats because coastal seas undergo cumulative changes, and because they are a significant part of complex biological systems. Anywhere along our coast, the species are numerous, the numbers are large, and there are different metabolic rates and different impacts of myriad lifecycles. These different biological systems respond slowly, which delays or disguises the ecosystem response. And that is why the overall burden of economic growth on coastal mainland India, of 5,400 km x 50 km, is so poorly understood. And why the response lag is exploited by industry and authorities alike.

Municipal wastewater constitutes the largest single source of coastal marine pollution. The Central Pollution Control Board estimates that 87 cities and towns located in India's coastal areas in nine states together emit more than 5.5 billion litres of wastewater per day, which is almost 80% of

Coastal districts under stress

Urbanisation	Industrial activity	Intensive agriculture/ aquaculture	Port activity	Tourism	Rank
Mumbai	Mumbai	Kheda	Mumbai	Chennai	1
Chennai	Thane	Tanjore	Chennai	Mumbai	2
Mahe	Ahmedabad	West Godavari	Kutch	North Goa	3
24 North Parganas	Raigad	24 North Parganas	Visakhapatnam	South Goa	4
Ernakulam	Chennai	Krishna	24 North Parganas	Ernakulam	5
Pondicherry	Bharuch	Ernakulam	South Goa	Thiruvananthapuram	6
Kozhikode	Vadodara	Kottayam	Dakshin Kannada	Kozhikode	7
Alleppey	Surat	Chengai Anna	Ernakulam	Kanyakumari	8
Daman	Kheda	Alleppey	Cuttack	Ahmedabad	9
Ahmedabad	Valsad	Srikakulam	Jamnagar	Kottayam	10
Thiruvananthapuram	Visakhapatnam	Vadodara	East Godavari	Vadodara	11
Trichur	Pondicherry	East Godavari	Raigad	Pondicherry	12
Quilon	Ratnagiri	Surat	Ratnagiri	Visakhapatnam	13
Yanam	24 South Parganas	Pudukkottai	North Goa	Puri	14
Thane	Daman	Mednipur	Sindhudurg	Bhubaneswar	15

Source: The Energy and Resources Institute (TERI); Indicators of coastal vulnerability. Higher rank indicates greater stress



their total water supply (the estimate in million litres per day, or MLD, which is the measure that water resource and pollution control authorities use, is 5,560.99 MLD). This is a staggering volume of fluid, equivalent to a third of the total quantity of wastewater generated by 644 Class I cities and Class II towns in the entire country. It is also 2.5 times the volume of wastewater (about 2.2 billion litres/day) that the same 87 cities generated two decades ago. Of the 5.5 billion litres/day — less than a tenth (521.51 MLD) — is treated to any level before being released into coastal waters. The three states of Maharashtra (45%), West Bengal (26%) and Tamil Nadu (9%) account for the bulk of wastewater flushed into our coastal seas, while about 3.22 billion litres/day of wastewater flow into the Arabian Sea and about 2.33 billion litres/day flow into the Bay of Bengal.

What is to be done? A first step would be to close the treatment gaps for domestic wastewater and industrial wastewater. Today, for every litre of domestic wastewater in India that is treated and then released, 3.8 litres are left untreated. The ratio for industrial wastewater is marginally better: for every litre cleaned, 1.6 litres are not. However, these are official figures and based on registered usage — every single urban settlement and its adjoining unregistered micro-enterprise zones survives on water and power theft, and, while electricity leaks are easily detected, water pilferage is not. A more realistic pair of ratios (cleaned:uncleaned) to use for the municipal limits of metropolises therefore would be 1:5 litres for domestic wastewater and 1:2.5 litres for industrial.

The cost estimates for cleaning up domestic and industrial wastewater may be formidable to the average Class II town municipality, but scaled to a national need, the total capital cost for establishing treatment systems for India's entire domestic wastewater is placed at around Rs 7,600 crore, which is well under the lifecycle budgets of some of the Bharat Nirman components (operation and maintenance would be in addition, but solutions can be found using service fees for residents). The answer for untreated industrial wastewater is rather more troublesome, for setting up effluent treatment systems to tackle wastewater from small-scale industries runs into the twin problems of space (besides, many small-scale industry estates adjoin residential areas) and funds. One solution lies in common effluent treatment plants, a number of which are running already and show they can reduce the pollution load in aqueous resources.

This requires local-scale solutions, costs, benefit-sharing, monitoring and empowerment. Which are the districts that place the greatest stress on India's coastal ecosystems? A framework of indicators of potential coastal vulnerability to development was developed by a team (L Noronha, S Nairy, S Sonak, M Abraham and S Sreekesh) at The Energy and Resources Institute's (TERI's) Western Regional Centre in Goa. They presented a framework of indicators of coastal vulnerability to development-related activities in India. The object is to enable policymakers and others involved in coastal management to assess the vulnerability of coastal regions in India and to examine the links between anthropogenic activities and the health of coastal ecosystems. The framework identifies:

- Key development pressures with the potential to affect coastal ecosystems.
- Where development driving forces are strongest.
- Where coastal ecosystems are most affected.
- Coastal districts that have heavy development pressures as well as stressed ecosystems.

The results list coastal districts in India in order of priority for intensive study aimed at improving coastal planning and suggesting management interventions (see Table). The indicators suggested could be used to design coastal monitoring systems, which can help develop more sophisticated socio-economic and environmental indicators for both west and east coasts.

The TERI group also identified pressure indicators and their significance to the environment:

- Persons/sq km (population density) to understand threats from coastal development, sewage, land cover clearance, groundwater depletion, and overexploitation of resources.
- Density of tourist rooms (tourist infrastructure) to capture the threat to land use and land cover, groundwater depletion, water and beach pollution from

recreational activities.

• Area under intensive aquaculture to find threats to mangrove clearance, land use change (agriculture), saline intrusion into coastal aquifers, eutrophication, threats to wildstock.

• Fertiliser use/ha, cultivated area, irrigated area to assess potential threats of eutrophication, groundwater depletion, soil degradation, and land cover change.

• Number of potentially polluting industrial units located determines threats from industrial pollution, land cover change, and groundwater depletion.

• Total cargo handled at ports measures potential threats from oil spills and impacts on marine life; from species introduction through release of ballast water and need for port extension and consequent impact on marine life.

Following the release of the National Action Plan for Climate Change in 2008, the additional factor of climate change vulnerability of coastal districts and their populations is gradually gaining acceptance. Such recognition has come late, but Centre, state and particularly local self-governments will have to act urgently to find their footing. Changes in temperature and precipitation will have a direct impact on demand and supply of energy and the quantity and quality of water available for irrigation, hydropower, and domestic and industrial use. A change in rainfall patterns could lead to intense and shortlived precipitation in coastal urban watersheds (as we have seen from 2004 onwards, and in Mumbai 2005) which would lead to calamitous flooding. When accompanied by sea level rise — a consequence of climate change — excessive flooding of urban settlements and industrial zones is a certainty, endangering the lives of tens of millions and threatening infrastructure. This is especially so where drainage infrastructure is poorly designed and maintained, which is the case in most of these cities and towns right now. In addition, because appropriate urban development planning and land use zoning is not practised or is politically suppressed in most cities and towns in India, residential areas are mixed with commercial and industrial units. The combination of sea level rise, calamitous flooding, chronic wastewater pollution and stressed public health systems poses a severe threat to coastal populations. The response — guided by frameworks such as the TERI attempt — is for coastal urban and local government authorities to legislate adaptation measures as quickly as possible.

What are the chances that this understanding will be embedded into urban and local coastal administrations in time? On paper, central government agencies are promoting a strategy that combines climate change efforts with the broader development and poverty reduction agenda to foster more climate-resilient and sustainable economies. One recent indication comes from the Parliamentary Standing Committee on Science and Technology, Environment and Forests report on Coastal Management Programmes, which was presented to the Rajya Sabha on March 20, 2009. It deals mainly with the proposed Coastal Management Zone (CMZ) notification, which was designed to replace the 1991 Coastal Regulation Zone (CRZ) notification but was dropped in July 2009 by the government due to opposition from fishermen and their organisations. In the report, the aspect of community ownership of resources and the need to strictly control use of the coastal zone are emphasised. "The basic rights and opportunities for the local communities or their representatives (panchayat members) to participate and plan the activities in their local environment and settlement areas are highly curtailed in the proposed Integrated Coastal Zone Management Plan (ICZMP) process," states the report.

It goes on to add that the roles of public authorities and of government departments (such as fisheries, environment, municipal corporation and block development office) need better definition. "The concepts like 'setback line', 'ecologically sensitive area', 'integrated coastal zone management' mentioned in the CMZ notification, 2008, are vague and are open to subjective interpretations. Hence clarity is required on these aspects," the report says. In view of the local-needs-versus-national-policy conflict, the report is clear and direct: "The committee is of the view that a common management plan for the entire coastal area of the country is not a workable proposition. It feels that it should rather be specifically designed for different states keeping in mind the diverse coastal environments and specific cultures of coastal communities."

How will the new claimants to India's coasts react to the emerging official line (even if this new line is a subjective guideline)? The answer lies with the state governments that have encouraged 'notified industrial estates', special economic zones, greenfield airports, new gas-based power plants with LNG jetties attached, and that have permitted the conversion of hectare after hectare of agricultural land to commercial or settlement to favour the property development industry. It lies also with the many panchayats which have organised themselves — often in the teeth of state-sponsored opposition — to examine and reject such takeovers, and whose communities have been traditionally linked to the sea as original stewards and protectors of our coasts.

Rahul Goswami is an independent journalist based in Goa

India's watery waste footprint

Fifteen locations that degrade our coastal ecosystems with untreated effluents thick with metals and chemicals, and raw sewage

From 2006, the Ministry of Earth Sciences has monitored marine pollution through the Coastal Ocean Monitoring And Prediction System (COMAPS) programme. This programme has, for the first time, measured the wastes from settlement zones, industrial zones and coastal aquaculture that flow into our coastal waters near major urban centres. The results so far are an eye-opener. Each one of the 19 coastal locations monitored and mapped shows how the health of our coastal ecosystems is being steadily degraded by currents of untreated effluents thick with metals and chemicals, and torrents of raw sewage. Here are the assessments of the 15 main COMAPS stations, starting from West Bengal and moving counter-clockwise round the coast to Gujarat:

Hooghly: The Hooghly river at its mouth receives domestic sewage which is mostly treated in Kolkata, and untreated sewage from a number of villages along its banks. As a result of sewage disposal, wastewater contains mostly bacteria, nutrients and putrefied organic compounds. A number of industries discharge their waste directly into the Hooghly estuary. These industries manufacture products like chemicals, pesticides, fertilisers, pharmaceuticals, synthetic fibre, engineering, etc. The total wastewater generated from these industries is around 7 MLD (million litres per day, or 7,000 cubic metres), and is discharged mostly treated.

Paradip: A port town on the Orissa coast. It has a population of about 75,000 and generates 6.6 MLD of sewage, all of which is discharged untreated into the coastal waters. There are two major industries here: Paradip Phosphates and Oswal Chemicals and Fertilisers. Paradip Phosphates discharges 8,900 m3/day of treated wastewater into the coastal waters through creeks. The major pollutant is phosphate. Oswal Chemicals and Fertilisers does not discharge wastewater; it is reported to be recycled within the plant. Industrial wastewater and municipal sewage discharged into coastal waters have high biological oxygen demand (BOD) and bacteria levels.

Visakhapatnam: A port city hosting industries like steel mills, engineering, chemicals, fertilisers, petroleum, and a thermal power plant. India's largest shipbuilding yard and port are located here. The population of Vizag city is around 1.3 million. The steel plant discharges its effluents into a creek which empties into the Bay of Bengal. About 68 MLD of sewage is generated and about 55 MLD is discharged through the Mehalingatta, which drains into Visakhapatnam harbour. As a result of multiple industrial discharges, which are mostly treated, the coastal waters receive a combination of untreated sewage and treated industrial waste. Near Visakhapatnam is Gangavaram, a fast-developing port town with a steel plant and thermal power plant. It is likely to attract several industries.

Kakinada: A port town with industries like fertilisers and petrochemicals. There are two large fertiliser plants and one gas-based power plant here. Kakinada has a deep-water port and a population of around 0.45 million of which about 0.2 million depend on fishing for their livelihood. Agriculture and aquaculture are other major sectors. Reliance Industries, which is extracting gas from the Krishna-Godavari basin, has built a gas-receiving jetty. Kakinada bay is bordered on the south by Coringa mangroves which are ecologically sensitive. Kakinada canal, through which the town's sewage enters the bay, is the major source of organic pollution.

Bhimavaram: Bhimavaram town, with a population of around 0.13 million, is located about 20 km from the Bay of Bengal. Aquaculture is a major livelihood activity and fish farms operate between Bhimavaram and the coast. Agriculture is the next major sector. A few industries are located in the vicinity of Bhimavaram. Discharge of untreated sewage by civic bodies and effluents by industry is cause for concern. The wastewater from aquaculture farms contains high concentrations of nutrients, toxic chemicals and antibiotics.

Ennore: On the outskirts of Chennai city, Ennore hosts a variety of industries: pharmaceuticals, engineering, fertilisers, lead, rare earth, and two thermal power plants. The total wastewater released by industries other than power plants is 28 MLD. The two power plants discharge about 100 MLD of coolant water into the sea through the Ennore creek. The coastal waters off Ennore also receive untreated sewage through marine outfall close to the shore. As a result of multiple industrial discharges, the coastal waters receive a combination of untreated sewage and treated industrial waste. Domestic sewage predominantly contains BOD compounds, nutrients and bacteria.

Pondicherry: Pondicherry has a population of around 0.75 million and generates wastewater of about 45 MLD, with the entire amount discharged untreated into the sea through backwaters and creeks. Pondicherry hosts major industries like paper, alcoholic beverages, chemicals and pharmaceuticals. The total treated wastewater discharged from industries is about 7 MLD. Wastewater from sewage contains mostly BOD compounds, nutrients and bacteria. Industrial wastewater mainly contains suspended matter, BOD compounds and trace amounts of oil and gas.

Cuddalore: With a population of around 0.3 million, this town generates about 13 MLD of sewage. All this, in untreated form, is disposed of in the Ponnayar river which empties into coastal waters. Near Cuddalore is SIPCOT, an industrial zone that houses a variety of industries

manufacturing paints, pharmaceuticals, chemicals, agro-chemicals, agro-food, ceramics, engineering, plastics, textiles and PVC. These industries release approximately 7.5 MLD of mostly treated wastewater into the backwaters that empty into the sea. The raw sewage contains high BOD compounds such as putrefied organic matter (kitchen and toilet waste), nutrients and bacteria.

Tuticorin: A port town with several industries and saltpan activity, its population is around 0.4 million. The town generates an estimated 17.5 MLD of sewage. There are no treatment facilities for the sewage; all of it is disposed of in canals that eventually reach the sea. Industries around Tuticorin include a refinery, aquaculture, chemicals and fertilisers, caustic soda and a thermal power plant. The total volume of waste discharge from these industries, other than aquaculture, is about 10.4 MLD. The effluent characteristics from these industries include suspended solids, ammonia, nitrate, BOD compounds, oil and grease, and trace quantities of heavy metals such as chromium. Aquaculture generates about 91.2 MLD. Municipal waste contains high BOD compounds (putrefied organic matter), nutrients and bacteria.

Kochi: A heavily populated city located along backwaters that receive effluents from upstream industries including fertiliser plants. Kochi's population is around 0.6 million and the amount of sewage generated is about 36 MLD. The backwaters do not experience strong tidal action and therefore seawater that can dilute pollutants is limited. However, heavy rainfall causes flooding during the monsoon months which serves to dilute pollutants from June to September.

Mangalore: A coastal city in Karnataka with a population of 0.5 million. This is not a heavily industrial area, except for a refinery, a few medium- and small-scale industries and the Kudremukh iron ore handling facility. The coastal waters experience intensive fishing activity; a large number of fishing vessels are berthed in the fishing port. Sewage of about 28 MLD is released into the Netravathi and Gurupur rivers which reach coastal waters.

Goa: Has a population of around 1.3 million and few industries are located near coastal areas. A major source of pollution of the Mandovi and Zuari rivers is the release of untreated domestic sewage. The Zuari Agro Chemicals plant releases effluents into coastal waters. Mining of iron and manganese ore occur on a large scale in the upper reaches of the Mandovi and Zuari rivers; mining wastes containing iron in suspended matter empty into coastal waters mostly during the monsoon, through canals.

Thane creek: A variety of industries, including a chloralkali plant, release their effluents into the creek which runs into the sea. There are about 140 large-scale industries, around 125 medium-scale industries, and around 1,600 small-scale industries in Thane district. Most of these industries generate wastewater which is released into Thane creek with or without treatment. The large-scale industries are believed to treat effluents whereas the medium- and small-scale industries dispose of untreated waste, mostly effluents, into Thane creek. Some efforts are being made to set up a common effluent treatment plant for treatment of effluents from medium- and small-scale industries. Besides, domestic sewage also enters Thane creek from sewage/open drains surrounding the creek. The spring tidal range of 4.2 m-5 m is prevalent at the mouth of Thane creek, diluting effluents.

Mahim, Versova and Bassein (Mumbai): Mahim bay receives sewage from point sources collected by sewers from residential areas. Waste from a variety of industries located along the banks also reaches the bay. The total sewage load of Mahim bay is about 830 MLD, and industrial effluents about 93 MLD. As a result of heavy inflow of sewage, which contains mostly organic waste, water quality is seriously degraded especially during the non-monsoon months. The near shore waters of Versova receive 440 MLD of sewage. There are hardly any industrial sources of pollution in this area and the sewage is released after primary treatment. Bassein receives domestic effluents through the Ulhas river, and industrial effluents from the Kalyan-Ulhasnagar-Ambernath belt which supports 79 large-scale industries, 55 medium-scale industries, and 92 small-scale industries. All these release their effluents into the Ulhas river. The amount of sewage received by the river is estimated to be 730 MLD.

Hazira: Located at the mouth of the Tapi estuary in Gujarat which carries domestic and industrial waste from Surat city and the suburbs. The Hazira-Kawas industrial belt is home to petrochemical, fertiliser, steel, engineering and power industries together estimated to release 60 MLD of effluents. The LNG terminal is also located at the mouth of the estuary. Surat has a population of around 0.35 million and is estimated to release about 300 MLD of sewage, mostly untreated, into the Tapi estuary, which finally reaches Hazira point.

(Institutions participating in COMAPS are: Institute of Minerals and Materials Technology, Bhubaneswar; Department of Marine Biology, Annamalai University; Centre for Earth Science Studies, Thiruvananthapuram; National Institute of Oceanography, Goa; and Regional Centre, National Institute of Oceanography, Mumbai)

Coastal refugees

According to the Intergovernmental Panel on Climate Change, sea levels in India are expected to rise at the rate of 2.4 mm a year; in 2050, the total increase will be 38 cm, displacing thousands. For nearly 25% of India's population living along the coast, global warming is a question of survival rather than a scientific theory. City slums are already seeing an influx of climate refugees

RICHARD MAHAPATRA

BIPLAB MONDAL, a migrant from Sagar island in the Sunderbans of West Bengal, now a resident of Delhi's Govindpuri slums, had a nightmare for 25 years. "Whenever I looked at the sea I thought it would march into our village," he recalls. So when he migrated to Delhi in 1992, to take up a daily wage job, he started saving to invest in a house that would be permanent.

After 17 years, Biplab's nightmare has turned into a reality. "My relatives informed me how the sea slowly submerged my home in Sagar. Now there is nothing to call home there," he says.

In 2009, he spent Rs 70,000 on an illegal hut in the Govindpuri slums. "My hut is illegal, but I am sure that it will not be submerged, ever."

Biplab's hut in Govindpuri is surrounded by the illegal settlements of many of his fellow villagers who have been forced to leave the island due to the invading sea. "In the last 30 years the sea submerged many islands in the Sunderbans. And many of us have migrated to Delhi, Kolkata and Mumbai," Lata Mondal, Biplab's relative, says.

Biplab and Lata are 'climate refugees'. So far, India's climate refugees are from unknown villages in the Sunderbans, Orissa, etc. In a matter of years there will be climate refugees from Mumbai, Chennai and other big coastal cities as these too will face the onslaught of rising sea levels.

Visit any daily wage market in Delhi (desperate assemblies of migrant labourers around key residential areas) and you will find a significant number of people from coastal parts of the country.

The reasons for migration are familiar — loss of livelihood due to a plethora of disasters like cyclones, drought, ingress of the sea, and lack of fresh water for agriculture.

"My father migrated to Kolkata after the 1971 cyclone as he couldn't manage our family of six. He never returned to the village. I struggled hard on our small agricultural plot till 1999. The supercyclone left it completely saline," says Jagannath Sahu, a resident of Orissa's Kendrapara district, the worst affected by the 1999 supercyclone.

"Of late, migration to cities from our district has increased as people residing along the sea are finding it difficult to withstand its fury," Sahu adds. There have been reports of sea ingress claiming over 15 village settlements in this one district.

Coastal blues

It's a familiar story all along India's 8,000-odd-km coastline comprising nine states and two island groups. Indeed, the reality of rising sea levels due to global warming is fast sinking in. For nearly 25% of India's population residing along the coast it's a question of survival rather than a scientific theory.

The likely fallout: a flood of migrants from these parts to other areas in India. Once known as islands of hope, coastal cities like Mumbai, Chennai and Kolkata will be forced to accommodate more migrants. This means the added pressure of rising populations in urban pockets that already lack basic amenities. The migrants will bring with them a host of issues that could spark off fresh conflict.

Last year, an Australian scientist came out with a startling finding that hinted at rising sea levels virtually choking a whole new generation before it is born. He postulates that as the sea advances, people will be forced to drink saline water leading to more miscarriages among pregnant women living in coastal areas.

"There will be a severe problem of potable water and people will drink salty water. This will adversely impact pregnancy in coastal India," says Anthony J McMichael of the Australian National University, Canberra, and an author with the Intergovernmental Panel on Climate Change (IPCC).

According to McMichael, a group of British scientists had carried out a survey in Bangladesh and found that surges in sea levels had started affecting pregnant women there. "We don't have any research data on India, but the situation will not be very different," he told the media in New Delhi.

Rise and rise

Increases in sea level are due mostly to thermal expansion — that is, the warming of sea water causing it to expand in volume. Observations since 1961 show that the ocean has warmed up to a depth of at least 3,000 metres and has been

absorbing more than 80% of heat added to the climate system. This causes water to expand and sea levels to rise. Melting glaciers add to rising levels.

Sea level rise will have multiple impacts. It will inundate coastal settlements, aggravate flood situations, erode beaches, further impacting settlements, and will leave vast swathes of land and water sources saline. The net result will be the displacement of people from these densely populated areas.

According to IPCC reports, a sea level increase of between 15 cm and 38 cm will displace tens of thousands of people along the country's coastline and threaten drinking water sources in many coastal states. The IPCC-IV Working Group-II says that sea level rise is a high possibility, with 90% probability. "The largest number of people affected by sea level rise will be in the heavily populated large deltas of Asia and Africa," the report says. This includes the cities of Mumbai, Kolkata and Chennai.

Sea levels in India will rise at the rate of 2.4 mm per year, according to the IPCC. In 2050, the rise will be 38 cm. The UN second working report predicts huge coastal erosion by rising sea levels (about 40 cm) resulting from faster melting glaciers in the Himalaya-Hindukush ranges. "It could adversely affect half-a-million people in India because of excessive flooding in coastal areas, and it can increase salinity of groundwater in the Sunderbans and surface water in coastal areas," says R K Pachauri, chairperson of the IPCC.

The IPCC goes on to estimate that sea levels in 2100 will be around 40 cm higher than they are today, causing an additional 80 million coastal residents in Asia alone to be affected by flooding, most of them in South Asia, particularly in Bangladesh and India. Greenpeace says a rise of 3-5 metres is 'not out of the question at the end of the century', with a 4-5 degree Celsius increase in average global temperatures.

To new land

Millions of people in India live within 50 km of the coast. The area — referred to as the 'low elevation coastal zone' — comprises coastal regions that are 10 metres above the average sea level. These are areas that will be submerged first in the event of rising sea levels. They are inhabited by rural and urban populations in equal proportion. A 1-metre rise in sea level could result in nearly 6,000 sq km of India being flooded.

In a study for Greenpeace, Sudhir Chella Rajan from the Indian Institute of Technology, Madras, suggests that India will face major out-migrations from coastal regions. Taking note of various current estimates of sea level rise, he divides the 'business as usual' scenario into three categories: 1 m, 3 m, and 5 m of sea level increases in the year 2100. This is basically low, medium and high, respectively. According to these estimates, around 120 million people will be rendered homeless by 2100 in Bangladesh and India (see accompanying table).

Table 1

Migrants (assuming phased movement)

India	1 mt sea level rise in 2100	3 mt sea level rise in 2100	5 mt sea level rise in 2100
2010	23,723	33,212	42,701
2015	36,850	51,591	66,332
2020	149,675	209,545	269,415
2025	316,617	443,264	569,911
2030	589,419	825,186	1,060,954
2035	1,209,244	1,692,942	2,176,640
2040	2,221,491	3,110,088	3,998,684
2045	3,607,278	5,050,189	6,493,100
2050	4,365,833	6,112,166	7,858,499
2055	5,259,326	7,363,057	9,466,787
2060	6,313,208	8,838,492	11,363,775
2065	7,557,351	10,580,292	13,603,232
2070	9,026,801	12,637,521	16,248,241
2075	19,762,637	15,067,691	19,372,746
2080	12,812,968	17,938,156	23,063,343
2085	15,234,067	21,327,694	27,421,321
2090	18,091,665	25,328,331	32,564,997
2095	21,462,425	30,047,395	38,632,365
2100	24,027,847	33,638,968	43,250,124

Source: Blue Alert, Sudhir Chella Rajan, IIT, Madras, Greenpeace, 2008

"Climate change is going to lead to bigger human migration than we've ever seen before," Koko Warner from the UN University said during a conference in Poznan, Poland, on the sidelines of the December 1-12, 2008 summit of the UN Framework Convention on Climate Change (UNFCCC).

