Beyond the Tsunami

Community Perceptions of Resources, Policy and Development, Post-Tsunami Interventions and Community Institutions

2008

Sudarshan Rodriguez, Gomathy Balasubramanian, M. P. Shiny,
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Front cover photo: Competing beach space use in coastal areas (Photo credit: S. Rodriguez, 2008)
Back cover photo: Mending of nets on the beach (Photo credit: S. Rodriguez, 2008)
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Executive Summary

The December 2004 earthquake and tsunami that swept through the Indian Ocean region had unprecedented consequences for human populations and natural systems along the coasts and islands of the region. The coastline of India was seriously impacted and led to large-scale destruction of not only housing and infrastructure but also affected the fragile coastal ecosystems and resulted in the loss of thousands of lives, assets, livestock and crops.

There have been several rapid post-tsunami socio-economic studies and diverse forms of rehabilitation actions. Rehabilitation efforts that are based on poor socio-economic data could have the potential to promote inequity and also adversely affect resource use. The various rehabilitation efforts must also be evaluated to assess the impacts of such actions on the coastal and marine ecosystem. Thus it was felt important to document what the local communities' views on resources, resource management, state policies, rehabilitation, and the impacts of the tsunami were.

The study also focuses on fisher community perspectives and participation on coastal development and state polices [management of fisheries resources, fishing holiday, banned fishing practices. The component basically looked at three aspects:

- Analysis of the various community institutions, their roles and functions. This provides insight into how they can be strengthened to participate in resource management, local governance and local development planning
- Perceptions of the community towards resources, state fisheries policies, coastal management policies and development on the coast.
- Analysis of the effect and implications of certain post-tsunami interventions strategies on socio-ecological resilience.

Based on this information, some possible focus areas for future interventions are developed. The key focus of these recommendations is to evolve and strengthen policies along with community based governance structures and organizations on resource conservation, use and management. As a result, community resilience in socio-ecological systems can be strengthened to handle change so as to ensure an inclusive, efficient development planning' and natural resource and coastal management.

Major Findings

- Large stretches of beach length which are mostly sandy beaches (41%, 28.35 km) have being use for Casuarina plantations with only 44 % of the shore is open space The average is distance is about 48.81m with the median being 43.98m. various sampling point of the plantation from the approximate tide line at the time of sampling. Thus significant amount of space that would otherwise be sandy beach (and would have been used communities) by is now occupied by plantations.
- There are community institutions that bind the community into collective fora down the coast. They vary down the coast and include traditional village governance [village committee, kadal committee, caste panchayat], church based community groups; and livelihoods based groups. All of them have transformed themselves over time to meet modern demands and work with modern institutions, including the state and church where applicable. Most community institutions have internal, commonly agreed upon regulations for governance of land and sea resources. These usually are based on membership,

consensus and democracy. There is an evolving, shared framework of perspectives about livelihoods and settlements that come from active dialogue between these institutions.

- A significant number of people know something about CRZ. While no one said that they were completely ignorant about CRZ, the knowledge that different villages held was graded on a continuum. Communities view the CRZ's purpose as safety and protecting lives of coastal peoples and are not aware of the purpose of conservation and protection of ecologically sensitive and productive habitats such as estuaries, mangroves, sand dunes, coral reefs, fish breeding areas. Almost all villages expressed the need for community consultation in drawing up this coastal legislation policy.
- Communities have internal regulations of how this beach space is to be used. These regulations vary down the coast depending on the site of the settlement and the nature of near shore fisheries. Most villages develop internal regulations; that are supportive of fisher people across communities; indicative of deeper social identities
- Communities use the beach land for making and mending nets, drying catch, landing and storing boats, repair and maintenance of boats, community and governance meetings; cultural festivals; leisure activities. Thus fishing communities use beach land for livelihood related as well as community cohesiveness reasons.
- For some of these activities, fishing communities use more shore space than what is immediately available before their settlement. Fish drying tends to use more beach space than storing boats.
- Most fisher communities claim that there is over-exploitation of fish in the sea. The three main reasons for over exploitation include lack of control on the use of mechanized means of fishing; increase in number of fishers; use of harmful fishing practices. Most communities report that the 45 day fishing holiday is useful and is needed

Main Recommendations

- Communities have to made aware of the conservation purposes and provisions of the CRZ, and the and the benefits of these for their livelihoods.
- Monsoon ban / fishing holiday is a useful intervention. However, there has to be more scientific information on breeding patterns of fish in different coastal sites, climatic condition and species specificity. There has to be an active effort to understand community knowledge about local eco-systems and fish breeding patterns. This dialogue between modern science and traditional wisdom must be the basis of fixing the monsoon bans.
- Communities down the coast already indicate that they recognise these as the major factors are responsible for the reduction in fish catch and species. It is important to strengthen this awareness with community management measures that use internal community regulations and external regulation.
- Plantations must prioritise cultivating indigenous species that are appropriate for the coastal habitats, and to specific site requirement [water, soil conditions]. Forest department officials must be educated about locally preferred species by the community.
- Forest department officials have to be trained in understanding common land usage, so that they are enabled to respect and recognise traditional boundaries and spaces held across fishing villages.