Using data from the UN High Commissioner for Refugees, Warner estimates that around 24 million people around the world have already become climate refugees. The International Organisation for Migration, a UN body, says that the number of people forced out of their homes by the effects of climate change may touch 200 million by 2050. According to the international NGO Christian Aid, the number could climb to 700 million after 2050.

Warner says: "India is one of the hotspots for forced

Climate refugees exist, but the world does not recognise them

It's a unique situation. Increases in sea level will trigger an unprecedented number of refugees across the globe. But they can't receive international support or help as they are currently not recognised as refugees by various multilateral forums. UNHCR, the United Nations' refugee agency, is helpless as the 1951 charter of the UN's 1951 Refugee Convention doesn't recognise climate or environmental refugees. It also doesn't want to acknowledge them as that would entail the huge task of managing them. At present, around 15 million political refugees have to be looked after; climate or environmental refugees would add another 25 million to its jurisdiction.

There do, however, seem to be some international efforts at bringing the issue of climate and environmental refugees to the forefront. The United Nations University (UNU), United Nations Environment Programme, International Organisation for Migration and Munich Re Foundation launched the Climate Change, Environment and Migration Alliance in October 2008 to push for formal recognition of climate refugees.

Anthony Oliver-Smith of the United Nations University's Institute of Environment and Human Security says: "There is an urgent need for an internationally accepted definition of the term 'environment refugee'."

There were calls for talks on climate refugees during the last UNFCCC meeting in Poznan, Poland. Professor Atiq Rahman, director of the Bangladesh Centre for Advanced Studies, and a member of the IPCC, says: "The rich nations must open up their boundaries for climate refugees." He suggests a new mechanism that will allow developed countries to trade their carbon emissions for permission to accept climate refugees in their lands.

Norwegian Refugee Council, a prominent humanitarian organisation in Norway that works with global refugee issues, has been advocating an international convention to protect the rights of climate refugees. It suggests an international environment migration fund contributed to by industrialised nations.

Meanwhile, a WWF-UK study released in December 2008 has asked for a new UN pact to compensate victims of climate change. The issue of climate refugees is starting to receive political recognition in the European Union.

migration due to climate change, with people displaced by drought, floods and a rising sea."

As the focus on climate refugees increases, particularly as a result of sea level rise, India finds herself in a disadvantageous position. The estimated high impact on Bangladesh's coasts means more refugees from that country to India. There are already a substantial number of Bangladeshi migrants in India.

Cardiff University's Dr Hefin Jones, a climate change expert focusing on environmental refugees, says India will have to cope with around 15 million refugees from Bangladesh by 2050. In its 2007 report, the IPCC says that by 2050 the estimated rise in sea level in coastal areas of Bangladesh will be 1 metre, and by 2100 it will be around 2 metres. As a result, Jones says, the sea will submerge most of the Ganga-Brahmaputra delta that supports around 120 million people.

That's not all the future holds. According to a recent document 'Human Impact Report: Climate Change' by the Global Humanitarian Forum, Geneva (the report estimates the human impacts of climate change), the impact of climate change will increase in the next 20 years. "Rising sea levels, which affect relatively few people today, are expected to impact large populations in the future," it warns. As water takes time to warm up, in the next few years the rise in sea temperatures will catch up leading to an expansion in sea volume. And more devastation.

Table 2

Migration triggered by increases in sea level will be accentuated by migration due to floods, drought and development-related displacement. Greenpeace has calculated which areas will have how many migrants

Vulnerable region	Migrant levels in 2100
West Bengal	10 million
Coastal Maharashtra (around Mumbai)	10-12 million
Coastal Tamil Nadu	10 million
Coastal Andhra Pradesh	6 million
Gujarat	5.5 million
Coastal Orissa	4 million
Western Rajasthan	1.4 million
Northern Karnataka	1.3 million
Madhya Pradesh	1.2 million
Interior Maharashtra	1 million
Northern Andhra Pradesh	1 million
Southern Bihar	1 million

Source: Blue Alert, Sudhir Chella Rajan, IIT, Madras, Greenpeace, 2008

Richard Mahapatra is an environmental writer and researcher. He is currently with WaterAid India

The hungry tide

Cyclone Aila has snapped the fragile balance between man and nature in the Sunderbans, a mangrove-covered mud-flat where human settlement was enabled roughly 100 years ago by the construction of 3,500 km of embankments. An entire coastal ecosystem based on rain-fed sweet water perished in the deadly embrace of salt that came with Aila

SANTADAS GHOSH

"At low tide, when the embankment was riding high on the water, Lusibari (island) looked like some gigantic earthen ark, floating serenely above its surroundings. Only at high tide was it evident that the interior of the island lay well below the level of the water. At such times the unsinkable ship of a few hours before took on the appearance of a flimsy saucer that could tip over at any moment…"
— Amitav Ghosh (*The Hungry Tide*)

The event

And the moment actually came, for the first time in the Sunderbans' recent history, on that fateful Monday, May 25, 2009, with Cyclone Aila gobbling up much of the protective embankments and drowning the saucer in its salty deluge. The low-lying islands held in their lap an agricultural population with its supporting ecosystem entirely based on rain-fed sweet water. They had their sustainable stocks of fish, earthworms, snakes, rats, grass and cattle. And in a sudden unforeseen event practically the entire sweet water ecosystem was washed away. Almost all the smaller creatures on the islands perished within a day in that deadly embrace of salt! This tremendous natural event has few parallels, and is very different from an ordinary flood. The saline water makes all the difference.

At the time, the event received a lot of news coverage at the national and international level. But perhaps the full implications of the catastrophe eluded the outside world. This is plausible in light of the relatively low human casualties — around 200 over the entire cyclone path, and a little over 100 in the Indian Sunderbans. But the aftermath of Aila is still making headlines in the local press and regional news channels, with no signs of improvement in the plight of the marooned people. It was reported that over half-a-million people in the southern districts of South and North 24 Parganas are affected. More than 50,000 houses are partially or fully damaged. Most of the damage and suffering occurred on the 54 inhabited islands spread over the two districts.

But the real damage goes much beyond these numbers. For anyone who is acquainted with the people and their way of life in these parts, it should be obvious that the conventional statistics on the damage are grossly inadequate in representing the true nature of the disaster. This is an event that has snapped the fragile balance between man and nature in a very delicate ecosystem. Its full implications will unfold in the months and years to come. And if Aila is a forerunner of a series of such storms, as predicted by climate change models, it calls for urgent effort at the national and international level to save the lives and livelihoods of millions of people in such coastal ecosystems. The coping strategies are too costly to be borne by a provincial government alone. I will try to outline the multi-dimensionality of the disaster that has just begun to show up, without getting into the detailed statistics of the damage.

Embankments and tide country

The Hungry Tide captured the essence of the precarious existence of the inhabited islands of the Sunderbans with remarkable accuracy. Ghosh only changed the real name of his island. To a reader unfamiliar with tide country, it would be difficult to imagine what the daily onslaught of tidal water means for the island population. These low-lying, half-formed, mangrove-dominated mud-flats were reclaimed for cultivation about 100 years ago. Human settlement on them was made possible only by building earthen embankments all around them. In this watery labyrinth, the embankments run up to 3,500 km in length. They were the lifelines of human existence in the islands. Aila damaged an unprecedented 400 km of the embankments, of which 139 km have reportedly been washed away altogether, with their bases! The damage is fairly uniformly distributed across all the islands. None of them was spared.

Though the cyclone had been predicted, the people and the administration had no clue what a 100-120 kph wind speed would mean for this inter-tidal zone when combined with an unusually high tide. The fateful day was a no-moon day — a day when the high tide water level reached its maximum, almost licking the upper fringes of the embankments around the juvenile islands. In the Indian part, the islands float like lotus leaves in a shallow bay of seawater. The average height of the upper surface rises barely 4 metres above mean sea level. With a tidal amplitude of 8-10 metres, most parts of the islands would have been submerged twice during the day had the embankments not existed. On full moon and no

moon days, with tidal amplitude exceeding the usual margin, the rivers look like high watery expressways. And expressways they are; they are the only means of transportation across the islands. During high tide, standing on the inner basin of any island, one can see country boats of all sizes moving over the foaming, undulating waterways seen over the embankments' rim.

From a boat on that high river, one can see what Ghosh described — the interior of the islands awkwardly holding on their lap a freshwater ecosystem and a dense population. The ever-bending rivers coil around the islands like a mythological serpent that could crush the fragile embankments at will, but perhaps refrains from doing so out of mercy for the poor people. Or is it recognition by mother nature of the hard work of the islanders? For braving the mangrove-covered mud-flats to grow freshwater crops? For carrying out a massive project of manual labour in salty isolation?

For around 100 years of their existence, nature's mercy remained intact. But normal life on these islands has always held a deep insecurity. On May 25, nature didn't do anything unusual. It just matched the timings of a no-moon high tide with a cyclone blowing all through the day.

This part of the Sunderbans has withstood cyclones before. It is true that cyclonic storms generated in the Bay of Bengal mostly veer away to make landfall on the Bangladesh and/or Orissa coast. Though outside the storm's eye, the Indian part of the Sunderbans has faced winds of greater velocity than the winds that blew that day. But those were in times when tidal amplitude didn't peak. That made all the difference.

Uniqueness

The islands in the Sunderbans survive on two vital man-made factors — embankments and village tanks. While the embankments stand guard against saltwater, the tanks store rainwater for year-long use. The islands are dotted with tanks of all sizes. In earlier times, some of these village tanks were reserved exclusively for drinking water — a very precious item on the islands as the groundwater, for the most part, is saline too. On these premature islands, lifting groundwater for drinking and irrigation purposes is not feasible with shallow pumpsets. Only at certain places on the bigger islands can an underground stock of freshwater be found and lifted by deep tubewells. Some of these tubewells were built over time by government departments and NGOs. Where they came up, tanks reserved for drinking water were gradually allowed to be used for other purposes as well. Even now some islands are still totally, and some partially, dependent on village tanks for drinking water.

These village tanks provide a vital service to the islanders throughout the year. They provide drinking water for livestock, the water is used for bathing, washing clothes, cleaning utensils and nurturing freshwater fish stocks. Some of the stored water is also employed to grow vegetables and other crops in the dry season. But mostly the islanders practise rain-fed mono-crop cultivation.

Typically, the dwelling units are simple mud huts; mud applied to a bamboo skeleton makes the walls. The roof is mostly dry straw, occasionally earthen tiles or corrugated tin sheets. The huts usually stand on an elevated earthen platform.

Recovery from floods in other parts of the mainland means gradual restoration of order and livelihoods — with outside help. Immediate crop losses from freshwater floods are usually followed by a good harvest during the next season. But the situation in the Sunderbans is different. Salt deposits in the soil will mean nil or little agricultural activity for at least a couple of years. One can hardly imagine the implication of this on half-a-million people, over 90% of whom are directly dependent on agriculture. This event has crushed the very backbone of the islands' economy

Although the immediate impact of Cyclone Aila is tragic, on the television screens it doesn't look very unusual. You see fallen trees, twisted and collapsed huts, and a landscape strewn with debris of all sorts. You see the villagers robbed of their belongings huddled in groups on a relatively high village road or surviving embankment, or clinging to their rooftops just above the water. You see large pools of water trapped in rice fields and village tanks. Or flowing in a stream carrying the carcasses of livestock, occasionally even a human body!

The uniqueness — if you need to be reminded of it — is that all the water is saline water.

Two days after Aila, I was briefly able to set foot on part of an island. The first shock was the stench, which I soon recognised to be that of rotting fish. Perhaps also the smell of rotting livestock, which I could not see at that point. But I saw lots of decomposing fish dumped on the riverside of the village. All stocks of freshwater fish had died within a day, when the tanks were overrun by saltwater. Marooned and displaced villagers could not use them immediately. And they knew that eating dead fish after a day was dangerous. The best way to dispose of rotting fish is to bury it. But there was hardly any ground left above the water!

All the grass, standing crop and shrubs that were under water for more than a day looked like they had been burnt by acid! Juvenile trees with their leaves and branches 4-5 feet up showed the high water mark by their burnt black-brown colour. I was told by the villagers that the salty inundation was fatal to small trees and that all of them would soon die. Some of the dead carcasses were trapped in the islands' interiors, though most had flowed out into open rivers. But in this 4,500 sq km delta, water doesn't really flow out; it circulates like a whirlpool, moving back and forth every 12 hours with the turning tide. Bodies that were washed away by the river in the ebbing tide came back with the high tide. And so they circulated within the region until they were completely decomposed.

Almost all the mud huts that managed to withstand Aila were under a few feet of water for a couple of days. The mud at their base had washed off, baring the bamboo skeleton. I was told that none of them could be repaired because the mud had soaked in too much salt and that fresh mud does not mix with salty soil. Salt changes the texture of the soil; it makes it brittle and eventually turns it to dust when it is dry. All the standing huts in the villages, therefore, would have to be completely rebuilt!

You see the uniqueness of Aila in other ways as well. It is practically impossible to repair the protecting embankments within a short time. Many parts of the islands remained devoid of any embankments even a fortnight after Aila, with saline water regularly coming and going with the turn of the tide. Even though there were no fresh storms or heavy rain, the islands received another big splash on full moon day, June 7. No one can say how many days will be needed to complete a patchwork of the entire length of the embankments. It is like having an open wound in sultry weather, with no hope of it healing naturally.

Water everywhere, but not a drop to drink

The obvious fallout of the event is the nerve-wracking shortage of drinking water. Many of the tubewells are submerged and all the village tanks lost their fresh water within an hour! Regular trips by relief vessels from the mainland keep the surviving islanders in food and drinking water. But no amount of portable relief supplies is ever enough for a disaster of this scale. There is tremendous damage everywhere and no signs of any restoration. People spend nights and days in the open, mostly gathered on surviving embankments, looking for the relief boats. They are unable to initiate any restoration of order by themselves, crippled by the exposed lands that are regularly swept by water from the high tide.

The scale of the disaster has been recognised in the concerned government quarters. Relief supplies are forthcoming. Many civil society organisations and NGOs have pitched in with the relief operations. But in this chaotic situation it is obvious that supplies are not always equitably distributed or given to the most vulnerable. Many people remain in makeshift relief camps housed in village school buildings. Nobody knows when they can return home, or where their homes once stood.

One impact of the huge drinking water problem is widespread diarrhoea. Thousands of people are affected, with no official estimates forthcoming on this. An official estimate of livestock loss is also not available.

After Aila

Relief supplies in other natural disasters are a temporary lifeline, to be followed by gradual restoration of normal life. Recovery from floods in other parts of the mainland is a uni-directional process. It means gradual restoration of order and livelihoods — with outside help. Immediate crop losses from freshwater floods are usually followed by a good harvest during the next season.

But the situation in the Sunderbans is different. As long as the embankments are not fully restored all over the islands, no improvement is possible. Floods will continue to recur. Every fortnight there will be fresh flooding due to the lunar boost in water levels.

Salt deposits in the soil will mean nil or little agricultural activity for at least a couple of years. One can hardly imagine the implication of this on half-a-million people, over 90% of whom are directly dependent on agriculture. This event has crushed the very backbone of the islands' economy. Four days after the cyclone, I was finally able to establish mobile contact with one of my old acquaintances

All the grass, standing crop and shrubs that were under water for more than a day looked like they had been burnt by acid! I was told by the villagers that the salty inundation was fatal to small trees and that all of them would soon die. Some of the dead carcasses were trapped in the islands' interiors, though most had flowed out into open rivers. But in this 4,500 sq km delta, water doesn't really flow out; it circulates like a whirlpool, moving back and forth every 12 hours with the turning tide. Bodies that were washed away by the river in the ebbing tide came back with the high tide. And so they circulated within the region until they were completely decomposed

on an island. To my anxious queries, his answer was brief. With a deep sigh, he uttered: "We cannot live on these islands anymore — we are finished!" And then he fell silent. I did not know how to carry on the conversation. A fortnight later, again from unofficial sources, I heard that almost one quarter of the people of the village had vacated the islands and had moved to the mainland.

Forerunner of climate change?

Scientific research has already established that the greatest threat to the future of the Sunderbans is posed by continued global warming and the resultant increases in sea level. Apart from this, more short-term threats to human lives and livelihoods could come from an increased frequency of cyclones, even supercyclones. This also means greater probability of their coinciding with extreme high tides. Cyclone Aila has shown what this means for the delta. If Aila is a forerunner of many such events in the future, one has to seriously re-think the present method of repairing the embankments. At stake is a population of half-a-million. In a densely populated state, rehabilitating all these people on the mainland would be a difficult prospect.

And yet, a solution has to emerge. It is impossible to allow the recurrence of such tragic events. If this happens, the Sunderbans will, for all practical purposes, be depopulated. It is a disaster that must be handled with utmost care by all concerned. A long-term feasible solution must be found.

Depopulation and repopulation

I qualified the event as 'unprecedented in recent history'. But the Sunderbans have a much older history of human settlement. Historical findings in the region bear convincing evidence that the area was populated even at the time of Ashoka (273-232 BC), though the evidence so far has failed to add up to a comprehensive account of continued civilisation in the delta. However, it is well established that due to a series of natural calamities the region gradually lost its population during the Middle Ages. Eventually, after the invasion of Portuguese and Arakan pirates in the waters of the delta, the area was completely depopulated. The forests reclaimed the land, and when the British East India Company set up its headquarters in Kolkata it was at the edge of these forests.

Almost all the inhabited islands of the Sunderbans were cleared of forests for human settlement between the last quarter of the 19th century and the first quarter of the 20th century. The settlements were planned by the British administration with the stated objective of revenue collection. The present-day population of the islands thus bears a history of a little over 100 years. I was told by the older generation that they had never seen — or even heard from their forefathers — of a calamity of this scale in the Sunderbans. It would appear that the British started an economic venture — almost a gamble against nature's wishes — that somehow held its own until now. That black Monday, the islands' luck finally ran out.

Santadas Ghosh is a Reader in Economics at Visva-Bharati, Santiniketan, West Bengal. This article is a description of events in the Indian Sunderbans as they stood in the first week of June 2009 — a fortnight after the devastating cyclone. The author has been a regular visitor to the area over the last four years

The sinking of the Nicobars

The earthquake that caused the tsunami of December 2004 has altered the topography and ecology of the Andaman and Nicobar Islands forever: the Andamans were thrust upwards by four to six feet while the Nicobar Islands went under by 4 to 15 feet. So far the impact of such marked changes in topography do not seem to have been taken into account by policymakers and government

PANKAJ SEKHSARIA

IF THERE IS ONE THING that immediately springs to mind when the Andaman and Nicobar Islands are mentioned today, it is the devastating tsunami of December 26, 2004. Official figures give a sense of the massive damage that was caused to life and property: over 3,500 people dead or missing; nearly 8,000 hectares of paddy and plantation rendered useless; 938 boats completely damaged; more than 150,000 head of cattle lost.

These aggregated figures for the entire island chain hide an important detail that has not received the attention and analysis it deserves.

Of the 3,513 people reported dead or missing only 64 were from the Andaman group of islands; the remaining 3,449 were from the islands in the Nicobar group. Seventy-six per cent of the agricultural and paddy land destroyed, and 80% of livestock loss were also reported from the Nicobars. Likewise, nearly 70% of the construction of new housing for the tsunami-affected is in the Nicobar Islands.

It is evident that the impact of the tsunami was much greater in the Nicobar Islands than in the Andamans. So, while the Nicobars account for only 22% and 12% of the area and population, respectively, of the entire chain of islands, 98% of the deaths and 76% of loss of agricultural land occurred here. The damage caused was inversely proportional to the area and population of the two groups of islands, and strikingly so (see Table 1 and Table 2).

Tectonic movements

Although the tsunami was seen as the main cause of the damage, it was actually the earthquake that caused the tsunami in the first place that was responsible for most of the damage here. While the tectonic movements triggered by the earthquake catalysed the tsunami, they also caused a huge and permanent shift in the lay of the Andaman and Nicobar Islands.

Assessments by a number of scientists from various institutes, including the University of Colorado in the USA and the Geological Survey of India, indicate that the Andaman group of islands were thrust upwards by four to six feet while parts of the Nicobar Islands went significantly under — four feet of submergence in Car Nicobar; nearly 15 feet at the southernmost tip — Indira Point — on Great Nicobar Island. This important change in the lay of the islands was reported to have occurred almost immediately after the earthquake, a few minutes before the huge waves struck the coastline. Pre- and post-earthquake satellite maps released by the National Remote Sensing Agency (NRSA) show striking visual evidence of this. It also explains the huge submergence and damage experienced in the Nicobars, though this group covers a relatively small area and is more thinly populated.

Pankaj Sekhsaria

Sippighat, outside Port Blair, submerged after the tsunami

Pankaj Sekhsaria

Jogindernagar, Great Nicobar

Ecological changes

Tectonic activity and the submergence and emergence it caused also resulted in significant ecological changes in the islands. A survey by the Andaman and Nicobar Environment Team revealed, for instance, that huge areas (nearly 60 sq km) of coral reefs along the western and northern coasts of Middle and North Andaman Islands were lifted up, permanently exposed, and destroyed. Studies in the Nicobar group of islands by the Salim Ali Centre for Ornithology and Nature (SACON) showed that immense damage was caused to coastal ecosystems by the joint impact of the tsunami waves and the permanent subsidence and resultant permanent ingress of seawater. Coastal features like beaches, mangroves and littoral forests were the most badly impacted. Coastal wildlife like the endemic Nicobari megapode, the giant robber crab and the Malayan box turtle were among the species worst affected.

Coral reefs off the coasts of the Nicobars were also hit by a combination of submergence, a resultant increase in turbidity, and physical damage caused by tonnes of debris thrown back and forth by the furious water. A survey conducted by the Zoological Survey of India reported large-scale sedimentation on coral reefs around Great Nicobar Island, following the tsunami. A drop in the number of associated coral reef fauna, including nudibranchs, flat worms, alpheid and mantis shrimps, and hermit and brachyuran crabs was also reported.

Increased vulnerabilities

Significantly, the region is reported to have become much more seismically active now. Data gathered by the United States Geological Service (USGS) show that over 20 earthquakes of a magnitude above M6, in addition to several hundred of lesser intensity, have struck the region in the last five years. The most powerful was the September 2007 quake that had a magnitude greater than M8. It was followed by a tsunami warning; there have been at least half-a-dozen such warnings since 2004.

It would appear that the Andaman and Nicobar Islands, which have always been seismically active and therefore unstable, are even more vulnerable now. It is crucial that this increased threat becomes an important aspect of policy and development planning on the islands. Likewise, changes in the islands' topography on account of tectonic movements must be factored into future planning. An important dimension, for instance, is the alteration along the coasts of all the islands of the high tide line (HTL).

Pankaj Sekhsaria

Mangroves, Mayabundar, North Andaman

Table 1: Island-wise losses												
Island	People (dead or missing)		Livestock loss		Agricultural land lost		Permanent housing		Area		Population (2001)	
	Total number	Per cent	Total number	Per cent	Area in hectares	Per cent	Number	Per cent	Sq km	Per cent	Number	Per cent
Andamans	64	2	31,521	20	1,877	23.5	2,796	28.6	6,408	77.68	314,048	88.1
South Andaman	7		19,634		1,667		823					
Little Andaman	54		11,165		117		1,973					
Middle Andaman			722		93							
Nicobar	3,449	98	126,056	80	6,115	76.5	7,001	71.4	1,841	22.32	42,068	11.9
Car Nicobar	854		50,350		969.35		3,941					
Chowra	117		11,896		230.4		346					
Teressa			17,307		743.96		506					
Katchal	1,551		18,678		1,628.50		315					
Nancowry	378		1,440		256.57		269					
Kamorta			7,501		637.4		518					
Trinket			2,590		328.5							
Little Nicobar			2,267				111					
Great Nicobar	549		12,298		1,291.28		995					
Kondul			336									
Pilomilow			823									
Bambooka			570		29.55							
Total	3,513		157,577	100	7,992	100	9,797	100	8,249	100	356,252	100

Table 2: Losses in percentage (island-wise)			
	Andamans (%)	Nicobars (%)	Total
Area (sq km)	6,408 (77.68)	1,841(22.32)	8,249
Population (2001)	314,048 (88)	42,068 (12)	356,252
People (dead or missing)	64 (2)	3,449 (98)	3,513
Livestock loss	31,521 (20)	126,056 (80)	157,577
Agricultural land lost (hectares)	1,877 (23.5)	6,115 (76.5)	7,992
Permanent housing	2,796(28.6)	7,001 (71.4)	9,797

Pankaj Sekhsaria

Fishers in Great Nicobar

Unless this is recalibrated, any management or implementation of laws and regulations related to the coastal zone cannot be carried out effectively. They would in fact be meaningless.

The changed scenario also has direct implications on issues like land that can and cannot be allotted for reconstruction or for agriculture and plantation, as also on the materials and design of new buildings being built on the islands.

All these aspects need careful consideration because they are the foundations on which any scenario for the future of the islands must be built. Many worry that they are not being given the importance and consideration they deserve. This was starkly evident in September 2009, when former President Dr A P J Abdul Kalam was in Port Blair to unveil Andaman Vision 2020 "for the strategic development of the Andaman and Nicobar Islands by the year 2020". Speaking at a national seminar on 'Security and Development of the Andaman and Nicobar Islands', Kalam advocated, amongst other things, the construction of a 250 MW dedicated nuclear power station on the islands, and use of the islands as bases for static aircraft carrier and a nuclear submarine-based fleet.

It's as though the earthquake and tsunami of December 2004, and the hundreds of subsequent earthquakes, did not happen at all! Whatever visions of power we might have for ourselves, 'security and development' cannot be ensured by industrial and military might alone. If we ignore the foundational contours of the region's topography, its seismic instability, and its environment, we only increase the risks and our subsequent vulnerability. And we do so at our own peril.

Pankaj Sekhsaria is the author of Troubled Islands — Writings on the Indigenous Peoples and Environment of the Andaman and Nicobar Islands

Porous borders, unsafe waters

The 3.5 lakh fisher people of the Rann of Kutch have been swept up in the gigantic brawl between India and Pakistan. After the 26/11 terror attacks in Mumbai they live in perpetual dread of being apprehended by the Pakistani maritime authorities for straying into their waters, and endless inquiries by the Indian security forces. Around 554 fishermen and 418 boats from India are still in Pakistani custody

ANOSH MALEKAR

"FISHING IS NOT for the fainthearted."

"The sea currents and tides are part of a fisherman's life. They make fishing a dangerous game."

"Fishermen are 10 times more likely to be injured or killed on the job than truck drivers."

"The danger is the attraction."

"When fisher people get out of sight of land, they feel they have left the law behind too."

Skipper Laljibhai Sidi was unstoppable when queried about the occupational hazards of fishing. The middle-aged man from Diu, thinly built with a swollen gut, has been fishing for years in the Arabian Sea off the Gujarat coast.

Back then, in the 1980s, when he started as a teenager "with nimble fingers that trained fast", nobody seriously believed that the ocean's free-roaming fish belonged to any one nation. "Six men in a small fishing boat felt safe by themselves anywhere in the deep sea. The skipper would announce 'Boys, we're going fishing tonight' and then add 'If anybody doesn't want to come, better opt out on the shore rather than be thrown overboard mid-sea'. As young boys, we always wanted to go," he recalled.

Two decades later, however, life at sea is changing, especially around the Gulf of Kutch, and always for the worse.

It all began with the industrial nations of the world sealing off their continental shelves with 200-mile 'exclusive economic zones' through the 1980s followed by new restricted zones, no-catch areas and special permit sectors that have reduced the once-unbroken blue sea into a complex maze of curbs and checks on traditional fishing.

On August 20, 2009, the day we arrived in Diu, seven local fishermen were knocked overboard by a patrol vessel of the island's coastal police. Their traditional wooden boat was destroyed completely; it reportedly split into pieces and sank within minutes of being hit by the patrol vessel. The fishermen were rescued and brought to a government hospital on the island. One of them had serious injuries and was shifted to Rajkot on mainland Gujarat, some 260 km by road. He died.

The following day, when I met Laljibhai, fishermen in Diu recalled the patrol vessel intercepting the fishing boat for a routine security check, introduced since the 26/11 terrorist attack in Mumbai in 2008. After verifying the identity cards of the crew members, the patrol prepared to leave. Before anybody realised it, the operator of the vessel made a U-turn and charged at the fishing boat resulting in the mid-sea collision.

Kantibhai Kharwa, leader of the local fisher community, demanded that only well-trained and disciplined policemen be posted on marine patrol duty. "The police operator could not control the speed of the patrol vessel," he pointed out. A senior fisheries department official later alluded to an island rumour that the police operator was in an inebriated state. Of course there was no official verification. No tests for drunkenness were conducted.

The mid-sea collision at the start of the fishing season could be more than just a setback for the fishing crew involved, perhaps a bad omen for the entire fishing community on the tiny island, I thought. But the islanders went about their daily activities as if nothing had happened. At the Vanakbara jetty, fishermen were busy holding elaborate *havans*, the sacred purifying ritual, on their colourful fishing boats with distinct names and the Indian tricolour fluttering atop them.

Vanakbara is a typical fishing village, located on the western tip of Diu facing the Arabian Sea. The island itself is about 11 km long and 2 km wide, separated from the Saurashtra or Kathiawar Peninsula in Gujarat by a marshy creek. Diu (from the Sanskrit word *dwip* or island) was a Portuguese colony for over 450 years till India took over in 1961.

Traditionally, the island economy has been based on trade and fishery. There was and is little agriculture with only 20% of the land mass under cultivation. Lately a part of the Daman and Diu Union Territory, tourism has emerged as a significant contributor to the economy of this area. A perfect weekend getaway, especially for Gujaratis coming from a dry state, Diu is better known now as a tipplers' paradise!

"The residents of Vanakbara too love their tipple, preferring the environs of their shabby fishermen's bars to celebrate their victories at the dangerous game of fishing in foreign

waters," Laljibhai said. But this year, it is not time yet to celebrate the good catch. The first contingent of boats left the shores just five days ago.

At noon on August 21, the Vanakbara jetty was abuzz with activity, with boats lined up and readied for fishing expeditions. The atmosphere was charged. Nobody seemed to have the time to chat. The *tandels* or skippers were shouting last-minute instructions to their young assistants busy loading the boats with ice, salt, diesel and other provisions for longer spells of fishing that could stretch from a week to a fortnight. A little distance from the shoreline, expert repairmen in dirty tunics, their mouths bulging with tobacco and betel nut juice, were conducting last-minute repairs while their helpers cleaned the wood shavings at the insistence of the boat owners, who couldn't wait to see their vessels ready with a fresh coat of paint. A stone's throw away, closer to the warren of typical fishermen's dwellings, specialists were mending fishing nets. The fisher women, usually part of the scene sorting out the day's catch or hanging fish for drying on ropes, were conspicuous by their absence. The arrival of the first catch of the season was still a couple of days away.

Officially, all fishing activity, except by non-mechanised boats and on foot, is banned from June 10 to August 15 along the entire west coast of India to give a chance for fish to breed during the monsoon, and ensure the natural revival of stocks. But this year, Kutch district authorities had banned fishing without any exception, severely affecting the livelihood of traditional fishermen on the island. The authorities perceived a threat to India's maritime security in permitting small fishing boats in the Kutch Sea.

Over 50% of the fishing vessels operating near major ports on the country's western coast are unregistered. Most of these ports are compliant with the International Ship and Port Facility Security (ISPS) code, which prescribes the responsibilities of the government, shipping companies, shipboard personnel and port personnel to detect security threats and take preventive measures. The code was introduced after the 9/11 attacks in the United States.

Still, the menace of unregistered boats persists. "Unregistered fishing boats neither have proper identification numbers nor do their crews have any identity cards. The boats enter the sea at will, with no information or record of what happens to them while at sea in close proximity to Pakistan. If left unchecked, these vessels can be used for any kind of subversive activities in India," Assistant Superintendent of Fisheries Sukar Anjani said.

The Indian security agencies were especially wary since the 26/11 terrorists had hijacked Indian fishing boat *MV Kuber* from Porbunder, near the Sir Creek marshlands, and travelled to Mumbai to carry out the attack. The 10 Pakistani gunmen had earlier set out from Karachi in a Pakistani vessel.

The Indo-Pak boundary in Gujarat runs through the low-lying, salty wastelands called the Rann of Kutch. A number of creeks jut out like fingers from the body of the Arabian Sea into the marshy flatlands of the Rann. Apart from declaring an area of 10 nautical miles from the International Maritime Boundary Line (IMBL) as a no-fishing zone, the coastguard sought a ban on fishing in a 500-metre radius of oil refineries, oil rigs and important ports on the Saurashtra coast.

The fishermen were informed in advance about the changes in security measures that the coastguard planned to propose to the state government. They had no objection to the 10-nautical-mile no-fishing zone on either side of the IMBL, but wanted the no-fishing zone area to be limited to 100 metres instead of the proposed 500-metre radius. "We do understand that these are sensitive areas. We are ready to follow the boundary drawn from the IMBL, but a 500-metre no-fishing zone will adversely impact our livelihood," Vanakbara Boat Owners Association president Bhagwanbhai Baraya said.

Vanakbara boat owner Premjibhai Solanki said they had stopped going into the deep seas since the Mumbai incident. "What can we do? Our men and boats have been taken away in the past by Pakistan, leaving the families to starve," he said. "Our livelihood is dead. There is no fish left along Gujarat's coastline. But if we venture out in the high seas, we risk being captured by the Pakistanis."

Many of Diu and Gujarat's 3.5 lakh fisher people, who depend on marine fishing for a livelihood, must feel like Premjibhai these days — ignored by the world, swept up in a gigantic brawl that is being fought largely over their heads, and scrambling to survive.

Because of a rich delta, Gujarat once had the best fishing grounds, and the Gulf of Kutch the best fish in India. The waters of the Indus delta at the Arabian Sea are considered good for fish breeding. It lures the Indian fishermen into Pakistan's territorial waters for a better catch. As a result, the Kutch Sea has become the scene of numerous arrests of fishermen after they stumble into either disputed areas or territory on the side of the border other than their own. The woes of these fishermen, after they are caught, are well-known. The two countries don't treat them as they should — in accordance with international laws. They are kept in confinement with no charge, and offered no legal assistance.

In the wake of the Mumbai attacks, Pakistan's director-general of the Maritime Security Agency (MSA), in a weekly talk with his Indian counterpart, said he was passing instructions to apprehend Indian fishermen caught fishing in Pakistani waters with immediate effect. According to official sources in Gujarat's capital, Gandhinagar, the director-general of the Indian Coast Guard (ICG) found that

Because of a rich delta, Gujarat once had the best fishing grounds, and the Gulf of Kutch the best fish in India. The waters of the Indus delta at the Arabian Sea are considered good for fish breeding. It lures the Indian fishermen into Pakistan's territorial waters for a better catch. As a result, the Kutch Sea has become the scene of numerous arrests of fishermen after they stumble into either disputed areas or territory on the side of the border other than their own

complaints by Pakistan about the large-scale presence of Indian fishermen in the Kutch Sea off the coast of Karachi, were not unfounded, and requested the state government to take stringent punitive steps against those found violating the International Maritime Laws.

In early-August 2009, India's Border Security Force (BSF) arrested nine Pakistanis and seized a small fishing boat in which they had entered Indian territory near Sir Creek on a day Prime Minister Manmohan Singh said intelligence inputs suggested more 26/11-type attacks on Indian soil launched from Pakistan. The BSF said its suspicions were raised when the nine Pakistanis claimed they had been fishing in the sea for three days, yet had not a single catch in the boat to show for it.

Porous borders along the International Maritime Boundary Line bordering Pakistan, and lack of enough maritime security personnel have made ports located on the western coast vulnerable to subversive activities. There are around 133 ports located along India's western coast, spread over five states and two union territories.

According to coastguard sources, minor ports like Oka, Veraval and Porbander located on the Saurashtra coast have the worst security in place. These ports handle commodities like oil, coal, pig iron, raw bauxite, wheat, sulphur, coke, LPG and fertilisers, among other things. Adjacent to these ports in the Rann of Kutch, which is rich in marine species, over 200 vessels can be found fishing on a daily basis.

"Since this area is rich in marine species, sometimes even fishing vessels from the Pakistan side tend to cross our border. However, with our limited resources and personnel, it is not possible to check every vessel. So we do only a random check," said a Gandhinagar official.

The alignment of the international border here is disputed and is commonly referred to as the 'Sir Creek issue'. The Sir Creek dispute involves defining the international boundary along the creek, roughly a 100-km-long estuary in the saline wetlands of the Rann of Kutch between the state of Gujurat in India and the province of Sindh in Pakistan. The dispute predates the creation of India and Pakistan and stems from differences between the British Indian state of Bombay and the princely state of Kutch in the first decade of the 20th century.

Post-Independence, fresh complications ensued when it was noticed that Sir Creek had started to shift its course northwards towards Pakistan, a normal geographical phenomenon with shallow creeks. It is now one of eight major issues on the Indo-Pak composite dialogue agenda devised by the rival South Asian nations for the peace process that they launched in 2004. The UN Convention on Law of the Sea required that all maritime boundary conflicts be resolved by 2009, failing which the UN may declare disputed areas as international waters.

Talks on Sir Creek, under the fifth round of the Indo-Pak composite dialogue, were scheduled to be held on December 2-3, 2008, in New Delhi. However, in the aftermath of the Mumbai terror attacks, India put a 'pause' on the dialogue.

There is also silence on the fate of the 554 fishermen and 418 boats from India, mostly Gujarat and Diu, still languishing in Pakistan's custody. For the families of the fishermen and boat owners this is disturbing, like the silence of the high seas.

Among those in Pakistani jails are 120 fishermen along with 19 boats from Diu. What happens to them? Former sarpanch of Vanakbara Ramjibhai Solanki had no answer. He only stared back at me. I had met him in 2004 with a similar query. The situation had not changed.

The fishermen of Diu are resigned to their fate. With the catch dwindling along their coast in recent years, it's not unusual for fishermen to move deeper into the sea in search

"We have to take the risk. During the day you lay the nets in the deep seas and wait all night for the elusive catch. But the currents on the high seas know no boundaries. They are fierce, and almost always accompanied by strong winds. And when the wind blows through the Kutch Sea, it turns you over to the enemy," Laljibhai said

of a better haul. And when storms break and the waters turn choppy, it does not take long for them to lose their bearings at sea. "We have to take the risk. During the day you lay the nets in the deep seas and wait all night for the elusive catch. But the currents on the high seas know no boundaries. They are fierce, and almost always accompanied by strong winds. And when the wind blows through the Kutch Sea, it turns you over to the enemy," Laljibhai said.

"We thought we were in safe waters," said Haresh Mandan, one of four fishermen from Diu who were spared by the Pakistani marine guards after they crossed their territorial waters on April 22, 2004. "It was around 11 am," he recalled. "We had spent six days at sea when the Pakistanis came in speedboats. They abused us saying, 'Why do you come here? We are tired of capturing you', and took away 21 fishermen and left four of us — a 60-year-old and three minors."

Haresh was 18 at the time of the incident. And like all boys his age in Vanakbara, he had offered to help his friends on a fishing expedition that day. "When surrounded by the boats of the Pakistan navy personnel who were firing in the air, I was scared we were all going to be shot and dumped in the sea. Luckily, that did not happen."

For the families of those captured it is a long wait. "How do I feed my four children?" a young Deviben Sidi asked. "I am forced to take up casual labour. Is there any hope for my husband's return?"

Ramu Sidi was the *tandel* of the fishing boat *Nandini Sagar* from Vanakbara, which was captured a couple of years ago. He had ventured out into the sea a day after his mother's cremation. "We badly needed money, there was no option," his wife recalled. Now she has to feed the children — Yagnik, Milind, Pinkesh, and Jenil, aged between two and nine years — on the meagre Rs 30 she earns as daily wages.

The family of Chunilal Jiva Sidi, who accompanied Ramu, is relatively better-off. His brothers Sonji and Vijay earn enough to feed his wife Dhaniben and eight-month-old son. Iruben, their mother, is concerned but helpless. "It is fate," she says of her eldest son. "I cannot ask my sons to give up fishing. The currents and tides are part of our lives."

The fisherfolk know they shouldn't be sending their children out to sea, but it's hard to resist the additional income and the boys have to learn the ropes someday. Young boys are in demand for their nimble fingers — useful in sifting the small catch from the big, and for assisting the experienced fathers and uncles. The general equation is four-six adults and two minors to a boat. A boy earns up to Rs 3,000 a month for the season extending six to seven months a year.

"We don't know the fate of our brethren, some of whom have been languishing in Pakistani jails for years," said Manish Lodhari, the Porbander-based secretary of the National Fishworkers Forum (NFF), which has been appealing to the leaders of India and Pakistan to settle the matter once and for all. NFF's counterpart, the Pakistan Fisherfolks Federation, has been pursuing the matter with their leaders.

What happens once captured by Pakistan is incarceration in prison, mostly at Karachi Jail. Some of them will be lucky to be released as a goodwill gesture mostly around August 14 — Pakistan's Independence Day — but the procedure for release is completely arbitrary. It is entirely dependent on the goodwill of the two nations.

Responding to an NFF memo, a senior official in the Union Ministry of External Affairs conceded that a mechanism has to be put in place to address the prisoners issue. "Though there is a hotline between Indian coastguards and the Pakistan Maritime Force in place since 2006, and more than 1,500 boats have been saved from detention, there has to be a permanent mechanism to address the problems of fishermen not covered by any security net," the official stated.

India has an agreement with Sri Lanka on the maritime boundary in the Gulf of Mannar and the Bay of Bengal, allowing fishermen from both countries to share the catch. The fishermen of Gujarat and Diu hope the external affairs ministry will think of a similar solution with Pakistan, Lodhari said.

Anosh Malekar is a senior researcher with www.infochangeindia.org and Infochange Agenda

Saltpan city

Mumbai's saltpans stretch over 5,000 acres, nine times the size of the defunct mill lands. Governments and the city administration have been eyeing these protected areas for commercial development, ostensibly to house the poor. Environmentalists argue that these saltpans, with their thick mangrove forests, are Mumbai's last defence against ocean flooding

FRENY MANECKSHA

• *The Centre is working on a comprehensive policy for redeveloping Mumbai's slums so that precious real estate in the island city can be freed up for infrastructure and development. The 'From Hutments to Tenements' policy envisages resettling Mumbai's slum-dwellers in housing projects that could be developed on the 2,700-acre expanse of saltpan land in the city. (Indian Express*, June 16, 2006)

• *A much-awaited measure to alleviate the severe paucity of land in the country's financial capital, Mumbai, is close to realisation. Over 5,378 acres of saltpan land in the city's suburbs, owned by the Centre, will soon be unlocked to develop low-cost housing projects for rehabilitating slum-dwellers to be displaced by the various infrastructure upgrade projects, including expansion of the Mumbai international airport. (The Financial Express*, May 30, 2008)

• *"Opening saltpans for development will decongest the city considerably and ease the housing shortage. This would automatically ensure a fall in prices," said Anuj Puri, chairman and country head, Jones Lang LaSalle Meghraj, a leading real estate consultancy firm. In most parts of the world, where saltpans have been developed, he said, there has been a spurt in the construction of high-end luxury houses and hotels due to the proximity of the sea. (Hindustan Times*, November 20, 2009)

Both the Centre and the government of Maharashtra have long been eyeing Mumbai's saltpans under the pretext of undertaking low-cost housing projects to relocate the city's slum-dwellers and upgrade infrastructural facilities. Saltpans are lands along the coast that were hollowed out to process salt; in Mumbai they are spread over approximately 5,378 acres.

The Konkan coast around present-day Mumbai was ideal for the manufacture of salt; indeed, salt works have been in existence here for as long as people can remember. Since 1850, however, the saltpans began to be acquired for various public purposes, and little by little, they ceased to be used to produce salt.

Mumbai's saltpans are spread across the eastern suburbs of Ghatkopar, Chembur, Wadala, Kanjurmarg, Bhandup, Mandale, Turbhe, Nahur and Mulund, and the western suburbs of Dahisar, Mira Road, Bhayander, Malvani and Vihar. Although most of these lands are privately owned, since 1960 the Central Salt Department in Jaipur has taken the view that salt work lands belong to the central government, and that the salt manufacturers only have right of use to the land to produce salt under the terms of the licence.

More recently, the state government has been claiming that though owned by the central government, the salt work lands were leased out to the Brihanmumbai Municipal Corporation (BMC) in the late-19th and early-20th centuries. Subsequently, the BMC sub-leased the land to various people on a 99-year lease, to manufacture salt. Though the lease is over in most cases, the lessees have not given up possession of the land.

People like K D Doongiriwala, whose family is still in the salt-manufacturing business and owns salt work land in Bhayander, claim that most of the land is private land not government land as claimed by the state. Salt workers have been in possession of land in and around Mumbai to make salt since the Portuguese and Marathas ruled the region.

In the 1980s, salt manufacturers, afraid of the government's new attitude, brought hundreds of court cases before various civil and revenue courts. Most of these are still

pending. A high court decision in 1996, holding saltpan lands to be the property of the government, raised a major hue and cry although the ownership matter subsequently fizzled out. Most saltpans are now occupied by unauthorised slums.

These salt work lands, said to be nine times the size of the defunct mill lands in central Mumbai, are now slated to be exploited for private real estate and public infrastructure projects under the pretext of freeing Mumbai of its slums. At the meeting of a high-powered group of central ministers it was decided, in May 2008, that "efforts of various central and state agencies (will) be coordinated and urgent measures evolved for using these lands for rehabilitation of slum-dwellers," (*Financial Express*, May 29, 2008).

Prime Minister Manmohan Singh, in the wake of the 2005 floods, called for the expeditious transfer of saltpan lands to the state government, in September 2006. But even as the state government seeks clearance for the saltpans to be used to rehabilitate 80,000 slum-dwellers and project-affected families in Mumbai, the BMC has ambitious plans of its own. The current development plan envisages converting saltpan lands for residential purposes, and creating commercial zones with "adequate infrastructural augmentation". The Federation of Indian Chambers of Commerce and Industry (FICCI) has welcomed the use of these lands for real estate.

The BMC is drawing up a revised development plan (a blueprint for the city's development) for 2014-2034 that suggests opening salt work lands for commercial development. One of the "urgent measures" needed to make this possible is to relax environment protection regulations governing coastal land use — these regulations, as applied to Mumbai, prohibit development on all but 240 hectares of salt work lands.

The move has triggered a heated debate among environmentalists, citizens' groups and those concerned with urban planning. The civic body's plans for the last few stretches of saltpans would spell disaster for Mumbai, say citizens' groups and environmentalists. The latter argue that a major portion of the land is covered by Coastal Regulatory Zone (CRZ) guidelines, and that these lands cannot be used for development. Besides, saltpans form part of the fragile ecosystem that supports thousands of species of animals, birds and fish.

Environmentalists also claim that saltpans, with their thick mangrove trees, are Mumbai's last defence against flooding. "The saltpans are eco-sensitive zones that act as natural buffers against ocean flooding… They absorb the rush of water from the sea," says the Bombay Natural History Society (BNHS), a research body.

Hearing a public interest litigation filed by the Bombay Environmental Action Group (BEAG) in the wake of the July 2005 deluge in Mumbai, a division bench comprising Chief Justice Dalveer Bhandari and Justice Dhananjay Chandrachud ordered a total ban on the destruction and cutting of mangroves throughout the state. Mumbai alone has over 1,534 hectares (3,800 acres) of mangroves. Not stopping at a ban, the court also issued orders for the cessation of all construction activity within 50 metres on all sides of mangrove areas.

Environmentalist Nahar Singh says: "If they (the state government and BMC) go ahead with their plan, the city is doomed. It will mean more July 26, 2005-like disasters in the city." Vidya Vaidya, a member of the NGO Citispace, adds: "This will mean irrevocable damage to the environment." Activists allege that the BMC's latest move will benefit Mumbai's construction lobby that has been pushing for the city's last remaining open spaces to be opened up for development.

Rishi Aggarwal, an environmental activist who is also involved in issues of development and governance, is a staunch critic of the bid to build on saltpan lands. Aggarwal, joint secretary of the Mangrove Society in India, and part of the Mumbai Environmental Social Network, says any move to develop salt work lands without a proper scientific proposal or sound environmental impact assessment study would make it a purely greed-driven exercise, not an attempt to address people's housing needs.

Aggarwal points out that unilaterally freeing all saltpan lands would necessarily mean bending some of the CRZ guidelines because although all saltpan lands do not support mangroves, they do see tidal action. He alleges that structural engineers too have expressed concern over the wisdom of putting up buildings on such hollowed out lands.

Are saltpans the only answer? "If the leverage of the floor space index (FSI) directive is applied correctly, there is sufficient good quality housing stock in the main island city," says Aggarwal. Dr Amita Bhide of the Centre for Urban Planning and Governance, Tata Institute of Social Sciences (TISS), says one must explore all options like lands under the Urban Land Ceiling Regulation Act (ULCRA), lands belonging to the defence, railways and Bombay Port Trust. "Having said that, I am aware that asking for land for the poor is often just a front," Bhide concludes.

The proposal to use saltpan lands first emerged in 2002 when the Maharashtra Housing and Area Development Authority (MHADA) warned that it was running out of land and asked the state to release land belonging to various departments like defence, the Bombay Port Trust, and saltpan lands.

In 2006, the then Union Minister for Commerce and Industries Kamal Nath and Maharashtra Chief Minister

Vilasrao Deshmukh worked out a formula of developing saltpan lands on a no-profit-no-loss basis. The scheme proposed allowing private developers extra FSI for commercial purposes after setting aside 225 sq ft houses to accommodate slum-dwellers.

In 2007, a committee of union ministers including Sharad Pawar, A Raja, Kamal Nath and Jaipal Reddy was formed to look into all aspects before a decision regarding saltpan development was taken. In May 2008, the decks were cleared for the private development of saltpan lands stretching to 2,177 hectares. This, despite the Union environment ministry objecting to the release of lands covered by mangroves, which fell under the CRZ 1 category.

In August 2009, Union Minister for Environment and Forests Jairam Ramesh once again indicated that the central government leadership was unhappy about opening up salt work lands for development. "My understanding is that currently there is no evidence among top political leaders that they are in favour of opening up the saltpans for development, although there was some interest in the past," Ramesh said at a public hearing on the CRZ notification. Stating that saltpans were vulnerable lands, the minister added that a proper study should be conducted on the ecology, environment and socio-economic aspects of salt work areas before taking appropriate steps.

Earlier, in July 2009, around 180.42 hectares of salt work lands around the prime locations of Dadar, Naigaum and parts of the main city, were declared 'protected forests' under a state government notification. The notification identified 3,431 hectares of mangrove lands in the extended city as forest land to be protected by the state forest department.

According to S S Sandhu, Divisional Commissioner, Konkan division, who issued the notification: "Many of these vast tracts of saltpan lands have significant mangrove growth. When the Nagpur-based Maharashtra Remote Sensing Application Centre (MRSAC) began mapping mangroves in the city, these tracts appeared on the map. We simply followed the court directives and notified them as forests."

Although environmentalists are heaving a sigh of relief, government officials maintain that the new notification will not upset state projects. Shree Bhagwan, Chief Conservator of Forests, Thane range, explains: "These lands may be protected, but that doesn't mean the forest department is going to lock horns with the state over the development of any of these lands. We will make sure there is agreement on the issue."

Mangrove expert and member of Conservation Action Trust (CAT) Vivek Kulkarni says: "These are basically saltpan areas which have not been used for salt production for long. There is considerable mangrove growth on them that needs to be protected." Kulkarni, however, points out that there are larger areas of saltpan lands with mangroves along the Eastern Express Highway, Dahisar, and Mahul, which also need to be notified urgently. The authorities seem to have suddenly woken up to the dangers of climate change and global warming; efforts are being made to find ways to mitigate the effects. But a lot more has to be done, and fast, Kulkarni concludes.

The next five years are going to be crucial, say experts, as rising sea levels threaten the city. One of the biggest challenges for the state forest ministry will be to save the saltpans and mangrove lands in and around Mumbai. It will also have to put an end to the large-scale destruction of mangroves along the city's coastline, failing which millions of lives will be affected. "Mangroves are a natural barrier between the sea and the land. Their importance has increased manifold because of the erratic weather patterns Mumbai is prone to," says Debi Goenka, member of Conservation Action Trust.

"Opening up saltpans is a bad idea," says urban planner Chandrashekar Prabhu. Writing on the 26/7 catastrophe, which the government blamed on unprecedented rainfall, Prabhu said: "The writing has been on the wall for a long time. Why did this happen? Every city has its share of dissipation spaces — wetlands, wastelands, mangroves and saltpan lands. These act like sponges and take the pressure out of the high tide. In the past 10 years, each of these has been destroyed systematically in Mumbai. It is a carefully planned strategy. It is a transition from wetland to wasteland. This has happened in Chedda Nagar in northeast Mumbai where saltpans were filled in to create land."

The release of thousands of acres of salt work lands for 'development' remains on top of the state government's agenda. In fact, for several months before the October 2009 assembly elections, there was hectic lobbying in Mumbai and New Delhi to open up vast tracts of land in the suburbs. It was put on hold when MP Milind Deora and other prominent citizens of Mumbai raised an alarm over the move. With a fresh mandate, and the next polls four years away, the new government is expected to take up the matter once again.

Freny Manecksha is a freelance journalist based in Mumbai

Tradition versus tourism

The unbridled growth of tourism in 'God's Own Country' has wrought an ecological disaster along the Kerala coast and famed backwaters. Some 2,000 houseboats spew sewage and kerosene into the backwaters that locals use for cooking and cleaning, the mangroves have shrunk to 1% of their original size, beaches are being privatised and local communities are being displaced and dispossessed of their livelihoods

ANOSH MALEKAR

VALIATHURA, NEAR THIRUVANANTHAPURAM, was declared a 'dead port' in the early-'80s after it lost prominence as the only port along the south Kerala coast to Kochi. The only sign of its past glory, a 703-foot pier that is more than 50 years old, lies in a considerably weakened state and is used by the local fisherfolk to launch their traditional *kattumarans* or catamarans during the monsoons when the rough sea renders the neighbouring beaches inaccessible. The *kattumarans* — literally meaning tied wood and well known as the only unsinkable light craft in the world — are thrown into the sea; the fishermen then jump in and swim to them in a potentially life-threatening but daring act that, strangely, has turned into a modern tourist delight.

"The fishers from Valiathura are mainly Latin Catholics, there are very few Hindus and Muslims," local journalist-activist Ajith Lawrence says while adding that these indigenous fishers who historically inhabited the adjoining districts of Kanyakumari in Tamil Nadu and Thiruvananthapuram in Kerala are a rare breed among the marine fisher people inhabiting the Arabian Sea coast. "They are manual shark hunters, skilled in all kinds of traditional as well as modern gear and crafts. They dare the sea in all seasons in all regions and their traditional skills in determining the course of the currents and the winds, even in the most adverse situations, is legendary," he claims.

Fishing communities in Kerala are said to be of tribal origin; they were later incorporated into the Hindu caste hierarchy right at the bottom. Around the 8th-9th centuries, many communities in the northern region converted to Islam, and in the 15th century a large number in the southern region converted to Christianity.

Over the centuries, theirs has been a story of extreme marginalisation in virtually every sense. The dark, muscular men with bare torsos, and the frail women with prematurely wrinkled faces, have lived on the margins of society — on the sea front — in tiny huts thatched with the dry plaited leaves of the coconut palm that are so ubiquitous in Kerala but now seem out-of-sync with the modern architecture of homes fuelled by Gulf money and the luxury hotels catering to foreign tourists.

The fishers, despite their extreme poverty, claim to have enjoyed a stable and fulfilling life over generations due to ideal ecological conditions that foster marine diversity and high primary productivity in the region. The shores they inhabit lie within 20 degrees north of the equator and enjoy relatively warm and stable climatic conditions round the year. The two monsoon cycles in a year enrich the sea with oxygen and fresh water. Two of the Arabian Sea estuaries, of the Neyyar and Thamiraparani rivers, provide the right mix of salt and nutrients for all forms of marine life to flourish.

Kerala's coast stretches 580 km in length and varies between 35 and 120 km in width. The state has 44 rivers, of which 41 flow westward towards the sea. That's roughly one river every 14 km. This plentiful fresh water from the eastern tropical forests is a substantial contributor to Kerala's bountiful marine fishery resources. The rivers crisscross the western coastal belt dotted with a network of interconnected brackish canals, lakes, and estuaries known collectively as the 'Kerala Backwaters'. These plentiful inland water resources amidst the lush green vegetation dominated by tall swaying coconut palms are also the hallmarks of the state. Tourism flyers proclaim Kerala to be 'God's Own Country'. The state was selected by *National Geographic Traveler* as "one of the 50 destinations of a lifetime, and one of the 13 paradises in the world".

Around three years ago, the World Travel and Tourism Council shortlisted Kerala, along with Greece and Mexico, for its 'Destination of the Year' award. The nomination drew widespread criticism from civil society in Kerala, which highlighted the massive degradation tourism had wrought on the state's highly sensitive ecology. The nomination was subsequently dropped, but ever since the divide between local communities and the state's tourism industry seems to have grown.

Thiruvananthapuram-based NGO Protsahan's secretary A J Vijayan alleges that powerful tourism lobbies, in connivance with obliging government officials, have carried out rampant encroachments in coastal areas and backwater regions along with surrounding wildlife sanctuaries and small landholdings owned by adivasis and other economically disadvantaged groups like the fishers. "In the coastal region, illegal constructions have made a mockery of the law. The


Gita Vasudevan

unbridled growth of tourism is forcing traditional fishermen to quit their land and livelihood by inducing them to sell their usually minuscule properties at throwaway prices."

Fisherman V Benedict, 52, who used to own about 1 acre near Alappuzha's famous Mararikulam beach, lost it all a couple of years ago when he sold it for a pittance. "A group of prosperous looking businessmen came to my house one day to convince me to sell my land. How can a poor, unlettered fisherman like me resist their tactics?" Benedict is in tears as he narrates how he was stripped of his land. Hundreds like him in coastal Kerala have had their centuries-old livelihoods taken away, says local fishermen leader Lal Koyilparambil.

Koyilparambil alleges that the privatisation of Mararikulam's 'public' beach is near total, with almost 90% of it now in the hands of private entrepreneurs. While the Kerala government continues to tout Mararikulam as a shining example of its 'responsible tourism' initiative, the beach's erstwhile fishermen have been dispossessed forever of the lands and sea they once called their own, he says.

A major casualty of the damage done to Kerala's unique backwater region is Vembanad lake, the largest in the Alappuzha-Kottayam area and the setting for Arundhati Roy's Booker prizewinner *The God of Small Things*. According to local fishers Rajen Palikkalayil and Josy Gabriel, about 70% of the lake has fallen victim to reclamation projects. Their observation is corroborated by the Kerala Council for Science, Technology and the Environment, which reports that the state has managed to retain only 23% of its backwaters.

Koyilparambil, who has spent all his activist life around Alappuzha (also known as Alleppey) and Kochi, says there was practically no tourism here till about the 1990s, when things started to change quickly: "The thatched-roof wooden *kettuvallams* (houseboats) were used to transport rice till then, until the boatmen realised they could make much more money by hiring them out to foreign tourists. As the tourists came flocking, boatmen began to build bigger and fancier boats."

Koyilparambil concedes that the houseboat industry has brought a welcome source of income to Kerala's backwaters, but stresses that the backwaters are not only for the tourists. There are rural communities including traditional fishers who live along the shores, and they use the polluted water for their cooking, cleaning and washing. The tour operators of the fancy houseboats make good money, but the people in the villages don't see any of the profits.

There are about 2,000 *kettuvallams* in the Alleppey backwaters today. All have living/dining rooms, kitchens, bathrooms and verandas, while some are even more spacious, resembling floating mini-palaces. "The tourism authorities are simply ignoring the environmental impact of the increasing number of luxury houseboats that are two-storeyed with air-conditioned bedrooms, conference rooms, flat screens and whirlpools. The kitchens use kerosene stoves for cooking, and there is a generator for electricity and an outboard motor that runs on diesel. This has had a serious impact on the ecology of the backwaters. Sewage from the kitchens and baths ends up as pollutants. The diesel from the outboard motors and kerosene from the stoves leak into the water. As a result, the *karimeen* (a local fish delicacy) actually tastes like kerosene," Benedict, who now works for a houseboat-owner, says.

The major tourist destinations across the state suffer a host of serious problems: piling of waste and garbage, water and air pollution, loss of biodiversity, lack of land use and infrastructure planning, encroachments, unauthorised constructions, drinking water shortages. According to the State Pollution Control Board, 1 million cubic metres of sewage is generated in the state's coastal areas, of which 30,000 cubic metres reaches the surface of waterbodies. The backwaters in Kochi alone receive 60 tonnes of sewage from the city. Streets in major tourist destinations like Alappuzha and Kochi now resemble garbage dumps, leading to the outbreak of epidemic diseases like chikungunya in the post-monsoon months over the last few years.

A worse fate awaits the mangroves, warn environmentalists and activists. "Hotels and holiday resorts have mushroomed on reclaimed wetlands which were once part of the mangrove ecosystem. Nobody in Kerala is bothered about the horrifying shrinkage of the mangroves from 70,000 hectares to just 1% of their former size," Vijayan says.

Kerala Minister for Tourism Affairs Kodiyeri Balakarishnan says: "The state's acceptance of 'responsible tourism' as a motto a couple of years ago is part of efforts to save the deteriorating situation. Nature will be protected and haphazard growth of tourism will not be encouraged." The minister further claims that the tourism department and local bodies have been advised to evolve a permanent mechanism to minimise pollution, and efforts are already on to initiate legal measures against large-scale violators.

But representatives of people's movements of fishers, adivasis and dalits, among others, deliberating the issue at a Convention against Irresponsible Tourism in March 2008, voiced strong opposition to the intentions of the Kerala Tourism Department and tourism lobbies to project Kerala as a global destination of 'responsible tourism', pointing to their repeated failure to address and resolve the enormous problems caused by indiscriminate tourism development in the state.

"We feel that the widely propagandised International Conference on Responsible Tourism that took place (earlier) in Ernakulam, not surprisingly failed to coherently address

the real social, environmental and ethical impacts of tourism and did not seriously consider the concerns and anxieties of the local communities such as traditional fishers and indigenous people in the destinations," they say in a press statement.

The representatives further pointed out that "many of the recent legislative interventions in the tourism sector in Kerala, such as the Kerala Tourism (Protection and Conservation of Areas) Act, 2005 appropriate important constitutional powers (bestowed through amendments 73 and 74 of the Indian Constitution) of local self-governments (LSG), jeopardise the decentralisation process and hugely reduce the scope for local participation at the decision-making and implementation levels of tourism projects".

"We would like to make it clear that local communities will not play their expected roles of suppliers and dependents (the idea latent in the euphemism 'economic responsibility') of the tourism industry. We wonder why the tourism lobby pretends to ignore the fact that Kerala has now become a net importer of its staple food, rice, and depends heavily on neighbouring states for everyday supplies of vegetables, meat, eggs and milk. We strongly feel that the immediate responsibility of Kerala Tourism, hence, is to address and resolve the burning problems of the local communities that are displaced, disempowered and dispossessed from their livelihoods as a result of the unregulated and uncontrolled tourism activities in the state," the press statement says.

Kerala is a typical case of overexploitation and mismanagement of its resources, whether it is marine fish reserves or coasts and backwaters, Vijayan says: "The origin of this can be attributed to the state playing host to the Indo-Norwegian Project (INP) in the '50s. The project was intended to upgrade the existing fisheries sector and improve the standard of living of the fishing community, but it became an unintended catalyst for launching the whole of Kerala's fisheries into a new western-oriented export drive."

Vijayan also observes that in the past few decades, harbour-based mechanised trawlers with a single-species orientation (shrimp) were actively promoted at the cost of beach-based artisanal fishery, falsely dubbing the latter as too traditional, unscientific and resistant to change. Shoaling pelagic species like oil sardine and mackerel, and demersal species like prawn have made Kerala a major fish consuming and fish exporting state.

The total fisher population in Kerala is over 1 million, which is 3.2% of the state's population. Marine fishermen, who constitute more than 80% of the state's fishers, live along the coast in 222 fishing villages; the rest inhabit the 113 inland fishing villages. Alappuzha district has the largest number of fisherfolk (1.86 lakh) followed by Thiruvananthapuram (1.83 lakh). The state roughly accounts for 10% of India's coastline, nearly 27% of the country's active fishermen, and a quarter of its sea fish production. With an estimated 5,000 mechanised boats, 10,000 motorised and 20,000 non-motorised country craft, Kerala also shares around 37% of the all-India marine product export earnings.

Despite the vast resources offered by the bountiful sea and an apparently thriving export market, why are the local fishers poor? "The only real wealth we possess is our knowledge of the sea and a modest collection of fishing

Gita Vasudevan

equipment. There is nothing else we have in this world," Xavier Culas, a local fisherman and an activist from Marianad, a little fishing village near Thiruvananthapuram, says. "The *kattumaran* is a raft made from logs of lightwood. Traditionally, it is propelled by a triangular cotton sail and paddles made from bamboo. The fishing gear is designed with an emphasis on specific mesh size, so that it catches the desired species alone and the adult fish only. Both are developed and utilised in such a way as to cause minimum damage to the environment and help in preserving fish stocks for the future."

The famed 'shore-seine' operation is the best example of the superior and environment-friendly skills of the artisan fishers from Kerala, says Robert P, who hails from the local fishing community but now runs a successful business venture in Valiathura: "From the beach, expert fishermen examine a shoal of fish migrating at a distance of say 2-3 km from the shore. They judge the type of fish in the shoal, the depth at which the fish are travelling, and at what speed. The seine net is then set from a boat and operated from the shore. This accumulated knowledge system of traditional fishing has stood the test of time for hundreds and thousands of years."

The educated among Valiathura's and Marianad's traditional fishers say that since the 1980s, fisheries in Kerala have been in sharp decline, and with it a way of life. Sitting inside his comfortable businessman's residence, Robert narrates the tragedy of Kerala's fisherfolk, who for centuries were the poor people, the pariahs, not allowed into schools, churches or temples until the arrival of the Portuguese. "The Portuguese, unlike the Syrian Orthodox Christians who had already been in Kerala for about 1,000 years, saw the fisherfolk as souls fit for conversion. And for the first time the fisherfolk got some status. They had a church and with it an organised social life. At a price though. The Church came to own the land on which their huts stood and extracted 10% of their catch as well — hence the large churches and the small houses," Robert says.

Tired after a long night's fishing, the men would come back with their catch at dawn hoping to hand it over to their womenfolk for sale or for a meal. But, waiting for them on the shore were the merchants and the loan sharks. "They would buy the fish at rock-bottom prices," says Robert. "The same merchants would often lend the money the fishers needed to replace craft or nets at an interest rate of 10% a day. If the fisher could not pay back the loan he would have to hand over part or all of his catch to the merchant or moneylender. That's how so many fishers got trapped in poverty."

Held in the grip of an unholy trinity of merchants, moneylenders and priests, the fisherfolk had little hope of improving their lives. It was only in the 1960s, with the arrival of radical nuns and priests influenced by Marxism and liberation theology, that life really began to change. These radicals in robes set up a cooperative fishing village and called it Marianad, providing a model that has now been adopted by fishing communities all along Kerala's coast. "The emphasis was on cooperative marketing of fish," Xavier says while explaining the success of Marianad. "Instead of handing over the catch to the merchant, the fishermen gave it to the cooperative to sell at the highest price possible. And instead of borrowing from moneylenders and merchants, they started borrowing from the cooperative which could get low-interest loans from banks."

Marianad was hailed as a triumph of the Kerala fishermen's cooperative and conservation spirit in the '70s and '80s. But by the mid-1980s, the Government of India began to support the motorisation of traditional fishing craft. As a result, a large number of fishermen became dependent on multinational companies whose high prices for their machines and spare parts soon led them into a debt trap. Moreover, kerosene and diesel were in short supply and thus expensive. In recent decades, the state government's beach tourism and port development policies have further added to the fishers' woes. The latest case of Vizhinjam, near the famous Kovalam beach, is a case that begs attention, Vijayan says.

Vizhinjam is 16 km from Thiruvananthapuram and a natural port located close to the international shipping route. The government has plans to reclaim around 2.5 sq km (600-700 acres) of the sea and build two breakwaters of 1.5 km and 6 km, with a harbour basin and wharfs, in the hope that at least 50% of the nearly 20,000 ships that annually pass through the Suez Canal will anchor here. A few years from now, Vizhinjam port would compete with other important ports like Colombo, Singapore and Dubai to boost trade and commercial activity in Kerala. At the same time, arrangements are in place for start of work on a multi-purpose 150-metre reef off the coast of Kovalam in an attempt to attract surfers to the area and turn Kovalam into a year-round tourism destination.

The local fishers of Vizhinjam are urging the authorities to halt these projects and are demanding a careful assessment of potential sea erosion. Fishermen's access to local beaches has already been curtailed by tourism activity. They fear that the new projects will further restrict their fishing space, threatening the livelihoods of up to 2,000 fishermen and their families and forcing some to relocate. Interestingly, the proposed Kovalam reef is funded by central government tsunami rehabilitation funds. "This is a clear case of tsunami funds being used for the benefit of the tourism lobby," Kerala Swathanthra Malsya Thozhilali Federation (KSMTF) president T Peter says. "We are raising fundamental

questions here: who wants the reef, and why? And are there any benefits for the fishing community?"

Ironically, Kovalam has been selected by Kerala Tourism as a site for its 'responsible tourism' initiative, though it has failed to ensure the participatory planning processes that are meant to ensure accountability and transparency in such projects. In a joint statement, KSMTF along with Kerala Tourism Watch, Kerala United Fisheries Forum and Kabani have demanded a public hearing. "Any public hearing should be an open consultation in which community leaders and their representatives have the opportunity to make submissions, ask questions or register objections to the proposed funds diversion," it said while referring to past public hearings where "manipulative official reporting" led to further litigation and protests by local communities.

The coalition has also called for the establishment of a tribunal to discuss the wider issue of diversion of central government tsunami rehabilitation funds to tourism in Kerala. The Kerala government has reportedly allocated Rs 850 million (almost £10 million) of central government Tsunami Rehabilitation Programme money to Kerala Tourism, to fund 20 tourism projects. In direct contravention of central government guidelines, the projects cover areas that were not damaged by the tsunami; they were actually devised before the tsunami but were not implemented because of lack of funding, Peter alleges.

In a further irony, Kerala Tourism has re-labelled the projects 'coastal protection' in an attempt to quell public outrage. But they consist almost entirely of beach beautification measures to attract tourists. Toilet blocks, walkways, kiosks, lamp posts, plumbing, electrical works, an amphitheatre, and flower pots are among the items to be funded.

In a press statement, Tricia Barnett of Tourism Concern says: "Kerala's tourism industry must not be developed at the expense of the rights and entitlements of tsunami-affected (fishing) communities. To use funds meant for their rehabilitation for tourism projects that will bring them no benefits and undermine coastal protection measures will make a mockery of the huge donor support provided by individuals and governments across the world in the aftermath of this unprecedented disaster."

Meanwhile, other areas remain in urgent need of coastal protection and infrastructural repair. This includes the peninsulas of Allapad and Arattupuzha, which witnessed the greatest loss of life in Kerala during the tsunami as there was no bridge linking them to the mainland. "Following the tsunami, and after pressure from local residents, the government did begin building a bridge but work has since stopped. The bridge remains unfinished and the planned coastal protection measures are yet to be implemented. Local people feel vulnerable, stranded and angry," Tourism Concern points out in a press statement.

Closer home, Forum Kerala, a collective of civil society movements, people's groups and individuals has been for the past few years consistently opposing the state government's Special Tourism Zone (STZ) projects at major tourist destinations, cities, and along the coast, fearing "it will increase the pressure over natural and other resources such as land, water, forests… lead to environmental destruction, revenue losses and lack of real economic development of the state… cause a breakdown of governance systems, especially of panchayats, with the creation of enclaves, and lack of equal and non-exploitative employment opportunities for local communities in STZs".

Government and tourism industry sources dub the Forum "anti-tourism" and argue that Kerala currently has an upper hand in tourism and remains a much-sought-after tourist destination. "With 'responsible tourism', the environment and social concerns will be taken care of even while keeping the economy going," Kodiyeri Balakarishnan says.

Forum Kerala strongly opposes use of the 'responsible tourism' tag to market Kerala: "The Forum views it with concern that… issues such as the constitutional rights of panchayati raj institutions, Coastal Regulation Zone (CRZ) violations by hotels and resorts, backwater pollution by the houseboats and tourism industry, child abuse and child labour in service industries in the state and various other social issues have been completely ignored. Who is responsible for this damage? And for effectively addressing these problems?"

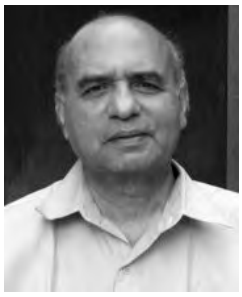
Vijayan says the main issue in Kerala today is managing resources properly, followed by improving the basic living conditions of people and protecting their livelihood options. "The current policies in the tourism sector are set to promote the interests of capital and an elite minority that benefits from the global neo-liberal economic order. There are numerous examples before us to corroborate this position. The central government seems to have realised its folly, but we have reason to believe the state government is yet to learn to stand up to the sheer economic might and political clout of the tourism lobby in Kerala," he concludes.

Koyilparambil says the fishers are not asking for any favours from the tourism department or the tourism industry. "The demands we raise are the legitimate rights of every citizen in the state. Like the demand elsewhere of 'farms for farmers', we demand the 'sea (and backwaters) for our fishers'. Fishing is a traditional right and you cannot have tourism and trawlers and ports encroaching on it."

Fish wars in the Global South

Ten thousand tonnes of fish that would have been available for the common man are converted into fish meal to produce 1,000 tonnes of shrimp that only the rich can afford to buy, says Thomas Kocherry, who has, for decades, been organising coastal communities around the right to fish. In this interview he explains the challenges faced by 13 million fisher people in India

ANOSH MALEKAR



Thomas Kocherry was born in 1940 in Changanassery, an inland fishing community in Kerala. He studied chemistry and law at Kerala University. As a young man, he started working for Bangladeshi refugees and fisher communities, and went on to help found the Kerala Independent Fishworkers Federation and serve as chairperson of the National Fishworkers Forum from 1982 to 1996. He continues to mobilise fisher people to fight against destructive fishing and water pollution, organises coastal communities around the right to fish, and pushes for a stronger voice in Indian fishing policy.

Kocherry was general coordinator of the World Forum of Fisher Peoples and helped organise the World Summit for Sustainable Development. He is a co-convener of the National Alliance of People's Movements, a national network of community struggles in India. An ordained priest, he is also a member of the Congregation of the Most Holy Redeemer, a Roman Catholic congregation founded in 1732 to work among marginalised people in over 77 countries around the world.

Tom, as he is referred to in close circles, also teaches the theology and spirituality of people's movements at a number of seminaries across India and abroad.

In this interview to Infochange, Kocherry speaks at length about the challenges facing India's fisher people and their struggle since the 1970s.

What challenges do fisher people face today?

India's coastline stretches over roughly 7,500 km and is dotted with small villages inhabited by around 13 million traditional fisher people. Most of them live below the poverty line and are illiterate. They catch around 40 lakh tonnes of fish annually. The lives of these fisher people have been organically linked to the coast for centuries.

The aim of multinationals, and some rich local inhabitants, is to transform the coast into a money-making haven. In the name of Special Economic Zones (SEZs) and tourism development, more and more people are being displaced from the coast. And, in the midst of it all, there are natural disasters like tsunamis, cyclones, floods, etc.

The coast is also closely linked to inland waters, rivers, lakes and reservoirs, many of which are slowly drying up and becoming polluted. The condition of the fisher people is fast deteriorating. Catch per vessel is decreasing, and debt among fishermen is on the rise.

Is globalisation responsible for this?

Globalisation began with colonialism. In the 16th century, Europeans began to migrate and conquer other continents. The sword and the cross went together. The conquerors forcibly enslaved and converted natives and indigenous peoples. They took their lands, exploited the resources, and accumulated wealth. In the 20th century, the world witnessed a number of people's uprisings for political freedom. But economic exploitation has continued through multinational and transnational corporations. The rich and the ruling classes in the newly-freed Third World generally side with the foreign corporations against the interests of the common people. As a result, according to a UN study, today, a 20% minority in the northern hemisphere has cornered or controls 82.7% of the world's gross national product, 81.2% of world trade, 94.6% of all commercial lending, 80.5% of all domestic investment, 80.6% of all domestic savings, and 94.0% of all research and development.

It is in this context that we need to understand 'globalisation'. Those who have more are bound to get more. This means more accumulation and centralisation. The North's 20% people are better placed to take away even the 10-20% of wealth left in the hands of 80% of the people in the South.

But how has globalisation impacted fisheries in particular?

The first surge of fishing vessels came during the Industrial Revolution. It tapered off during the two World Wars, but began again in the 1950s through the 1970s. The world's fishing fleet doubled between 1970 and 1990. In the 1990s, fishing reached the point of diminishing returns. Indeed,

many fish populations have fallen to levels from which they can no longer recover. There are simply too many boats catching too many fish.

More than 100 million people in developing countries in the South are dependent on fisheries for their livelihood. For them, fishing is a way of life, not a source of profit. The sea is like a mother. Traditionally, small-scale or artisanal fishers provided fish for local consumption; but as fish became scarce and its value increased, people found they could no longer afford it.

Most governments, particularly those of the North, promote unsustainable fishing. According to the Food and Agriculture Organisation (FAO) of the United Nations (UN), every year governments worldwide pay US$116 billion to catch just $70 billion worth of fish. Developed nations, which have over-fished their own waters, have headed into the waters of developing nations. The European Union (EU) has around 40% more vessels than is necessary to catch fish on a sustainable basis.

Volatile 'fish wars' are commonplace. There are over 1 million large industrial fleets in the world that have depleted the world's oceans. These industrial fleets have organic links with the coastal mono shrimp culture. Fresh fish caught by industrial vessels is converted into fish meal for the production of shrimp. Ten thousand tonnes of fish that would have been available for the common man are converted into fish meal to produce 1,000 tonnes of shrimp that only the rich can afford to buy.

What is the impact on traditional fisher communities in India?

With its long coastline and innumerable rivers and lakes, India has one of the largest populations of fisher people in the world. Estimates vary between 10 and 13 million, of which one-third constitute marine fisher folk and two-thirds depend on fishing in inland waters.

The Indian fishing community covers a wide spectrum — tribal, dalit, Hindu, Christian and Muslim. They are generally extremely poor and have low social status and little political power. Each community is socially stratified, particularly on a class (rather than caste) basis. Local merchants often hold positions of power, as moneylenders.

Each religious group generally lives in a compact geographical area, though there are a few exceptions where Christians, Muslims and Hindus live together. Traditionally, they have lived as enclosed societies gathered around the church, mosque or temple which gives them their identity.

Incidents of communal clashes over fishing rights are rare. Because there are usually clearly demarcated areas and times for fishing and landing among the various communities, fishing populations have worked together in harmony.

Over the centuries, the fisher people have amassed a vast fund of knowledge about the resources in their immediate vicinity, and have developed a variety of technologies tailored to specific ecological niches along the coast. This accounts for the immense diversity of artisanal fishing techniques in the country, the hallmark of which has been their ecological sophistication rather than an orientation towards quick monetary gain.

In the south of India, 40% of fishing crafts are still the traditional catamaran — a canoe built out of three logs of lightweight albyzzia wood, bound together by rope.

When did the process of modernisation begin?

The modernisation of Indian fisheries started in the 1950s with a Norwegian-financed project involving the introduction of mechanised boats and renovation of a port in Kerala. The aim was to help traditional fishermen increase their production, but in reality the project brought them nothing but trouble as they did not have the necessary capital to invest in the more expensive gear and fuel needed for mechanised boats. Nor did they have access to markets to sell their larger catches. This was only the beginning of their woes.

In the following decades, outsiders started coming in with trawlers that scrape the bottom of the sea and deplete fish stocks by destroying larvae and young fish. The economy underwent a marked technological polarisation, with traditional fisher people rapidly losing their hold on a livelihood that had kept them going for generations. By 1975, Kerala alone had 3,500 mechanised trawlers. In 1997, their number across India was around 23,000.

But it was the arrival of purseiners (mechanised trawlers that encircle the fish with a long net and draw the bottom closed to capture them) in the 1970s and 1980s that caused near panic among the fish workers and led to violent clashes. The trawlers cut the nets and damaged the boats of smaller fishermen. The government of Kerala had set apart inshore waters up to a depth of 20 metres exclusively for traditional fish workers, but the trawlers did not keep to the rules because prawns are normally found within these waters.

In recent years, the greatest predators of all have been industrial fishing vessels whose trade is sustained largely by demand in the United States and Europe for fish meal for farm animal feed and pet foods. Jobs provided by industrial fishing are few, and working conditions rarely comply with the labour standards set by the International Labour Organisation. Even if these huge vessels were to be prevented from encroaching on coastal waters, the ecological damage caused by deep sea industrial fishing would still mean the destruction of species essential to coastal fishing.

In the mid-1980s, the Government of India began to

support the motorisation of traditional fishing craft. By 1993, however, only around 13% of vessels had been fitted with engines, and the expected massive transformation from artisanal crafts to boat fishing did not take place. Fishermen who fitted outboard motors to their crafts became dependent on multinational companies whose high prices for their machines and spare parts soon led those with little capital into debt. Moreover, kerosene and diesel were in short supply, therefore expensive.

In the landmark judgment of June 23, 1993, the Supreme Court of India summed up the situation: "Over the years, while the population of the traditional fishermen has increased by more than 20.8%, the average production of each fisherman declined by more than half, which resulted in 98.5% of the fishermen population descending below the poverty line."

What about inland fishing?

The plight of inland fish workers as a result of four decades of 'development' is probably even worse than that of marine-based fishermen. Water pollution, construction of huge dams, deforestation due to industrialisation and other encroachments, siltation, and land reclamation have all drastically reduced fish availability.

In recent years, these problems have been compounded by the government's push for industrial fishing and aquaculture, involving large tracts of land being taken over for prawn farming by national elites and multinational investors. The prawns are destined for the apparently insatiable markets of the United States and Europe. Usually, after about 10 years, productivity declines and disease sets in among the prawns. So the aquaculturists move on, taking over more land and leaving saline, toxic wastelands in their wake.

My contention is that an alternative already exists in the form of traditional small-scale coastal aquaculture and coastal fishing operations that are presently being carried out by millions of fisher folk in Asia. These coastal communities that are facing the threat of displacement and loss of livelihood are the human foundation on which an alternative should be built. And the numerous low-lying inter-tidal coastal zones and inshore seas are the ecosystem foundations on which to build this alternative.

An important aspect of the alternative is to support the cause of small-scale coastal marine fishery and actively promote techniques that do not distort ecosystem dynamics. In a sense, it is like going back to the future. There is a need to harmonise strategies for food production with nature's principles of ecosystem dynamics. This is the only sustainable manner in which we can maximise the benefits derived from it, with the least possible negative social and ecological impact.

Could you recount the struggle of fishing communities in India?

From the mid-'70s, there have been spontaneous outbursts of violence in different parts of the country between small trawlers and the catamaran fishermen. The first big clash occurred near Chennai on the east coast of India, in May 1976, resulting in loss of human life. Tamil Nadu was under President's Rule then and no serious action was taken despite the fact that the state government, as early as 1964, had issued an order granting artisanal fishermen exclusive fishing rights within three miles of the coast.

But, although buoys were placed at sea to demarcate fishing areas they could hardly prevent trawlers in pursuit of shrimp coming closer to the shore. Peeved at official inaction, traditional fishermen took the law into their own hands and started burning trawlers. The bloodiest revolt was witnessed in Tuticorin where, by the end of 1976, fishermen had destroyed 11 trawlers, risking 16 lives in the process.

Simultaneous protests broke out in the former Portuguese colony of Goa on the west coast, where rampon nets are used for fishing. These eco-friendly nets give a good catch and have traditionally provided hundreds of fisherfolk along Goa's 150 km coastline with a good source of income.

In 1977, no longer able to accept the way the catch was dwindling, rampon fisherman Piedade Fernandes of Velsao in south Goa, declared: "Velsao is a quiet bay. The entire population of 3,750 people is engaged in traditional fishing. There are 28 shore-seines here and around 145 smaller canoes for gill net fishing. First, the Birla-owned Zuari Agro Chemicals Ltd ejected its effluents into our bay, polluting the waters, now the trawlers are destroying our nets and taking away the fish. We have to hit back."

The otherwise-fun-loving Goans suddenly woke up to the fact that they were being colonised once again, this time by business interests targeting their shores. New chemical industries were depositing poisonous effluents in the sea; the tourism industry was privatising beaches for foreign tourists; and, worst of all, newly-introduced purseiners and trawlers were depleting their fish stocks.

Goans were angered not only by rising fish prices but by the fact that certain varieties of fish were no longer available. 'Goan fish for the Goans', 'Save Goa, Save Our Beaches': these were the dominant slogans as hundreds of rampon fishermen took to the streets and, for over a year, sustained a struggle demanding marine fishing regulation.

Mathany Saldanha, a young schoolteacher, took the lead in an organisation called Goenchea Ramponkarancho Ekvott (GRE). In June 1978, Mathany and Xavier Pinto, an enthusiastic young Redemptionist priest, began travelling along the coast making contact with activists, citizens' groups and NGOs involved with the fishing community in

the south. They met large groups of women net-weavers in Kanyakumari who spoke about their apprehensions that machine-made nets were entering the market and would eventually render them jobless.

They invited all these groups to a meeting in Chennai where around 30 representatives from 13 fishing organisations decided to set up a national organisation and make a representation to the prime minister. Thus, the National Forum for Catamaran and Country Boat Fishermen's Rights and Marine Wealth came into being and held a nationwide action programme culminating in New Delhi on July 15, 1978.

Although the Goa struggle made national news, most members of parliament in Delhi knew nothing about coastal communities. The National Forum received some support from leftist groups and, on July 27, a delegation met Prime Minister Morarji Desai and presented a memorandum with the following demands: introduce a marine fishing regulation bill that would reserve 20 km of coastal waters for the artisanal sector; fix a minimum mesh size for different fishing gear; restrict the number of trawlers and purseiners; introduce regulations to prevent pollution of coastal waters; and initiate fishermen's development banks.

In order to control and study the violence at sea, the government appointed the Majumdar Committee that submitted its report in 1978. The main recommendation was the creation of a consolidated legislation, called the Marine Fishing Regulation, to end the dichotomy between territorial waters (22 km from the coast) and national waters. But, instead of it being discussed in Parliament, the draft bill was sent to the state governments where it got stuck.

The beginnings of local organisation started in Anjengo, Trivandrum, in 1978, where the fishermen came together under the banner of the Anjengo Boat Workers Union (ABWU) to expose corruption in the Anjengo Refinance Scheme. This was a scheme initiated during the Emergency to assist fishermen in acquiring mechanised boats for which they received soft loans. But the boats were of bad quality and the fishermen could not repay their loans. As a result, many boats were confiscated.

Supported by a group of Redemptionist priests and Medical Mission sisters who lived in the village, ABWU members went on a fast in front of the Kerala secretariat. As a result, the government was forced to return the boats and order an inquiry into corruption in the scheme.

Subsequently, along with the parish priest and local NGOs, the Trivandrum District Fishworkers Union was formed. With the enthusiasm generated, people felt empowered to take up other issues as well. Women fish workers demanded that the exorbitant tax in Chirayinkil market be reduced. In Kanyakumari, thousands of women took to the streets when a merchant who dealt with the sale of nylon yarn imported a net-making machine. This, again, was a three-month struggle.

The National Forum, still a loosely-knit body, at its second general body meeting in Bangalore in August 1979, came up with the following nine common demands: central marine regulation reserving 20 km of coastal seas for artisanal fisherfolk; a ban on trawling between 6 pm and 6 am (night trawling); diverting fund allocations for trawling and purseining to the artisanal sector; nationalising deep-sea fishing and shrimp exports; preventing the pollution of common waterbodies; prohibiting the removal of sand from beaches; stopping licences to mechanised net-making machines; organising pisciculture to benefit traditional fishing communities; ending the eviction of traditional fishing communities in favour of tourism.

In November 1979, fishermen's organisations in different states initiated fasts and carried out public action to pressurise the government into enacting the marine bill. In Goa, a fishermen's relay fasted for 367 days. In Kerala there were relay fasts in Trivandrum, Quilon and Alleppey. Picketing action took place in Tamil Nadu, Maharashtra and Karnataka.

In 1980, the National Forum presented the central ministry of agriculture with a model copy of the marine law which the minister agreed to forward to the states. From 1981 onwards, a few state governments began to formulate and pass a Marine Regulation Act but these were instantly opposed by the boat-owners associations. Thus began the long battle between the state and the fish workers.

1981 also saw a series of protests in Trivandrum, ignited by the fact that the government issued a ban on trawling during June, July and August, but, within three days, had exempted Neendakara, a major harbour in Kerala at the confluence of the Arabian Sea and Ashtamudi lake, because of pressure from boat-owners.

Following an 11-day hunger strike and a series of protests, the government agreed to institute the Babu Paul Committee to consider the "scientific and technological issues and assess the socio-economic consequences of the fishery management demands of the fishermen".

The agitation was originally led by the Trivandrum District Fishworkers Union, that later became the Kerala Swathanthra Malsya Thozhilali Federation (KSMTF) led by a fisherman, Joyachen Antony. The KSMTF started a series of agitations for a seasonal ban on trawlers during the monsoons. Today, this seasonal ban has been legislated all along the Indian coast.

Tamil Nadu also witnessed a series of protests on the issue. Unlike in Kerala, it was the local party organisations of the DMK, the AIDMK and the Janata Party that came together under one banner to lead the struggle.

In 1983, the National Forum was rechristened National Fishermen's Forum (NFF) and worked to finalise a national manifesto. On June 15, 1985, the NFF observed National Demands Day.

When did the march to Kanyakumari take place?

Members of the fishing community commenced a march from Kolkata on the east coast of India on April 2, 1989, and from Mumbai on the west coast, on April 3, 1989. The slogan was 'Protect Waters, Protect Life'. The core team of activists travelled in vans alighting at fishing villages to talk and walk with people *en route* to St Anthony's High School in Kanyakumari on May 1. At 3 pm that day, the marchers assembled at the venue and launched a procession towards the seashore. They waved blue flags and banners and shouted slogans. They were greeted by fishermen with banners in boats on the sea. The most spectacular part was the massive participation of women who constituted about three-quarters of the crowd that stood against the backdrop of the Vivekananda memorial.

The march to Kanyakumari was supposed to represent the people's desire to resist dominant development concepts. It was also meant to be a call to start a people's movement. However, the people's voice was drowned in police firing; several people were injured in the skirmish that ensued.

It was after this that the struggle was taken up in Umbergaon. Umbergaon was once a quiet fishing village on the southernmost tip of Gujarat. It is now known to social activists all over India as the home of Lt Col Pratap Save, a martyr in the struggle for alternative, more humane, development.

After retiring in 1995, Save settled in his hometown and was looking forward to a quiet life working the family land. In 1999, word spread about the Gujarat government's plans to set up the Maroli-Umbergaon port. Save was among those who vehemently opposed the proposed port and helped form and lead the Kinara Bachao Sangharsh Samiti (Save the Coast Action Committee). The Samiti organised non-violent protests to prevent survey work from being conducted at the site.

In April 2000, there was a sudden crackdown by the state police and several activists of the Samiti, including Save, were taken into police custody. Save's family and fellow activists allege that the police beat him up, causing severe brain injuries that killed him a few days later. The police claim he suffered a cerebral haemorrhage out of natural causes.

Friends and colleagues have filed criminal complaints and petitions in the courts alleging that Save was murdered in cold blood. But justice is still awaited. Although the Gujarat government has instituted a judicial inquiry into Save's death, the report is not yet out.

Save's son, Nikhilesh, maintains his father was murdered at the behest of those who had a vested interest in the port's development. Save's martyrdom did serve a purpose: the government of Gujarat dropped its plans to construct the port.

When was a national policy formulated?

After the adoption of a new economic policy, the Indian government announced a Deep Sea Fishing Policy in March 1991. The policy allowed foreign fishing vessels into Indian waters beyond 12 nautical miles (18 km) of the coast. Further, it permitted duty-free import of vessels under joint ventures, and the sale of diesel at international prices. Also, vessels could transfer their catch on the high seas and carry away fish from Indian waters.

The Indian government had plans of importing 2,660 foreign fishing vessels. At the time this policy was introduced, there were around 35,000 small mechanised boats and about 2 million artisanal crafts with a wide range of gear suited to tropical waters.

The NFF presented a paper opposing licences for joint venture fishing at a national workshop organised by the government in Kochi, in 1992, to arrive at a consensus on a proposed National Fisheries Policy. By this time, fisher people's groups from Maharashtra and West Bengal were actively opposing the intrusion of deep sea vessels into coastal waters.

By the end of 1992, the Maharashtra Machhimar Krithi Samiti stated that the NFF should unequivocally demand a ban on deep sea fishing and begin efforts to reserve this sector for traditional fishing communities. Just as there are regulations on the use of agricultural land, it said, the coastal belt should be reserved only for fishing communities. No foreign and multinational intervention should be permitted in this area of 'primary production'.

In September 1993, the NFF organised a National Seminar on Deep Sea Fishing where the problems of deep sea fishing were analysed. The report read: "In 1992, India's fisher people caught 23 lakh tonnes of fish; 98% of this comes from territorial waters. The exploitation of territorial waters has reached a saturation point… Despite such a grave situation, the Government of India feels that 15 lakh tonnes of fish can further be caught from the deep sea. Therefore, the Government of India appointed a technology mission to look into the matter. The mission recommended 2,600 deep sea fishing vessels in the range of 12-40 metres and recommended the promotion of joint ventures. A number of big industrial houses have queued up to enter deep sea fishing with foreign equity participation. Most of these are 100% export-oriented units. The past experiences of deep sea fishing were not taken into account. All the deep sea fishing vessels including the public sector ones are being

operated from Visakhapatnam. Out of 148 vessels, only 20 are running at a profit. In spite of this, the food processing ministry has already issued 39 licences to Indian entrepreneurs and three joint ventures — Japanese, American and Mexican. It is interesting to note that the Mexican vessels have six purseines that are each 15 km long. These are going to be a big threat to the artisanal fisher people and the small mechanised sector. This conflict has already appeared in West Bengal between the gill-netters and the 148 deep sea fishing vessels. In spite of continuous requests, the central government has refused to do anything to resolve the crisis. Despite several declarations on its intention to enact deep sea fishing regulations, the food processing ministry has not done anything concrete in this regard."

Of course, there were dissenters at the seminar who were of the opinion that, rather than oppose joint ventures, the NFF should try to fight for the rights of workers on joint venture vessels, thereby protecting the interests of traditional fish workers.

A series of state-level seminars were held to discuss these issues at greater length, bringing together the small mechanised sector and the artisanal sector to work out a strategy to face the onslaught. Finally, it was decided to organise an All-India Fisheries Bandh in the first week of February 1994. The struggle against joint ventures in deep sea fishing had just begun. The strike on February 4 was a huge success, serving as an example of united action within the traditional and mechanised sectors, merchants and exporters. Gujarat led the struggle, supported by no less than the Gujarat fisheries department. Wholesale fish merchants in Howrah and Mumbai too actively participated. Leaders from various states went to Delhi and staged a *dharna* before the Ministry of Food Processing.

The only response from the ministry was the appointment of the Dr D Sudarshan Committee to study conflicts between the traditional sector and deep sea vessels. As this was seen merely as a means to postpone a decision, the NFF went ahead with its plans that included an indefinite hunger strike by me in Porbunder, on May 2, 1995.

What about the Murari Committee? What were its recommendations?

The P Murari Committee, constituted by the central government in 1995 to look into issues concerning deep sea fishing in Indian waters, was a 41-member panel comprising a diverse group of bureaucrats, experts, politicians and activists. It was expanded to include 16 members of parliament and six representatives from the fisheries sector. I was nominated as one of the members of this expanded committee that made 21 recommendations. The important ones are:

• All permits issued for fishing by joint ventures/charter/lease/test should immediately be cancelled subject to legal processes as may be required.

• No renewal/extension of licences/permits should be issued in future for fishing by joint ventures/charter/lease/test fishing vessels.

• All licences/permits for fishing should be made public and documents and copies made available for inspection at the office of the registered authority.

• Areas already being exploited by fishermen operating traditional crafts or mechanised vessels under 20 metres in size, or areas which may be exploited in the medium-term, should not be made accessible to vessels above 20 metres in length, except for Indian-owned vessels currently in operation that may be given three years to move out.

• Parliament should enact deep sea fishing regulations after consulting the fishing community.

• Coastguards should be strengthened, expanded and technically upgraded with state-of-the-art systems of navigation, surveillance and weaponry, and properly tasked to prevent poaching by foreign vessels and the observance of zone restrictions.

• All types of marine fisheries should be put under one ministry.

• Fishermen and women need to be trained in handling new equipment, larger vessels and new fishing techniques besides fish-handling and processing. The government should give this priority under a new deep sea fishing policy.

• The new policy should be reviewed/evaluated from time to time (three to five years).

• Government should take decisions on the recommendations of the committee within six months.

Have any of these recommendations been implemented?

The recommendations of the high-powered Murari Committee constituted the first victory for the fisher people against globalisation. However, the government has made no move to implement them though it was expected to arrive at a decision within six months. Forty foreign vessels continue to operate within Indian waters. Apparently, they have life-long licences although no such facility exists for Indian fishermen who are forced to renew their licences every year. Meanwhile, the struggle continues…

Social and communal tensions along the Kerala coast

For centuries, Kerala's fishing communities shared the ocean's resources and maintained close ties despite cultural and religious differences. In recent years, subsidies, global trade, and competition from international fishing conglomerates have seen a sharp decline in profits. The resultant impoverishment, anger and discontent have opened the doors to communalism and violence

N P CHEKKUTTY

THE SOUTHWESTERN COAST OF INDIA, consisting mainly of Kerala and south Konkan, is one of the richest in the country in terms of biodiversity, abundance of fish stocks, cultural diversity of fishing communities, and historical traditions. With a recorded history of fishing life and trade relations with far-flung countries like ancient Greece, Rome and the Arabs going back almost 2,000 years, life in this coastal belt has been comparatively friction-free and prosperous. There was abundant trade in spices and other valuables through major ports like Panthalayani and Kodungallur — known as Fandalini and Muziris in Arab and Roman texts — and the sea has been bountiful. The life of the coastal people was comfortable and peaceful, as they devised their own traditional methods of sorting out differences, methods that have remained in place for centuries.

But all this has changed. In the past four decades there have been violent clashes that have split the fishing community vertically, along communal lines. Such incidents have become regular in recent years, making it necessary to understand the socio-economic factors behind them.

Kerala is one of India's nine maritime states, and it is also the largest fish-producing state in the country. It contributes more than 30% of India's total marine fish production and over 36% of marine exports. Kerala enjoys a long and unbroken coastline that extends for 590 km; nine of its 14 districts have the Arabian Sea as their western border.

Kerala has an economic zone of 36,000 sq km of sea that is rich in diversity; over 100 varieties of fish are found here. According to a 1976 estimate, the fishery resource potential of the continental shelf of Kerala is around 8 lakh tonnes a year, of which 4 lakh tonnes is considered to be from the inshore sea area of 0-50 m depth. In 1991, the working group on resources, constituted by the Government of India, estimated Kerala's marine potential at around 5.70 lakh tonnes per annum.

The abundance and diversity of fish resources in Kerala's inshore sea is the result of unique geographical and oceanographic features. These shores lie 20 degrees north of the equator, with relatively warm and stable climatic conditions round the year. Besides, the Arabian Sea estuaries are nourished by 41 rivers originating in the Western Ghats; in fact, a river joins the sea at every 15 km, on an average, providing fresh water and the right mix of salt and nutrients for all forms of marine life to flourish. Sandy and muddy sub-strata, large coral reefs, rich benthic vegetation and protective coastal plants like mangroves are other important factors that aid biodiversity. The two monsoon cycles, occurring every year, enrich the sea with oxygen and
fresh water.

According to recent figures, more than 1.5 million people depend on fisheries for their livelihood. Official figures state that there are around 150,000 active fishermen along the Kerala coast, working both in the traditional artisanal sector as well as in the mechanised sector.

Till 1989-90, fish catches were abundant, reaching almost 6.5 lakh tonnes. Then there was a steady drop. In 1991, catches dropped to 5.64 lakh tonnes, and the next year, 5.61 lakh tonnes. In the past one decade there has been a fall in marine catch, putting a lot of pressure on Kerala's fishing population. This is one of the main reasons behind the growing social strife in coastal regions. As pressure on marine resources mounts, so too have social tensions in Kerala's coastal villages.

Traditionally, fishing communities maintained their social and economic ties on the basis of common property resources. They developed a number of social institutions that effectively oversaw disputes. These institutions, which continued to flourish for generations, have been under increasing pressure in recent times, mainly because of social and economic changes in the post-Independence years.

Two big changes are the advent of mechanised fishing and the pressures of economic liberalisation and globalisation. Traditional skills ruled fishing operations till the late-1960s. These artisans had developed their own skills based on rural technology. Historians say that this traditional knowledge system goes back to early historical times in south India, indicated in the rich Sangam literary texts that belong to the period between the 3rd century BC and the 3rd century AD. According to scholars, the southern region — known

generally as Tamilakam, which included almost the entire region south of the Deccan — was divided into five geographical segments. The people who inhabited the coasts, known as Neithal, were described as Meenavar or Paravar in Sangam literature. The Sangam texts refer to a variety of fishing operations and also mention fish like *ayala* (salmon) and *sraku* (shark), still popular in the region. They speak of *marakkalam*, a wooden vessel that floats on the water. Those who operated the *marakkalams* later came to be known as Marakkars, a seafaring community in the south.

Traditional Hindu fisherfolk are divided into 12 sub-castes on the southwestern coast, prominent among them being the Mokayas, Mukkuvas, Valers, Nulayars, Arayas and Mokaveeras. For administrative purposes, the groups were clubbed as one — the Dheevaras — through a 1961 government order giving them other backward classes (OBC) status because of their social and educational backwardness. These communities were ruled and controlled by the *sthanis* (seniors) or *kadakkoties* (sea-courts) of the respective area, which obtained *theetturams*, or decrees, from the local rulers; they had *de facto* control over the social and economic life of the people. These systems were in force till the end of the colonial administration that had accepted the *kadakkoties*, or sea-courts, as a legitimate quasi-judicial authority in matters relating to seafaring activities.

Though these communities keep their separate identities and have separate deities, in recent years there has been visible communal consolidation among them as a result of the spread of communal and identity politics along the coastal belt. Sociologists point out that in many places the mother goddess, Kurumba Bhagavathy, has been replaced by new deities like Vettekkorumakan, indicating a shift from a matrilinear to a patrilinear society.

The present demographic patterns among fishing communities in the south of India have remained unchanged for years: Muslims and Christians have been part of coastal society since the advent of these religions in the region. The demographic strength of both these communities is almost equal, with 27% of the population being backward caste Hindus, 30% Muslims, and 37% Catholic Christians, mainly Latin Catholics who are confined to southern parts of Kerala.

Many Hindu temples owned by the Mokayas had established customs like special *avakasams* or rights for Muslim families. For example, a Mokaya temple in Vatakara observed a tradition in which Muslim families in the vicinity made ceremonial offerings of betel leaves and areca nuts at the annual festival.

Now, all that is history. A communal agenda is taking hold. All social occasions are now observed separately, with society and the public sphere consciously stratified and divided. Why this change towards

Gita Vasudevan

social mobilisation along communal lines?

The economics of impoverishment

As huge mechanised trawlers began to dominate the coastline from the mid-'60s, traditional fishermen, whose small vessels were unable to compete with the trawlers, were pushed to the sidelines. The seeds of discontent among the coastal people were sown by this shift in technology, with no proper assessment of the impact of these policies on the poor. A new class of entrepreneur — the moneylender-cum-boat-owner — took economic control of the beaches, and tensions began to mount. There were clashes everywhere between the new class of mechanised boat workers and the traditional fish workers. Later, as the miseries of this impoverished class of people became more acute, the area became fertile ground for the spread of communal and divisive ideologies, with communal organisations playing on people's fears.

The economic relationship of various people employed in fishing activities, from boat-owner to worker to vendor, had been based on a system of sharing; all sections were entitled to a definite share in the proceeds, and everyone had a specific role in decision-making. For example, in a 12-man boat that is usually owned jointly by two or three people — most of them working as part of the crew — workers had the right to a one-third share in the proceeds.

The 1960s, however, saw the advent of an Indo-Norwegian project that emphasised capital-intensive fishing technology. The project, implemented on the southwestern and southeastern coasts, was a three-party agreement signed by the United Nations, Norway, and the Government of India. It was first implemented along the Travancore-Kochi coast during 1959-63, followed by the Karnataka and Tamil Nadu coasts in 1963-73.

The project was based on a model quite successful in Scandinavian fishing countries like Norway and Sweden. It promoted a western-style industrial fishery development strategy that focused on exports, and led to over-exploitation and speedy depletion of marine resources.

This soon resulted in the first series of physical clashes between the boat-workers and traditional fisherfolk, and organised violence became the norm in fishing villages. A senior activist with the Malsya Thozhilali Federation in Ernakulam recalls that the first clash was reported in the Mandapam-Tuticorin area of Tamil Nadu in the mid-'70s, when as many as 110 trawlers were set on fire and 16 fishermen killed. The violence spread to the Kerala beaches in the late-'70s, when protests were held against the impact of new economic policies being imposed on the fisheries sector. The protests were led by church leaders like Fr Paul Arakkal, who, in the 1980s, became one of the leading figures of the Kerala State Swathanthra Malsya Thozhilali Federation.

The shift in fishery policy was a conscious one: from the mid-'60s the government began emphasising the introduction of new technologies. State support and subsidies were chiefly made available for investment in mechanised boats and the latest fish processing technology, while support for traditional artisanal fisheries was practically withdrawn. The result was a massive increase in boat fleets operating with modern nets and gear. These fleets were so efficient they quickly monopolised most of the marine wealth, with no regard for species regeneration or environmental protection.

This policy had a number of long-term effects. First, over-exploitation led to a decline in marine wealth. This sharp and sudden drop was noticed as early as the 1970s. Up to the mid-'70s, there was an increase in fish landings; then a steady decline in prawn landings and fluctuations in overall fish catches. Artisanal fisherfolk experienced an almost 50% drop in productivity in the period 1969-70 to 1979-80. Their share in the total catch decreased sharply. In spite of the introduction of a trawling ban, in the mid-'80s, the over-fishing continued with new foreign trawlers entering Indian waters. By the end of 2000, the situation had become serious with a substantial drop in overall catch, indicating that fishing activities had far exceeded the maximum sustainable limit.

One new dimension is that boat-owners and artisanal fisherfolk — traditional rivals — have now joined forces to set up joint action councils to fight the entry of foreign operators into the fisheries sector and the import of fishery products envisaged as part of various international agreements. The latest and most important of these agreements is the Indo-ASEAN free trade agreement, signed in August 2009, which envisages the import of various fish items to India; this is expected to have an acute impact on local fisher people.

The second major impact of the new developments was irreparable ecological destruction. Species regeneration was seriously affected, showing a depletion of resources right from the mid-'70s. The Kerala government decided to introduce a trawling ban during the monsoons — the reproductive season — in 1981, but it had to revoke the order within three days under pressure from the mechanised boat lobby. With agitations turning violent, a 45-day fishing ban on trawlers was later introduced; it comes into force on June 15 every year.

The third impact was the pauperisation of traditional fishing communities. Fishermen today are not considered important stakeholders; many have been reduced to wage labourers. The common ownership pattern which once was the mainstay of life along the coast, has been replaced by a new class that includes powerful boat-owners-cum-moneylenders, trade unions, community organisations,

While the serious situation in the farm sector received the full attention of policymakers (thanks to a spate of farmer suicides) and the media, fisher people, who face a similar situation in coastal villages, are largely ignored. While the farmers had their influential political and trade organisations that kept their grievances on the national agenda, the fisherfolk had no such organised lobby and were trapped in the clutches of obscurantist and communal outfits

middlemen and traders, political parties, and communal organisations.

The transformation of the old social order based on common social ownership principles into a class-based exploitative economy in the short span of a few years has had a tremendous impact on the people. They were rendered jobless, their traditional craft made useless, and the sea, whose wealth was considered a common asset, was turned into raw material for private capitalist enterprise.

Dr K N Ganesh, who did a major study on the social and economic factors leading to communal tensions in Maradu, a coastal village in Kozhikode where a series of violent communal clashes took place, describes it as a state of total helplessness in the fishing villages, caused by intense competition, huge indebtedness and poverty and no effort on the part of the government or any other agency to help fisherfolk survive.

Many have left their homes looking for jobs in the Gulf, and an influx of their remittances soon added a new dimension to the existing social tensions. K V Devadas, who has observed the changing lives of fisher people in Madappally in north Malabar, asserts that while one section continued to live in abject poverty, a new class of new-rich came up among them. A visit to Maradu proves the point: the new houses built along the beach, mainly by Gulf returnees, are made of cement and concrete and have granite and marble flooring. Their neighbours, meanwhile, live in slum-like dwellings. The existence of abject poverty alongside a vulgar exhibition of wealth has been one of the major catalysts of communal tensions in many fishing villages, from Chombala in the north to Thaikal in central Kerala. It's the same story in the south, although the players and their communities differ.

Over the last four decades, the southwestern coast has witnessed a series of violent clashes. They can be divided into two types: those between the traditional fisherfolk and the new class of speedboat fishermen (quite common in the 1970s and 1980s), and those of a communal nature — between the Hindu fishing communities on one side and Muslims or Christians on the other. In the southern parts, it was between Christians and Muslims. This second type of confrontation became rampant mainly after the 1980s, although some flashpoints like Maradu have a history of occasional communal violence from the early-'60s.

At Naduvattom, near Maradu, incidents of a communal nature led to police firing in 1958; in Madappally, near Vatakara, clashes occurred among the fisherfolk over political disputes between the communists and the Congress Party, in the late-'60s; in Vatanappally, in Trissur, similar incidents were reported two decades ago. In Thaikal, near Cherthala in Alappuzha, clashes occurred between Hindu and Christian fishermen, resulting in five deaths in 2002; Vizhinjam and Poonthura in the south are well-known as sensitive areas with occasional outbursts between the different communities. Maradu witnessed two violent incidents that left over a dozen Hindus and Muslims dead. In Valiyathura, near Thiruvananthapuram, six people — all Muslim fisher people — were shot dead by police in 2009. Minor communal clashes are common throughout the region, resulting in loss of human life and property. According to police sources, there are dozens of sensitive pockets along the coast.

The seeds of a new social movement

In the hills, especially in districts like Wayanad, the past few years have witnessed an unprecedented decline in agricultural activities and a spate of farmer suicides. Recent studies by independent scholars as well as the official machinery have concluded that the decline in farm profitability and consequent debt trap posed by the import of cheap agricultural products, rise in input costs, and dependence on global market forces are the root causes of the farmers' misery. Most of the state's major agricultural products like coconut, spices and rubber are prone to international market price fluctuations and are dependent on them.

While the serious situation in the farm sector received the full attention of policymakers (thanks to a spate of farmer suicides) and the media, fisher people, who face a similar situation in coastal villages, are largely ignored. While the farmers had their influential political and trade organisations that kept their grievances on the national agenda, the fisherfolk had no such organised lobby and were trapped in the clutches of obscurantist and communal outfits, as seen in the coastal villages of Kerala in the past few decades. Instead of fighting a common enemy, the fisher people fought among themselves, leaving the wealth of the sea to be plundered by local middlemen and the global marine industry.

However, coastal social relations are now undergoing a transformation mainly due to the impact of globalisation policies.

The changes in economic and social relations within the fisheries sector were evident from the early days of globalisation, as the mechanised boat lobby and traditional fisherfolk began holding joint agitations to protect their rights. Take, for instance, the trawling ban. It was first enforced in Kerala and other southern states in 1988 when studies proved the depletion of fish resources owing to trawling by mechanised boats. Although there was stiff resistance from the mechanised boat segment in the initial days, in the past decade, a ban varying from 30 to 62 days has been imposed on them. Traditional fisherfolk in their small vessels are allowed to venture out to sea. State government figures show that the trawling ban did augment fish stocks. At the peak of heavy trawling through the years, from 1977 to 1986, annual average fish landings in Kerala declined to around 3.49 lakh tonnes. The ban was imposed in 1988; the figures for the period 1988 to 1997 show that fish landings increased to 4.58 lakh tonnes, and from 1998 to 2005 to 5.75 lakh tonnes.

But the gains from the increased fish wealth did not benefit the ordinary fisherfolk. Today, the fishing sector is dominated by huge vessels operated by Indian and foreign owners as part of new international agreements.

Fishing bans and rich-country subsidies in the fisheries sector are having a severe impact on the fisheries sector. Many small and medium export-processing firms in Kerala have been badly affected. This is the backdrop to the emerging unity among mechanised boat fishermen and traditional fisherfolk. In fact, the traditional sector is now almost extinct; its negligible catch caters exclusively to the local market. The mechanised segment provides fish products for the export-processing firms that operate in various parts of the state.

According to recent figures, there are roughly 4,300 mechanised fishing boats in Kerala while the number of inboard-engine-fitted canoes is only around 400. A recent report in *The Hindu* claimed that many boat-owners are in deep debt as catches in the past year have been lean. The Kerala State Fishing Boat Operators Association estimates that each operator has to spend Rs 2.5-3 lakh on annual maintenance. Painting alone costs between Rs 75,000-90,000. With new trade agreements covering marine resources, the financial stability of the local fisher people is under strain.

Then there is the investment needed to compete in the international market, according to agreements on sanitary and phyto-sanitary (SPS) conditions. SPS conditions have been harsh for small and medium exporters, with bans being imposed by rich countries like the European Union, Japan and the United States. The ban on shrimp from Bangladesh, Nile perch from Uganda and some shipments from India are recent examples, pointed out by the Kerala government's *Economic Review*.

According to a 2001 estimate, global subsidies in the fishing sector are as high as US$15 billion, most of which goes to fishermen in rich countries. In order to achieve safety standards in conformity with European Union norms, exporters will have to set up their own capital-intensive Hazard Analysis and Critical Control Points (HACCP) plants. The *Economic Review* points out that the installation cost of HACCP plants in India varies between Rs 10-25 million. The annual maintenance cost itself would be around Rs 2 million, increasing pre-export handling charges by an additional Rs 7-10 per kg of fish products. The government document says that the state will have to move towards international standards for product hygiene in order to retain its existing market share in the overseas market. Exporters involved in the marine sector claim that the cost of such factories is much higher; a number of exporting firms have faced ruin in recent years owing to rejection of shipments because of the strict standards set by importing countries.

The present situation calls for huge investments, even as the fisheries sector faces a major setback with falling prices, cost escalations, intense competition, and other problems. All this explains the high levels of anger.

The new scenario offers some hope for the future. Unlike in the past when a divisive and obscurantist ideology took control of the masses in fishing villages, the new situation has forced people to recognise external economic aggression and the need for a united front to face it. This united front transcends caste and communal divisions, based on a rational and realistic agenda. It could be the basis for a secular political movement in the coastal regions.

N P Chekkutty is a Kerala-based journalist. He is presently Executive Editor of Tejas*, a Malayalam daily. This article is based on a three-part series on the economic underpinnings of communal polarisation of Kerala's fisher community, researched as part of the Infochange Media Fellowships 2006*

Communities at the crossroads

The Koli fisher community and the Visvakarma Panchal artisans are amongst the earliest inhabitants of Mumbai. This article explores the contrasting impact of urbanisation, modernisation and globalisation on these two communities, with the Visvakarmas prospering and the Kolis increasingly facing loss of lands and livelihoods

SANJAY RANADE

THE STORY OF THE KOLIS and the Marathi-speaking Visśvakarma Panchals of Mumbai provides an interesting insight into the impact of urbanisation, modernisation and globalisation on centuries-old communities.

Accounts of the presence of the Koli community on the islands of Mumbai date back to the 12th century. The coast from Gujarat right down to the south of India was a traditional fishing area. Through the centuries, as part of their fishing activities, the Kolis moved up and down India's western coast. In their myths and traditions, they trace their history to the Ramayana, even calling Valmiki, its author, a Koli. Valmiki, the Kolis say, is their *adi purusha*, or 'first man'.

For a long time, before the first records of Koli settlements begin to appear, the Kolis' occupation of the islands of Mumbai was transitory as they halted between their journeys up north or down south. Their goddesses, like Harbadevi at Versova for instance, were clearly important deities in the 12th century.

The Kolis began to settle on the islands of Mumbai when, in the 12th century, the Salsette islands, or what are popularly called the Sashti islands, came under single rule and became a formal kingdom, Mahikavati or Mahimdesh.

Pratap Bimba, one of the Bimba kings of Champaner, marched into the region in 1138 CE. The area was then ruled by the Kolis and other tribal people. Pratap Bimba called a group of 66 *kulas*, or families belonging to different communities and occupations from Champaner, to build the new kingdom. Among these were the Visśvakarma Panchals.

The Visśvakarma Panchals comprise five artisan communities — Sonar or goldsmiths, Sutar or carpenters, Kasar or those

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working with copper, Lohar or blacksmith, and Silpakar or sculptors — collectively called Panchal. The Visśvakarma Panchal community, by virtue of its skills that were imperative to the building and establishment of towns, cities and business centres, and its organisational unity, successfully challenged the existing order of castes.

This grouping and regrouping happened through certain processes which also shaped the identity of the Kolis. The first is Sanskritisation, defined by M N Srinivas as a process by which "a 'low' Hindu caste, or tribal, or other group, changes its customs, ritual ideology and way of life in the direction of a high and frequently 'twice-born' caste". Thus, the Sonars now call themselves Daivadnya Brahmins, and the Twasta Kasars now call themselves Panchal Brahmins. This process of Sankritisation among the Visśvakarma Panchals in Mumbai has meant that of the five castes that comprised the community originally, only two are left to claim that identity — the Sutar and the Lohar. These identities have been further challenged because the government now recognises the Lohar as a nomadic tribe, whereas the Sutar come under the category of 'other backward classes'. Both categories get different opportunities for government jobs.

Meanwhile, modern construction processes have territorially marginalised the fifth caste, the Silpakar, who are without an occupation and concentrated in areas of Gujarat and Rajasthan.

The Kolis, on the other hand, had their own territories and considered themselves kings or landlords of these spaces in Mumbai. Early during the formation of the kingdom of Mahikavati there is record of at least one occasion when a Koli chief negotiated with the ruler and took for himself a high caste status in return for this favour. The Kolis' attitude to other castes coming into Mumbai has been one of benevolence — like a king towards his subjects. Very clearly, the Kolis considered themselves a high caste unto themselves. Among the Kolis, the Son Kolis view themselves as superior to other Koli sub-castes.

The Kolis were part of the reserved category of scheduled tribes, and many Kolis in the early-'50s and '60s got government jobs. Today, however, they have lost their scheduled tribe status in Mumbai following a court order.

Sanskritisation processes have changed the religiosity of the Kolis more dramatically. The goddess Mumbadevi, for instance, is no longer worshipped by the Kolis; she has been usurped and transformed into a form of Durga. The Varkari and Datta sects have found large numbers of followers among Mumbai's Kolis. These sects insist on abstaining from alcohol, meat and fish. Such abstinence in Hindu society is believed to lead to a higher social status and recognition within the community. The worship of Shiva too has been introduced with the very strict fasting that is done during the Shivaratri festival.

A second process that caused grouping and regrouping was migration. From their original base in Tamil Nadu, the Visśvakarma Panchals moved up the western coast along India's ancient and historic ports, right up to Gujarat, in the wake of urbanisation, the formation of cities, and development of trade. Many temples in Mumbai, including those of the Kolis, have been supervised and built by Visśvakarma Panchals. So too were the Shiva temples in Worli and Dharavi Koli settlements built in the early-1900s by Visśvakarma Panchals.

It was migration that led to the Visśvakarma Panchals moving into Mumbai along with the textile, engineering and automobile industries that came up in and around Mumbai. These required the traditional Sutâr and Lohâr to mix and match their knowledge of working with iron and wood. Bullock-cart making is one industry that brought the Visśvakarma Panchals prosperity in Bhiwandi and Kalyan. The skill of repairing looms likewise. More importantly, the idea of making dies from which jewellery could be moulded involved a combination of blacksmith and carpenter skills, and the Visśvakarma Panchals became experts at this. Today, not a single industrial estate in Mumbai is without a Visśvakarma Panchal and his workshop or factory.

The Kolis were faced with a very different situation. An important event occurred during the rule of the descendants of Kanhoji Angre, Shivaji's navy chief who ruled the sea along the coast from Raigad down south to Mumbai. The Angres levied a *joban kar* or *choli kar* on the Kolis of Raigad. This meant that Koli women had to pay tax if they wanted to cover their breasts. The practice drove the Kolis out of Raigad in large numbers and they began settling in and around the Mumbai islands. These were the Son Kolis. The prefix 'son', or 'golden', comes from their use of bright golden turmeric powder during worship.

The Kolis may have encountered Islam through trade with Muslim fishing communities even before the Portuguese arrived in Mumbai. Even today, every Koli village has a Muslim shrine and it is customary for the Kolis to offer worship there. Christian practices came with the Portuguese and there were conversions during that period. However, at a time when communal expression finds easy currency in the political theatre, the relationship between converts and non-converts is very different in Koli villages. Indian worship patterns have always been syncretic; this syncretic practice of religion is more pronounced among the Kolis. For instance, a Hindu is born a Hindu and it is impossible for him to get back into the religion if he converts to another one. Among the Kolis, however, if a Christian man marries a Hindu woman, the woman converts to Christianity, and if a Hindu Koli man marries a Christian Koli woman then the woman converts to the Hindu religion. The latter is achieved through the agency of the Brahmin priest who solemnises the marriage. The mere word of the Brahmin priest is

enough for the Kolis to accept the conversion and the woman as a Hindu!

The most striking feature of the Kolis' world of faith and religious practice is that the deity appears unimportant. The Koli, it would seem, keeps his own requirements at the centre and chooses a deity who fulfils those requirements. This brings about an interesting situation. Is the Koli a tribal? Is the Koli a Hindu? Is the Koli a Muslim? Is the Koli a Christian? It would seem that the answer is that the Koli is just a Koli. In any Koli place of worship we find different articles of faith represented in an unabashed, honest manner.

The Visśvakarma Panchals too have withstood the tensions emerging from the divisive and competitive forces of caste, religious fundamentalism and economic reform through a combination of traditional and modern. Their faith in their principal deity Visśvakarma, their pride in their work and confidence in their artistic and creative skills, and the historic ability of this community of artisans in India to form guilds that evolved into democratic institutions with highly transparent and interactive communication between members have made the Marathi-speaking Visśvakarma Panchal community a unique group worth studying in the context of globalisation and social fragmentation.

Both the Kolis as well as the Visśvakarma Panchals share a common social feature — an intra-community dispute redressal system whereby all sorts of disputes among members and, at times, even with members of other communities, are settled through the agency of elders within the community. This is a characteristic of older communities in India that has been maintained in spite of emerging legal systems.

Since Independence, Koli lands have been taken over in large measure by the Indian armed forces that want a portion of the land close to the coast for defence installations. The sea has increasingly been taken over by larger and more sophisticated fishing trawlers. The price of diesel and ice has been mounting, so also the price of land in Mumbai. Fishing died, local brewing of liquor was banned, and the salt areas were gradually filled up. At the same time, levels of illiteracy remained high among the Kolis and they continued to marry among themselves. As a result, the community ended up being trapped on pieces of land they could not even sell. These were large tracts on which the Kolis had built large houses. The Kolis began to rent the houses out to make money; it was a profitable business for many Kolis in the early years after Independence. Today, however, the business has changed the Kolis' position in their territory, as tenants outnumber Kolis ten to one. For decades, the Kolis did not keep a record of rents and, as land sharks begin to circle them, they are finding it difficult to hold on to their property. Without their property the Kolis are helpless, and within the property they are cornered by the overwhelming number of tenants and pressure from land developers.

The Visśvakarma Panchals, in contrast, have managed to transform from the 'low' Sudra castes to artisans to artisan capitalists through the centuries. Thus, the Kolis' indigeneity and the Visśvakarma Panchals' approach to modernity have brought both communities to a different crossroads in history today.

Sanjay Ranade is a Reader at the Department of Communication and Journalism, University of Mumbai, and Honorary Research Fellow, Monash Asia Institute, Monash University, Melbourne

References

Basham, A L, *The Wonder That Was India*, third edition, Rupa and Co, 1966

Bayly, Susan, *Caste, Society and Politics in India*, Oxford 1999

Chaphekar, Yashwant Narayan, Yashwant Mi, Kruťartha Mi, Sumangal Artec, 1992

Coomaraswamy, Ananda K, *The Indian Craftsman*, New Delhi, Munshiram Manoharlal, 1989

Dubois, Abbe J A, Beauchamp, Henry K, *Hindu Manners Customs and Ceremonies*, Asian Educational Services, New Delhi, 2001

Dumont, Louis, *Homo Hierarchicus*, Oxford Publications, fourth impression, 2004

Franklin, Benjamin, *Hindu World, An encyclopaedic survey of Hinduism*, Rupa and Co, 2005

Jaitley, Jaya, *Visśvakarma's Children, Stories of India's Craftspeople*, Institute of Social Sciences and Concept Publishing Company, 2001

Jaffrelot, Christophe, *India's Silent Revolution; The Rise of the Low Castes in North Indian Politics*, Delhi, Permanent Black, 2003

Joshi, Pandit Mahadevshastri, ed, *Bharatiya Sanskruti Kosa*, Vol 4, Vol 5, Vol 6, Vol 8, Anmol Prakashan, Pune, 1999

Kosambi, D D, *An Introduction to the Study of Indian History*, Bombay, Popular Prakashan, 1996

Kulkarni, P B, *Udyogpati Babasaheb Dahanukar*, Mauj Printing Bureau, 1965

Lannoy, Richard, *The Speaking Tree, A study of Indian culture and society*, OUP, 1971

Mendelsohn, Oliver and Vicziany, Marika, *The Untouchables*, New Delhi, Cambridge University Press, 2000

Patil, Raghunath Madhav, *Adharvruksha, Udyogshri Laxman Anant Tatha Nanasaheb Lokhande*, Sharprint, 1996

Ramaswamy, Vijaya, *Textiles and Weavers in Medieval South India*, Delhi, OUP, 1985

Singh, K S, *People of India*, National Series Volume VII, Delhi, Anthropological Survey of India and OUP, 1996, and *The Scheduled Castes*

Weber, Max, *The Religions of India*, New York, The Free Press, 1958

Bhartiya Sanskriti Kosha, ed Pt Mahadevshastri Joshi, Vol 19, 1993

Ghurye G S, *The Mahadev Kolis*, Popular Prakashan, Bombay, 1969

Vicziany Marika and Bapat Jayant, *Mumbadevi and the Mother Goddesses in Mumbai,* and *The Khadadevi Temple of Modern Mumbai: Community Harmony and the Koli Goddess*

Punekar, Vijaya B, *The Son Kolis of Bombay*, Popular Book Depot, Bombay, 1959

Rane, Kavita, *An Observational Study of Communication Skills Involving Fish Retailers in Mumbai*, Masters Thesis, Department of Communication and Journalism, University of Mumbai, 2005

Perceived conflicts and real solutions

Marine Protected Areas such as Gahirmatha in Orissa are vital for the preservation of marine biodiversity and the maintenance of healthy ecosystems to help combat climate change. But regulation and enforcement will not work if they exclude fishermen, the most important player in our marine conservation efforts

SANJIV GOPAL

THE TURTLE CONSERVATION vs fisher livelihoods conflict has been a long-standing issue in Orissa that escalates with the annual arrival of the turtles between November and May. On the one hand, the ongoing and large-scale mortalities of Olive Ridley turtles point to poor implementation of conservation and management strategies and laws. And on the other, fishermen still argue against the regulations, and traditional fishermen in particular face severe economic hardships. Making things worse is the fact that any approach to resolving this perceived conflict has largely been uni-dimensional, restricted to either turtle conservation or to the issue of livelihoods from the fishermen's perspective alone. No serious thought has been given to the larger ecosystem on which both turtles and fishermen depend.

As the debate rages on, another serious problem has begun to emerge — the deterioration of Orissa's coastal and marine environment, illustrated by the plateauing and possible decline of marine fisheries. Today, it's hardly breaking news that some commercially valuable stocks are in dire straits. Studies across Orissa show that fish catches have declined over the last decade in terms of quantity, quality and variety (1). This is further validated through anecdotal evidence across coastal marine fishing communities. In some regions, especially the south, communities estimate the decline to be as great as 90% compared to previous decades (2). Fish varieties that once supported the livelihoods of fishermen have been nearly wiped out and species that were once considered trash, like jellyfish, are now being targeted as the fishing industry works its way down the food chain.

It's not that the fishermen want to decimate fish stocks. In today's scenario, those who land the most fish reap the greatest benefits; those who take a more sustainable approach watch the fish they leave behind being caught by someone else. By putting various subsidies and incentives in place the state government has allowed in too many fishing vessels, resulting in too many boats chasing too few fish and leaving many fishermen barely able to make ends meet. Throughout, the emphasis has been on short-term benefits.

The number of mechanised boats has risen by 250% in 25 years, from 692 in 1981 to 1,796 in 2004-05, substantially reducing the area per fisherman. Quite clearly, there is now a problem of 'overcapacity' in Orissa's fishing fleet. The sheer number of fishing vessels, especially in the mechanised sector, and the advent of mechanisation and trawling has enabled vessels to run longer distances and to pinpoint areas that are frequented by the most fish. Wherever the fish go, they can and will be found.

Ironically, there are laws in place to regulate fisheries. The existing legislation has attempted to balance the issues of conservation and livelihoods. The most important of these is the Orissa Marine Fisheries Regulation Act (OMFRA), introduced in 1982, that reserves near-shore waters up to 5 km from the shoreline exclusively for traditional fisherfolk, with a ban on trawling. This Act was introduced primarily as a fisheries management measure, also to protect livelihoods in the traditional fishing sector. The Central Empowered Committee (CEC) constituted by the Supreme Court of India passed several orders in April 2004, including a distributed access system for different fishing vessels and sectors in the Devi and Rushikulya regions. Importantly, the seasonal restrictions on fishing in the Devi and Rushikulya areas (between the months of November and May) did not prohibit small-scale, non-motorised traditional fishermen; in fact it benefited this poorest section of the fishing community. Besides these, the turtles enjoy protection under the Wildlife (Protection) Act (WPA) 1972, which places them under Schedule I, on a par with the tiger even if merely on paper. Similarly, the Gahirmatha Marine Sanctuary (GMS) was declared under the WPA, in 1997, as a move to help conserve the turtles.

In spite of, and sometimes because of these regulations the problems persist. An average of 10,000 turtles die every year, and the economic hardship of the fishermen continues, especially those in the traditional sector.

So, what stands in the way of action to protect the turtles and manage Orissa's marine resources better; to safeguard it for future fishing communities?

Fishermen still fight regulations, which they view as obstacles that limit their income rather than measures needed to preserve their means of livelihood. As with the rest of India, lack of coordination between the forest and fisheries departments in Orissa is a major hurdle. In the

game of one-upmanship it's ultimately the seas, the turtles and the fishermen who end up suffering.

The fisheries managers, in this case Orissa's Directorate of Fisheries, are tasked not only with the health of fish stocks and the allied preservation of valuable habitats, but with evaluating the economic impact of implementing conservation measures. Simply put, the focus of the fisheries and fisheries export departments remains biased in favour of increasing short-term yields rather than sustaining them over the years. This bodes ill for fisheries management and species conservation.

On the legislative side, Orissa's politicians appear to lack the political will to dismantle this culture of conflict. It reflects the low priority many legislators give to coastal and marine spaces, both from a fisheries and an ecological perspective. Marine fish consumption in the state is a little less than 50% of the total catch. Marine fish consumption rose 285% in a span of 10 years, from 1986 to 1997 (3). This is vindicated by the growth in per capita consumption of marine fish, from around 2.85 kg in 1986 to around 8.60 until 1999 (4).

That the people of Orissa like their fish is well known; but we are not too interested in where the fish comes from, or how many are left.

The promotion and declaration of the Gahirmatha Marine Sanctuary as a "turtle haven", and not as a tool to conserve marine habitats, to allow fish to spawn, feed and thrive undisturbed, with the resultant benefit to fishing, has intensified the conflict. Fishermen complain, and rightly so, that they have been ignored and kept out of any consultations on the scale, design and size of the sanctuary. They question the current size of the sanctuary — over 1,400 sq km (20 km into the sea and over 65 km northeast to southwest). Those in favour of marine reserves/Marine Protected Areas (MPAs) in general, or the GMS in particular, are often labelled 'extremists' involved in a conspiracy to destroy livelihoods, even though the concept of a marine reserve or 'no-take areas', in principle, is not new. For centuries, communities have closed certain areas to protect their resources.

'Natural' sanctuaries are disappearing at an exponential

Sudharak Olwe

Sudharak Olwe

rate, so drastic times call for drastic measures. Marine reserves are part of the solution — designating a system of closed areas of critical importance helps restore exploited ecosystems and habitats and all that they harbour. Of course, given the history of conflict surrounding MPAs it is vital that coastal and fisher communities are involved in the process at every stage.

However all this pales in comparison with the problem of large-scale and thoughtless development along Orissa's coast. Currently, over 12 ports are being developed/proposed along the 480 km coastline, which translates to a port every 35 km! Of these, nine are in close proximity to important turtle breeding and nesting sites in Gahirmatha, Devi and Rushikulya, and other ecologically sensitive areas. This could have a disastrous impact on the coastal and marine environment, and allied fisher livelihoods. In the absence of any assessment of the cumulative carrying capacity of the coastal environment for large-scale development (including ports), the ongoing proliferation of ports is a matter of serious concern.

Exacerbating things further is the threat posed by climate change. Orissa is fast emerging as one of India's climate change frontiers. Drought, floods, rising temperatures, accelerated coastal erosion: Orissa has borne witness to all of these and more. Climate change could result in significant economic losses. Similarly, in the absence of effective management and conservation regimes in coastal and marine environments, sea level rises could inundate over 170,000 hectares of coastal areas — predominantly prime agricultural land — while displacing close to 1 million people.

Against the realities of climate change, MPAs, as part of a larger effective programme to conserve and manage coastal and marine environments, are being recognised as a powerful way to achieve both conservation and fisheries management objectives. They are vital for the preservation of marine biodiversity and the maintenance of healthy ecosystems to help combat climate change. Without intervention, the *status quo* could cause the eventual depletion of even the most resilient species, with Orissa's famous turtles possibly also becoming a casualty.

But the regulation and management of fisheries has to be properly implemented. This would require ensuring that the necessary resources (financial and infrastructural) are consistently made available. Effective implementation would, by default, also benefit conservation significantly. The issue of 'overcapacity' needs to be addressed on two fronts. Licensing mechanisms must be made more stringent to ensure that there is a cap on expansion of the existing fleet. Simultaneously, sensitivity must be shown regarding people's livelihood needs, by responding and acting on the longstanding demand of fisher communities for evolving additional and alternative income-generation programmes, in partnership with traditional fisher communities and the mechanised fisheries sector.

Fisher communities need to be empowered to co-manage marine resources. The current approach of regulation and enforcement must be strengthened by becoming more consultative and by going the extra mile to bring fishermen to the table. By excluding fishermen from the equation so far, we've taken out the most important player in our marine conservation efforts.

Enforcement agencies also need to be given the space and flexibility to accommodate and incorporate science into fisheries and sea turtle management. For example, although years of research have indicated that turtles congregate in small and specific offshore areas, adequate protection has not been afforded to these offshore congregations. Likewise, any strategy dealing with the management of Orissa's marine resources, including fisheries, must move towards an 'ecosystem approach' model of management which takes the entire ecosystem into consideration and the various species that inhabit it. It recognises complex interactions between species that make up the marine ecosystem.

These are critical times in the history of the state of Orissa. It remains to be seen whether the government chooses to go down the disastrous 'industrialisation-at-all-costs' path, or chooses the more holistic, people-centric, equitable and ecologically sustainable road that has the uplift of the poorest sections of the state as its main objective.

Sanjiv Gopal is a freelance writer. He also works with Greenpeace in India

Endnotes

1 Salagrama, 1999a

2 'Trends in Poverty and Livelihoods in coastal fishing communities of Orissa State, India', FAO Fisheries Technical Paper

3 Directorate of Fisheries, Government of Orissa, 2002: 3 and 7

4 'Trends in Poverty and Livelihoods in coastal fishing communities of Orissa State, India', FAO Fisheries Technical Paper

Coastal regulations flip-flop

The Coastal Regulation Zone (CRZ) notification of 1991 was enacted to preserve the coastal environment by regulating land use all along the coast. But various interest groups have succeeded in pushing through amendments that ride roughshod over the rights of coastal communities to the lands and waters they have used for centuries as common property resources. Now, finally, the 1991 regulations have been reaffirmed

KANNAN KASTURI

THE GENESIS OF COASTAL REGULATIONS in India can be traced to the United Nations Conference on the Human Environment, held in Stockholm in June 1972, and attended by then Prime Minister Indira Gandhi. The Environment Protection Act (EPA) 1986 was enacted to implement decisions taken at this conference to which India was a signatory. The Coastal Regulation Zone (CRZ) notification of 1991 was made under the provisions of the EPA with the purpose of preserving the coastal environment, and in particular, ecologically fragile areas, by regulating land use all along the coast.

The CRZ notification defined the area of coast to be regulated — the coastal zone — as a strip of land along the coast extending 500 m inland from the high tide line, including areas uncovered by the sea during low tide. Lands next to bays, estuaries, rivers and other waterbodies that were influenced by tidal action were also included in the coastal zone.

The coastal zone was further broken up into different categories based on the level of protection required and practicable. Ecologically sensitive areas such as mangroves, coral reefs, breeding and spawning areas for marine life, and areas of great natural beauty were deemed to require maximum protection and were categorised as CRZ 1. Areas that were already urbanised and substantially built up, such as metropolitan areas and town municipalities, were categorised CRZ 2. The rest of the mainland coast was categorised CRZ 3, and this included rural settlements. The last category, CRZ 4, was reserved for island territories such as the Andaman and Nicobar Islands.

CRZ 1 zones were to be kept free of any new development up to the 500 m high tide line. Urban communities in CRZ 2 zones were prohibited from expanding on the seaward side of their existing limits and from increasing the density of habitats within the zone. In CRZ 3 zones, the area within 200 m of the high tide line was to be maintained as a 'no development zone'. New development could take place only in the area between the 200 m and 500 m lines in CRZ 3 zones, and was restricted to industries requiring a waterfront or foreshore, such as tourism and ports and harbours, and required clearance from the Ministry of Environment and Forests (MoEF).

These, broadly, were the features that the 1991 regulations started with. Most importantly, the regulations recognised the right of coastal communities engaged in traditional occupations such as fishing and agriculture, to continue using these coastal spaces to live and work in.

A few words are in order here about coastal fishing communities. These communities have been living and fishing in the same areas for hundreds if not thousands of years, and treating their fishing waters and the land they use to beach their craft, land and process their catch, and repair their nets, as common property resources. Their rights to use these spaces are based on tradition and custom rather than legal or administrative sanction. The absence of legal rights to the land makes them extremely vulnerable in the face of local or state government development plans; they can be treated as encroachers on government land and displaced without any compensation and without recourse to legal action.

While the coastal regulation was clearly prompted more by ecological considerations than concern for the traditional inhabitants of the coast, the reference to 'traditional rights and customary use' of existing coastal villages in the regulation was welcomed by organisations such as the National Fish Workers Forum that represented the coastal fishing community.

The 1991 coastal regulation enjoined state governments to come out with Coastal Zone Management Plans (CZMP) that would clearly categorise the coast into different zones before February 1992, and to get central government approval for the plans. Plan implementation was to be the responsibility of state governments.

Undermining the law

Coastal states, however, were in no hurry to come up with coastal plans. They were clearly unhappy with the loss of discretionary powers and the attendant privileges with respect to deciding land use along the coast. The disinterest of state governments, even the central government, in implementing the law was exposed in the course of several landmark cases in the Supreme Court, between

1993 and 1996.

In a Public Interest Litigation (PIL), Indian Society for Enviro-Legal Actions vs Union of India, 1996, the petitioner sought the court's help in getting the government to implement the coastal regulations. The Supreme Court was convinced that governments, both at the Centre and the states, were tolerating violations of the coastal regulations that were being carried out with impunity. On finding that coastal states did not even have a CZMP, and after making strenuous attempts to get coastal states to file their plans, it set a deadline for their submission. State governments were therefore forced to submit their coastal plans. The central government approved these plans subject to certain conditions and modifications in 1996, and asked the states to submit revised plans. A government answer to a question in Parliament revealed that no state had submitted the required revised plans as of 2006!

Another Supreme Court case, S Jagannath vs Union of India, 1996, highlighted the effects of polluting industries on fragile coastal ecologies and coastal populations dependent on natural resources. The petitioner, through a PIL, sought to stop intensive and semi-intensive shrimp farming in ecologically fragile coastal areas. While hearing the case, the Supreme Court asked the National Environmental Engineering Research Institute (NEERI) to conduct a field investigation on commercial shrimp farms in ecologically fragile areas in Tamil Nadu, Andhra Pradesh and Pondicherry, within the coastal zone.

The 1995 field investigation by NEERI scientists came up with startling revelations. They reported indiscriminate destruction of mangrove areas in and around the creeks, estuaries and the sea, as well as destruction of natural casuarina plantations and sand dunes. Ecologically unsound practices in aquaculture farms had resulted in salinity in neighbouring agricultural lands, loss of potable water sources, loss of landing grounds and fish catch, and damage to the fishing nets of traditional fishermen. Large commercial aquaculture farms had built fences in and around their farms, resulting in blocking of free access by fishermen to the sea shore. The creeks had been polluted and their ecosystems damaged with wastewater discharged from the aqua farms. Disappearance of native fish species from water in the creek had been reported by fishermen and was observed by the team. Pollution from aqua farms caused skin, eye and waterborne diseases in the local population.

Pankaj Sekhsaria

Pilgrims and seagulls, Byet Dwarka, Gujarat

Talking about the effects of the industry on residents, the scientists observed: "Employment avenues of the contiguous population have considerably reduced due to commercial aquaculture farming. The unemployed villagers are seeking employment in nearby towns and cities. Owners of the commercial aquaculture farms are using various means to encroach upon government lands and also forcing the agricultural landowners/salt-making villagers to sell their lands. In addition, the fishermen are being forced to migrate to other coastal areas." Another NEERI team that visited Orissa found the need to abandon or review World Bank-aided projects and commercial shrimp farms in and around Chilika lagoon and the Bhitar Kanika Wildlife Sanctuary that were found to be violating CRZ regulations.

In its 1996 judgment, the Supreme Court determined that the shrimp culture industry was violating coastal zone regulations. It ordered all aquaculture industries operating in the coastal zone to be cleared and compensation paid to persons affected by their operations, as well as for the damage they had caused to the environment, in accordance with the 'polluter pays' principle. It also prohibited shrimp farms within 1,000 m of Chilika and Pulicat lakes, considering these to be 'precious ecosystems'.

Following the judgment, the government set up an Aquaculture Authority in 1997 to regulate new aquaculture farms and implement the Supreme Court directions with respect to closure of aquaculture farms that were violating coastal regulations. However, a few months after its constitution and after the deadline for closure of aquaculture farms had expired, its charter was changed and it was shorn of responsibility for the closure of existing aqua farms that were violating coastal regulations.

Were all these measures effective in controlling the destruction of the coasts? Food and Agriculture Organisation (FAO) studies on mangroves in the Godavari delta showed that the area under mangroves shrank between 1997 and 1999 and continued to be replaced by shrimp ponds. Subversion of the law was obviously still going on.

The shrimp industry was not the only industry lobbying against coastal regulations. No less than 19 amendments were made to the CRZ notification in a space of 17 years, mostly diluting the prohibitions in response to various pressure groups and lobbies. 'Non-polluting' industries (a euphemism for IT and service industries) that were part of Special Economic Zones (SEZs) were permitted in the coastal zone. Rules for the 'no development' zone CRZ 3 were diluted to allow development related to SEZs, ports, mining, exploration for oil and natural gas, and other purposes. Tourism-related development was allowed within 50 m of the high tide line in the Andaman and Nicobar Islands.

In spite of all these dilutions and the readiness of governments to overlook violations, the CRZ regulation of 1991 did put the brakes on indiscriminate development of coastal areas. The coast of Dahanu, in Maharashtra, considered one of the most ecologically fragile areas, was declared a CRZ 1 zone in 1991. In 1998, a plan to construct a port in Dahanu by P&O Australia Ports ran afoul of coastal regulations. The Dahanu Taluka Environmental Protection Authority, set up under Supreme Court orders, declared the port illegal and impermissible. The project was shelved, at least temporarily. So also were plans to 'develop' Mumbai's saltpans.

Scientific criteria for areas to be regulated

The MoEF has been under mounting pressure to change the coastal regulations, with a brief to "promote development without hampering the environment". A committee of scientists and academics, headed by Professor M S Swaminathan, was appointed in 2004 to review the CRZ regulations in light of all the problems faced by the MoEF in implementing them. In its recommendations, the committee, in 2005, identified basic principles (all impeccable) that must guide the management of coastal zones. It advocated an "integrated approach to coastal zone management" that had the objectives of protecting "the coastal zone with people's participation, the livelihood security of the coastal fisher and other communities, and the ecosystem which sustains the productivity of the coastal areas while promoting sustainable development".

The most significant recommendation of the committee was to move away from the fixed 500 m (from the high tide line) coastal zone landward boundary to a variable boundary based on the vulnerability of the stretch of coast to coastal hazards. (It must be remembered that it was during this committee's tenure that the terrible tsunami of December 2004 devastated coastal settlements in Tamil Nadu, Kerala and the Andamans.) The vulnerability line, or setback line, was to be determined using scientific criteria such as coastal topography, sea level trends, erosion, etc. Another significant change was to include coastal waters up to 12 km from the shoreline within the ambit of coastal management. The area of coast up to the vulnerability line on the landward side, and up to 12 km into the sea from the shore — the new extent of the coastal zone — would be regulated.

The committee also suggested changes to the boundaries of coastal zone categories based on management convenience. The different categories were termed Coastal Management Zones (CMZs). Ecologically significant areas were to be categorised as CMZ 1 (earlier CRZ 1) and were to contain all areas up to their natural boundary on the landward side, rather than bounded by the 500 m line. Coastal town municipalities were to be categorised as CMZ 2 (earlier CRZ 2) and contain all areas within their administrative boundaries. All areas of the coastal zone not already part of

CMZ 1 and CMZ 2 would be part of CMZ 3 (earlier CRZ 3). This would be bounded by the vulnerability line on the landward side and also include the sea up to 12 km offshore. Island territories such as the Andaman and Nicobar Islands, Lakshadweep, and other offshore islands would constitute part of CMZ 4 (earlier CRZ 4).

Pushing for 'sustainable development'

With this groundwork in place, the Ministry of Environment and Forests (MoEF) unveiled its proposals for new coastal regulations in the form of a draft Coastal Management Zone notification, between May and July 2008. The Swaminathan Committee recommendations were cited as the basis for the new regulations. The draft notification fleshed out permitted activities in the various coastal management zones and set guidelines for preparing their management plans.

The real objectives of the proposed regulation were revealed more clearly in the details.

The area of coast to be looked at from the perspective of conservation — earlier, a 500 m-wide strip along the entire coast — was pared down to 'ecologically sensitive areas', categorised as CMZ 1. Populated areas along the coast — municipalities and panchayats — would be regulated for development on the seaward side of the setback line (earlier, the entire coastal strip with a width of 500 m), with the main consideration being the safety of populations. There was no blanket ban on locating industry on the coastal strip. On the contrary, state governments could identify part of the coast as an 'economically significant area' and permit industry or infrastructure on it after getting an integrated coastal zone management plan for that area approved by the central government. Such areas were also categorised as CMZ 2 along with urbanised areas. Examples of such areas cited were: sites for mining, tourism, industrial estates, foreshore facilities for special economic zones, power plants and greenfield airports. The notification made it clear that this was only an indicative list.

While guidelines were laid down for land use management plans for coastal municipalities and coastal panchayats, the notification did not seem to prescribe any guidelines for the management plans of 'economically significant areas'. What happens to the traditional rights and customary use of a local community if the state government notifies an area as an industrial estate or an SEZ? How is land use to be regulated in a greenfield project? Questions remained. Likewise, there were no clear and definitive guidelines for CMZ 4 areas, island territories.

What's more, the proposed regulation legalised previous violations of the law. The guidelines for coastal municipalities and those for CMZ 3 zones accepted all structures that were already in place even if they had violated the existing law. The practice of introducing amendments to accommodate special interests also continued. The draft notification first issued in May 2008 was itself amended within a few days to allow greenfield airports in the coastal zone, even in an area considered ecologically fragile!

For Mumbai, the new regulation held the promise of freeing lands for real estate development. With the vulnerability line defining the bounds of the coastal area to be regulated, it was widely expected that several thousand acres of saltpans would be moved out of coastal regulatory control.

The proposed new framework showed a clear shift away from the objective of conservation and protection of coasts to the agenda of its 'sustainable development', by opening it up for 'economically significant' activities. Of course, this agenda was to be pursued 'taking into account' conservation of ecologically significant resources and the livelihood interests of local communities…

Temporary reprieve

The 2008 proposals were opposed by fish workers, environment groups, the governments of eight coastal states, and even a parliamentary committee looking into the matter. After the 2009 elections, the government set up another committee, again under Professor Swaminathan, to examine the proposed regulation. The committee took just a month to come up with the recommendation of retaining the 1991 regulation, with amendments to take care of various interests. The following extract from the committee report makes interesting reading:

"There is… most importantly, a basic uncertainty about the demarcation of the setback line… Without a clear setback line, even private developers who prefer the management regime of CMZ are not clear how they will be impacted… It is evident from discussions that however 'unscientific' the present demarcation based on 500 metres is, it is preferred because it is time-tested and clearly understood."

The government, quickly accepting the committee's recommendations, has allowed the 2008 draft CMZ notification to lapse, as of July 2009. What happens to the Maharashtra government's long-standing plan of relocating slum-dwellers to the saltpans so as to make available some of the world's most expensive land in the heart of Mumbai for development? Has the government taken back the CMZ draft merely because it was a shoddy job that did not please "even private developers"? Time will tell.

Kannan Kasturi is an independent researcher and writes on law, policy and governance

Conservation beyond penalties and punishment

Conservation in India has been based on the reductionist principle of physically separating humans from wildlife. The same approach is being adopted for marine conservation. But this style of conservation is completely unsuitable for marine socio-ecological systems, where flexible, socially appropriate and case-specific methods have been applied for the management of fishery resources by fisher communities

AARTHI SRIDHAR
KARTIK SHANKER

CONSERVATION STORIES frequently commandeer the nation's attention. Images of empty forests and vanishing tigers compete with those of strident campaigns by tribal rights lobbies, typical of the media-manoeuvred discourses on wildlife conservation. Much to one's despair, these complex debates on wildlife and livelihood matters have deteriorated into emotional polls on who — humans or animals — enjoys priority in India's forests, and whether environment wins over development.

Worse, the television channel approach to problem-solving is even employed by several national and international environmental organisations concerned with conservation, and eventually the results of these polls justify the formulation of laws and policies that are often as myopic as the television debates. The deadlock over conservation and development continues at varying scales, ranging from tribal communities to entire sectors such as agriculture, forestry and mining.

Our post-Independence attempts at legislating on matters of the environment have significantly contributed to positioning 'conservation' against 'development'. A range of specialised environmental laws developed from the 1970s onward. Although there are other laws governing natural resource use — such as agriculture, fisheries and revenue laws, all of which have significant environmental implications — the attention of conservationists has remained focused on the line-up of specialised legislations, namely the Wildlife (Protection) Act (WLPA), the Environment Protection Act 1986, and the Forest Conservation Act 1980, to name a few. Many of these laws were a result of active lobbying efforts by environmentalists themselves (1).

The economic reforms process undertaken by the government since 1991 has crystallised certain development priorities as India works its way towards 'developed country' status. The forays of the welfare state into a capitalist era intensified the angst against environmental laws, seen as antithetical to the development of the country. In response to industry ire, and under the World Bank's insistence, the Government of India embarked on a drive to re-engineer environmental clearance procedures and redraft certain environmental laws (2).

The result is that these laws read more like development laws, obfuscating the difference between the two. Ironically, even as powerful industrial lobbies seem to be winning the battle, marginalised communities continue to struggle with conservationists over laws that impact their livelihoods. And as these laws get increasingly applied in ecosystems like marine areas where other flexible management systems operate, the numbers embroiled in the impasse are rising.

The most popular terrestrial wildlife conservation approach has been the declaration of Protected Areas (PA) and the listing of wild species on protected lists, both facilitated by the Wildlife (Protection) Act (WLPA), 1972. These national parks and wildlife sanctuaries prohibit human presence and use of resources within their boundaries. The health of India's biodiversity is often projected through the extent of area under official PA cover. Many conservation research programmes and advocacy efforts aim at the inclusion of additional species on the 'scheduled lists' of the WLPA. This simple listing does not distinguish between geographical variations in the status of populations, thereby foreclosing the option of applying varying conservation methods in different areas. One rule applies to species in all areas. For example, Olive Ridley turtles which arrive in their thousands at Orissa's mass nesting beaches are accorded the same protection as solitary ones that visit other parts of India's coast.

The WLPA is itself drafted on the singular idea that physically separating humans from wildlife is the appropriate approach to all conservation challenges. It, therefore, does not provide much of a conservation plan beyond penalties and punishments for human intrusion into PAs and human use of protected species. Human-wildlife interactions, socio-ecological institutions, organisations and phenomena and even simple dependence regimes are given short shrift in this law. No wonder the real challenges to conservation persist and in many instances are not even acknowledged in the race to expand PA networks and scheduled lists of the WLPA.

Although the academic approach to understanding biodiversity conservation has evolved considerably, with concepts like socio-ecological resilience and community-based approaches gaining popularity, the overall

conservation effort in the country is still one that separates humans from wildlife habitats. If only government reports and presentations on India's PAs were accompanied by descriptions of the nature and extent of conflict in these areas, the 'success' of this 'one-size-fits-all' model would be evident.

The rigidity of this exclusionist approach in terrestrial area management, specifically through the narrow options offered by the WLPA, is in stark contrast to the flexible, socially appropriate and case-specific methods applied for the management of fishery resources by fisher communities. It bears repetition that even the formal marine fisheries regulation laws of state governments are not based on the physical exclusion of people.

Marine ecosystems require management measures that are distinct from those currently practised in terrestrial areas. In practice, however, the terrestrial approach is being increasingly applied to marine wildlife protection, as more conservationists look towards the WLPA and its design to provide solutions to marine challenges. This trend needs to be examined and revised as reports of conflict over these styles of marine conservation pour in. There are important lessons for the conservation of terrestrial areas from existing marine management strategies. Likewise, the conflicts over terrestrial conservation and environment protection laws provide several insights for designing coastal and marine conservation measures.

Marine ecosystems and coastal communities are poorly represented in public debates on India's environmental problems. The 2001 census shows that there are nearly 10 million fisherfolk. Our understanding of these communities through sociological research is, however, comparatively limited. There are several differences between terrestrial and marine socio-ecological systems. Obviously, water is not a natural human environment, though humans have evolved a relationship with this medium and those depending on it recognise both its power and the limitations of their knowledge of it. Fishing is, therefore, often compared to gambling.

The dependence on the sea is a daily one, first for safety and second for livelihood. Various fishery practices have evolved from assiduously studying and understanding the sea, its creatures, their behaviour, and the power equation between man and sea. Fishermen face definite and distinct challenges that limit their control over the sea and its bounty. These natural challenges posed by the sea are completely different from those of terrestrial areas. Fisheries development programmes aim at increasing the fishers' control over the capricious sea, intensifying production and reducing risks while doing so.

Another central difference is that there are no watertight boundaries that can be drawn within the marine space. Although ecosystems like coral reefs that surround small islands do have a discernable physical boundary in the form of lagoons, this does not impede the dynamic exchange of water, nutrients, pollutants and marine species within these areas. The social configurations of fishing communities are closely modelled along the patterns of marine areas. Reef fishing and fishing arrangements are, therefore, different from those seen in the open seas. Fishing patterns, the distribution of fish catch and income from fish catch all depend on the nature of the fishery itself. This, in turn, depends on the behaviour of the fish and its environment.

For example, the traditional fishing practice using shore-seines (still seen in parts of Karnataka, Goa, Orissa, Andhra Pradesh and Tamil Nadu) that target near-shore pelagic fish requires between 30-50 men, if not more, to work the boat and net. The rules of shore-seining and the share system that has evolved in each region are minutely shaped by the characteristics of the marine environment and its resources. In fact, the choice and design of fishing craft and gear are directly dependent on the targeted resource, coastal geomorphology and sea conditions.

Fishing communities in India by and large have been marked by community cohesion and a high level of autonomy; they have been largely self-governing communities with minimal interactions with the mainstream until recently. This has given rise to a 'culture of fisheries' which also shapes various aspects of fishing communities, their social organisation, institutions and identity. It is therefore only natural that the perspective and approach to the marine space be distinct from the terrestrial one.

Why is emphasising this point important? At the heart of the conservation-environment argument is the issue of who will enjoy priority access and user rights over natural resources. In the backdrop of the debate on the Recognition of Forest Rights Act, 2006 (3) fisher leaders have stated that they should be accorded similar rights as tribals, as they too are hunters, similar to their terrestrial counterparts in the forests. Nested in this articulation are several important issues. Clearly, while the nature of fishing described earlier provides legitimacy to the identity of the 'hunter-tribal', this categorisation serves more than a descriptive purpose.

The power struggle between the state and its various constituents hinges on identity politics. Fisherfolk too have been active in this struggle for over half-a-century, although they are somewhat invisible in the present debates on conservation and tribal rights. As a political constituency, fisherfolk have struggled for greater control over the seas and resource management, struggles which have been directed both inward as well as against the state. Control over the territorial waters of the country is vested with the central government (4) while fisheries in the coastal waters up to 12 nautical miles are managed by the state

governments. Although there are traditional arrangements to manage resources in these waters, individual or community rights over the waters still do not exist as in the case of land titles, or *pattas*. In aligning with a tribal identity, fishers have expressed the desire to be treated with the same attention as received by forest-dwelling communities.

Another important reason why fisher leaders are advocating a 'sea-tribal' political identity is that they do not enjoy rights over land either. The nature of fisheries requires that many fishing communities, particularly the traditional fisherfolk, be mobile and move residence across the coastline in different seasons. Consequently, in many states, fishing communities do not even possess land titles in coastal areas despite their growing numbers across the coast (5). This has implications not just for their entitlement to housing and related infrastructure but more importantly in their say over development in areas occupied by them.

It is important to recognise this aspect of fisher settlements while designing building regulations and coastal development laws to prevent the further marginalisation and alienation of this constituency. This is one reason why fisherfolk echo the slogans of the tribal campaigns for forest rights, to further their own demands for land and water rights and ensure greater access to the state's development programmes. This articulation unfortunately has not found space in the momentous political exercise of restoring rights to the marginalised peoples of India, as in the case of the Recognition of Forest Rights Act, 2006.

Fisher communities, particularly those of traditional communities, find themselves most impacted by this alienation, as the development drive has left them marginalised. Prior to Independence, marine fishing was carried out at a subsistence level, exclusively by traditional fishers. Over time, there has been a cultural transformation in fisheries — a process consciously facilitated by the state.

The current state of fisheries finds its genesis in the modernisation programme introduced by the Government of India to 'develop' the sector. For example, the Kerala government welcomed the Indo-Norwegian Project for Fisheries Community Development to increase returns from 'fishermen's activities', improve distribution of fresh fish and ensure a higher standard of living in project areas.

The basic idea was to remove the 'drudgery' of fishing and improve the economic condition of fishing communities.

Sudharak Olwe

Several programmes for motorisation of fishing crafts were simultaneously taken up across the country, such as the Bay of Bengal programme on the east coast. The South Indian Federation of Fishermen's Societies (SIFFS) in Kerala and the government of Kerala's cooperative initiative, the Matsyafed, actively promoted motorisation programmes, ensuring loans to acquire motors and fishing nets, better access to improved fishing technologies and equipment (6).

Unfortunately, these projects were carried out without much assessment of the impacts of modernisation and mechanisation on the culture of fisheries and social arrangements within communities themselves. For instance, fisherfolk were proud that they were people who earned independently and did not depend on wages. In fact, wage labour was perceived as shameful and communities faced severe conflict because of the changing labour definitions brought on by mechanisation and modernisation (7). As a result, development has been encouraged without sufficient emphasis on resource conservation as also increased disparity in the social and economic status of various fishing groups, with traditional fisherfolk falling at the bottom of the spectrum. Thus, although fisheries laws were introduced for better management of the fishery resource to ensure its availability for all categories of fisherfolk, the law has not been able to respond as effectively with the national obsession for development through the maximisation of production.

Far more densely inhabited than most forests, the coasts are necessarily used by numerous fishing communities concurrently. Traditional community-based systems of fisheries management include fishing gear restrictions, closed seasons in specific areas, or a ban on particular forms of fishing such as night fishing or dynamite fishing. In the late-1970s, modern fishing methods threatened the livelihoods of these communities and coastal ecosystems, as mechanised crafts and gear, principally trawlers with bottom-trawling methods, severely impacted fishing stocks.

By the early-1980s, many coastal states in India had responded by introducing legislation and formalising some of the existing management measures in the form of Marine Fisheries (Regulation) Acts. For example, the Orissa Marine Fisheries (Regulation) Act (OMFRA) 1982, prohibits all trawlers from fishing within 5 km of the shore. In recent years, the state has also regulated the use of certain fishing gear and fishing zones that permit only low-impact fishing practices in areas of sea turtle congregations.

These laws are not designed to exclude people from their marine environments. Fisheries departments and government institutes such as the Central Marine Fisheries Research Institute have systems in place for monitoring stocks of marine species (even if only partially reliable). It appears that these conservation measures also recognise that humans have historically 'used' or consumed marine species, including those now classified as 'endangered'. Thus, fisheries management while prescribing conservation options that allow for the presence of humans and human activity, also call for modifications in the range, intensity and nature of fishing activity. For example, in Gujarat, fisheries regulations prescribe prohibitions on the catch of gravid lobsters. The Tamil Nadu fisheries laws prescribe rules on species of sharks that can be harvested, and their size.

Unfortunately, the official style of managing terrestrial systems is being extended to the management of marine species and their habitats as well. Furthermore, the little data that exists on marine species and their habitats has not been able to inform appropriate management decisions. In reality, the wildlife department's response to demands for marine management has been to create a conservation mechanism identical to the terrestrial style, as seen in the five marine protected areas in the country: Gahirmatha in Orissa, Gulf of Kutch in Gujarat, Gulf of Mannar in Tamil Nadu and two protected areas in the Andaman and Nicobar Islands.

In response, fishing communities have objected to the complete ban on human presence in these formerly open access areas, the specific contours of the conflict depending on the intensity with which these bans have been enforced. The example of Orissa is apt here. For the last few years, conservationists have been trying in vain to prevent Olive Ridley turtles from being trapped in trawl-fishing nets. National and international efforts to introduce turtle excluder devices and keep trawlers out of the Gahirmatha Marine Sanctuary have failed, in part due to strong resistance from the trawling community. The 1997 declaration of the Gahirmatha Marine Sanctuary generated considerable discontent among various fishing communities as it denied them all fishing rights within a delineated core zone. Conservationists now recognise that it would be more effective to focus efforts on the protection of mobile offshore turtle congregation 'reproductive patches' containing mating turtle pairs. They also recognise that within these congregation areas, certain forms of fishing might be benign.

Unmindful of these facts, the Orissa forest department now plans to declare the other two known offshore congregation areas — off the Devi turtle rookery and the Rushikulya rookery — as marine wildlife sanctuaries. This would impinge on the rights of even the non-mechanised sector rather than simply restrict harmful activities. Ironically, since most major turtle congregations occur within a few kilometres of the shore, merely enforcing the fishing regulations of the OMFRA, which bans all mechanised fishing within 5 km of the coast, would help in effectively conserving these turtle populations. In contrast

Pankaj Sekhsaria

to laws governing protected areas, the OMFRA also has the flexibility to formulate creative rules that are area-, activity- and time-specific.

Though marine conservation is widely believed to have lagged behind terrestrial conservation, it is possible that marine management rules, such as the fisheries laws, are more appropriate since they view protection of the environment as the conservation of 'resources' that have human uses, a more realistic approach within this particular context. Many believe that wildlife conservation can succeed if it is done through means that protect people's livelihood rights rather than those of a single endangered species.

For example, protecting the interests of the traditional fisherfolk through implementation of the OMFRA would simultaneously protect turtle congregations (8). Today, conservationists and fisherfolk have rallied under the banner of the Orissa Marine Resources Conservation Consortium to work towards common marine conservation objectives. This alliance is possible because the fisheries laws only exclude certain activities rather than people. Not only can this practical, context-specific model form the basis for marine conservation in future, it could also serve as a powerful tool in refining terrestrial conservation methods which in most cases mandate the complete exclusion of people.

Other than not being able to adequately protect marine species themselves, Marine Protected Areas (MPAs), as envisaged and operated through the WLPA, fail on another count. Since the focus remains on protecting habitats within boundaries, the law is simply unresponsive to threats outside MPAs. All the MPAs of the country have some experience of this.

Take the example of the Gulf of Mannar Marine National Park (GoMNP). This MPA (measuring about 560 sq km, including 21 islands and their surrounding waters) lies in the core area of the ecologically sensitive Gulf of Mannar Biosphere Reserve measuring 10,500 sq km. Yet, all efforts at protection are concentrated only in the islands off the GoMNP. The Palk Bay and Gulf of Mannar are considered distinct waterbodies with varied conditions, seasonal cycles and ocean-met parameters, although they are inextricably linked to each other via Adams Bridge and the Pamban Pass. The sea grass beds and coral reefs in the Palk Bay and other areas off the Gulf of Mannar Biosphere Reserve make this region as fragile and important as the GoMNP. However, since these remaining regions of the biosphere reserve or the Palk Bay (which is home to a number of protected scheduled species such as sea fans, sponges, sea cucumbers and coral) have no legal protection for habitats, this loophole has been well utilised by proponents of the controversial Sethusamudram Ship Canal Project (SSCP).

The SSCP is a 167 km-long shipping canal which is to pass through the Gulf of Mannar, the Palk Strait and the Palk Bay. It involves dredging in an 89 km stretch for a width of 300 metres and a depth of 12 metres for ships less than 30,000 DWT with draft restricted to 10 m. A large percentage of this cargo is projected to be petroleum oil and lubricants. Despite the detailed and informed criticisms levelled against it, this project has overcome the challenges, ridden roughshod over the environment impact assessment notification and obtained environmental clearance. Dredging activity has been ongoing since 2006 and without any requirement that the chief wildlife warden be consulted for environmental clearance (9). Park managers remain mute spectators not just to the destruction of sea grass beds and coral reefs within the MPA, from increased sedimentation caused by the SSCP, but to the loss of flora and fauna all along the canal and outside the MPA as well.

Similarly, the authorities in charge of the Gahirmatha Marine Sanctuary in Orissa have been unable to halt the construction of Dhamra port, just 10 km north of the MPA. And the Gulf of Kutch Marine National Park in Gujarat is located in the middle of an active shipping route and its fragile islands have, in the past, been subjected to several oil spills from barges. The 'green' and 'brown' laws have only worsened the existing marine conservation 'blues'!

It is clear that the state has no single integrated position on wildlife conservation (both terrestrial and marine) in the country, as epitomised by the range of contradictory legislations and policies. Critics of environmental laws have shown that much of the legal text on the subject is contradictory and deliberately vague, creating an ideal environment for a corrupt state machinery (10). The concurrent operation of the Wildlife (Protection) Act along with pro-industry and controversial environment laws and policies such as the National Environment Policy, 2006, the

EIA notification, 2006 and the Coastal Zone Management notification, 2007, aside from numerous other environment-related laws point to the national confusion on environmental governance. This confusion impacts marine ecosystems, as the WLPA is increasingly applied in this region.

Although fishery laws approach conservation from a resource use and management standpoint, thereby possessing the potential to integrate both conservation and development, continued reliance on the WLPA for marine management cannot but result in a state of heightened mayhem. Would things have been different if environmental considerations were factored into existing resource use laws? Would there be a role for environmentalists and conservationists if we were to focus more on defining and implementing development goals? Clearly, there is need to revisit the drawing board.

Fisheries laws are far from perfect. The record of non-implementation is almost as old as the time of the promulgation of these laws. The fault, however, does not lie in the approach of these laws as much as it does in their design. While the approach of inclusion is commendable in fisheries laws as far as resource extraction is concerned, the laws are not as democratic in their implementation plan, where communities are far removed from this aspect.

The challenges to marine management systems are not uncomplicated. Marine management systems based on restricting activities work well only where fishing communities are an integral part of the monitoring and enforcing mechanisms. Rapid technological advancements in fisheries and a noticeable systemic breakdown within fishing communities make conformity to rules difficult. It is seen that only where fishing communities are still socially organised (such as the Mogaveera fisher caste members in Karnataka and the Pattinavars of Tamil Nadu), and where the level of awareness and political representation is greater, have the communities been able to enforce some form of indigenous or official fishing regulations. People are undoubtedly central to successful marine conservation efforts.

While it is clear that the terrestrial model does not fit the marine regime, there are experiences from terrestrial models that tell us what not to emulate for marine conservation. A combination of models is therefore required from both the terrestrial as well as marine paradigms, particularly where the mistakes of the former are avoided in the latter.

The revision of conservation methods must start with the constituency which is most vocal on these matters. It is time for conservationists to look within. As new entrants to an old arena, lovers of turtles, dolphins, sharks and other marine creatures must accord fishing space the respect this age-old industry and its people deserve. The satirist H L Mencken said that every complex problem has a simple solution, and it is usually wrong! Experience shows that as conservationists we would do well to avoid a general reductionist approach and simplistic responses to the challenges of conservation. It is time to embrace complexities by forgetting old ideas and learning from past mistakes.

Endnotes

1 See M Rangarajan, 'Indira Gandhi: Ideology, the Environment and Policy', *IIC Quarterly*, Summer 2006. Also see S Chainani, *In Defence of Heritage — a Bombay Diary* (unpublished draft)

2 See K Kohli and M Menon, *Eleven Years of the Environment Impact Assessment Notification*, 1994. Kalpavriksh, Just Environment Trust, Environment Justice Initiative (HRLN), 2005; A Sridhar, R Arthur, D Goenka, B Jairaj, T Mohan, S Rodriguez and K Shanker, Review of the Swaminathan Committee Report on the CRZ Notification. Draft submitted to UNDP, New Delhi. URL: http://www.undp.org.in/dmweb/tsunami; accessed May 20, 2006; A Sridhar, Environmental Governance Reforms, Rephrasing the Reform Process. Draft submitted to International Institute for Environment and Development, New Delhi, 2006

3 The full title of the law is Scheduled Tribes and Other Traditional Forest-Dwellers (Recognition of Forest Rights) Act, 2006

4 See the Territorial Waters, Continental Shelf, Exclusive Economic Zone and Other Maritime Zones Act, 1976

5 See J Kurien and A Paul, *Nets For Social Safety: An Analysis of the Growth and Changing Composition of Social Security Programmes in the Fisheries Sector of Kerala State, India*. International Collective in Support of Fishworkers, Chennai, 2000. Also see J Kurien and A Paul, *Social Security Nets for Marine Fisheries*. Working Paper 318, October 2001. Centre for Development Studies, Thiruvananthapuram, 2001

6 V Salagrama, *The Story of Globalisation, Modernisation and the Artisanal Fisheries of India*. Asian Fisherfolk Conference, Hat Yai, 2002

7 N B Gomathy, The Role of Traditional Panchayats in Coastal Fishing Communities in Tamil Nadu, With Special Reference to Their Role in Mediating Tsunami Relief and Rehabilitation. Proceedings of Regional Workshop on Post-tsunami Rehabilitation of Fishing Communities and Fisheries-Based Livelihoods, January 18 and 19, 2006, International Collective in Support of Fishworkers (ICSF), March 2006

8 K Shanker, 'Deconstructing Sea Turtle Conservation in India', in Ghazala Shahabuddin and Mahesh Rangarajan (eds), *Making Conservation Work*. Permanent Black, 2007

9 S Rodriguez, 'Review of the Environmental Impacts of the Sethusamudram Ship Canal Project (SSCP)', *Indian Ocean Turtle Newsletter* 6, 2007, 16-20

10 See M Menon and A Sridhar, 'An Appraisal of Coastal Regulation Law in Tsunami-Affected Mainland India', in Report on Ecological and Social Impact Assessments Post-Tsunami in Mainland India, submitted to UNDP. Post-Tsunami Environment Initiative, 2007, pp 105-149. Also see M Menon, S Rodriguez, A Sridhar, *Coastal Zone Management Notification '07 — Better or Bitter Fare?* ATREE, Bangalore, 2007, p 21

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Aarthi Sridhar heads the Law and Environment Programme at Dakshin Foundation. Her work involves research and advocacy with coastal communities around issues of rights to natural resources and ideas of social and environmental justice

Kartik Shanker is Assistant Professor, Centre for Ecological Sciences, Indian Institute of Science, Bangalore

Sudharak Olwe

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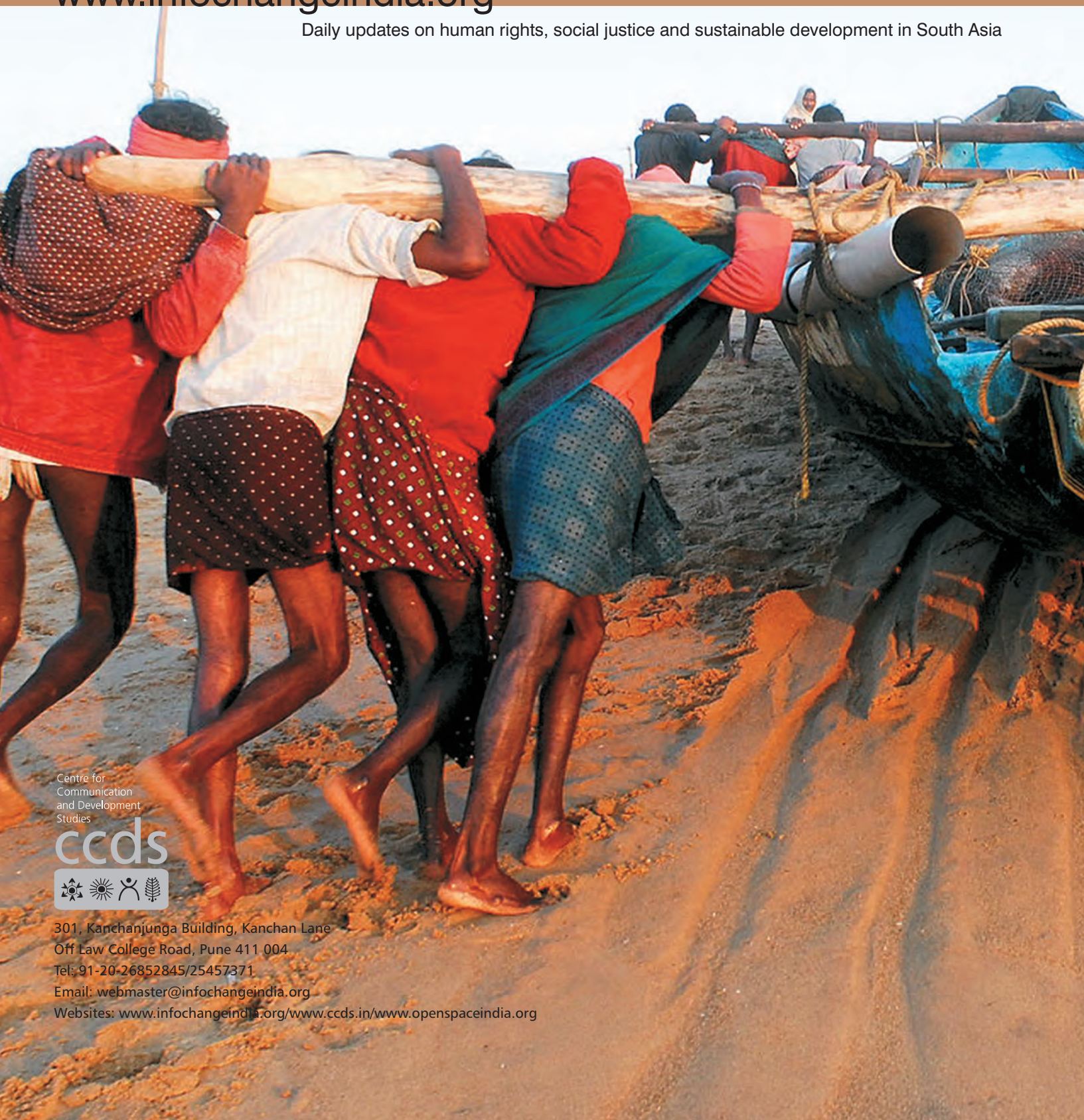

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301, Kanchanjunga Building, Kanchan Lane
Off Law College Road, Pune 411 004
Tel: 91-20-26852845/25457371
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