- Village micro-planning has to be reinforced and communities must be aware of their legal rights over access and benefit sharing in plantation various species. While defining communities affected by plantations, even those plantations proximal to the villages and not just those within village boundaries should be considered. Plans for plantations including the species planted, location of the plantations and the benefit sharing principles should be jointly drawn with the community.
- A detailed enquiry has to be made into how fishing communities traditionally use sandy beaches and how fishing communities regulate their sandy beaches internally. State policy must recognise traditional regulation of beach space use and strengthen these internal regulations. Given that the sea shore is an integral part of fishing communities, the state has to recognise the rights of fishing community to access and use beach space, as well regulate the entry of external actors and ensure rights of community commons as defined by socio-cultural traditional boundaries is recognized by the state
- All relocation efforts must ensure that communities have near access to the sea shore, for not just storing their boats and gear but also for other purposes that they use it for.
- All coastal development plans must assess impact on beach spaces and community usage of these spaces.

1. Introduction to the Study

The study aims to understand and document the social, economic and cultural relations of the fishing communities' with the natural coastal resource base, livelihoods and coastal development. It examines these relations from three points of view: (1) select post-tsunami interventions (particularly plantations and housing); (2) roles and functions of community institutions; and (3) indigenous knowledge and practices of community resource use. This effort considers a variety of natural resources and policy initiatives: settlements, plantations, coastal development as well as sand dunes, sandy beaches, sea and drinking water, and fisheries resources in the sea. The study also focuses on fisher community perspectives and participation on coastal development and state polices (management of fisheries resources, fishing holidays, banned fishing practices). Based on this information, some possible focus areas for future interventions have been developed. The key focus of these recommendations is to evolve and strengthen policies along with community-based governance structures and organisations on resource conservation, use and management. As a result, community resilience in socio-ecological systems can be strengthened to handle changes so as to ensure an inclusive, efficient development planning, and natural resource and coastal management.

The study basically looked at three aspects:

- Analysis of the various community institutions, their roles and functions. This provides insight into how they can be strengthened to participate in resource management, local governance and local development planning.
- Perceptions of the community towards resources, state fisheries policies, coastal management policies and development on the coast.
- Analysis of the effect and implications of certain post-tsunami intervention strategies on socio-ecological resilience.

2. Methodology

Geographical Coverage

Fifty-one fishing villages were covered in the study from five districts in the state of Tamil Nadu, India: Nagappatinam and Karaikal (11 villages), Kanyakumari (four villages), Thirunelveli (one village), Tuticorin (11 villages) and Ramnad (24 villages).

Sampling Technique

There are about 131 villages in north Gulf of Mannar (i.e., north of Tuticorin). Of these nine are in Tuticorin district and 122 in Ramnad district. There are about 40 villages in south Gulf of Mannar (Tuticorin, Thirunelveli and part of Kanyakumari districts). One out of four villages was selected, making the sample around 40 villages in total in the Gulf of Mannar area. To ensure that a wide variety of villages were covered, a number of criteria were used; religion, caste, age, and size of village were considered. In making the final selection, the active support of local partners, the non-governmental organisations (NGOs) - Peoples Action for Development (PAD) and East Coast Research and Development (ECRD), were sought. Villages in Nagappatinam and Karaikal were chosen on the basis of an earlier post-tsunami study conducted by one of the authors of this study. This was also to enable triangulation of data as well as to use the opportunity to see changes in community perceptions. The study on plantations and use of beach space was done by surveying representative stretch in Nagapattinam district i.e. from the village of Kallar to Pazhayar which amount to a shore length of about 70 km

Respondent Profile

In every village, the data collection team met with the local governance structures (parish councils, village committees, heads/leaders/elders of the village, *Gram Panchayat* members, church/temple priests, presidents' of fishermen cooperative societies, teachers, women and youth). The data collection process often extended for an entire day. Many times when some key respondents left to attend to their work, others from the community replaced them. Information collected was cross-checked through telephone conversations with key contact people in the village. Extensive context-setting interviews were conducted with local partners and contacts, and with scholars in the field.

Data Management

Both qualitative and quantitative tools were used. Responses were recorded quantitatively using forms. In addition, key stories and case studies were noted. These were then sorted into qualitative and quantitative information. The quantitative information was recorded in databases. These databases were then refined through repeated iterations to arrive upon core data tables and charts that have been used to prepare this report. Simultaneously, the qualitative information was processed into stories and case studies, and sorted into themes. Both the outputs were scrutinised for insights to arrive upon conclusions and recommendations. The first section gives an overview of the profile of the fishing community castes in the sampled villages. The second section focuses on the study of community perceptions. It covers community perceptions of resources on land and beaches, state policies such as the Coastal Regulation Zone (CRZ) and fisheries as well as coastal development along the coast.

The third section focuses on post-tsunami interventions such as coastal shelterbelt plantations and relocation. It also covers community views and perceptions on the same. The fourth section looks at the roles and functions of the various community-based organisations (CBOs) of the different fishing communities. The fifth and last section consists of the conclusions and recommendations of the study.

3. Profile of Fisher Communities in Tamil Nadu

In this section, we look at the history, caste and occupation of various fisher communities based in the districts of Nagappatinam, Kanyakumari, Thirunelveli, Tuticorin and Ramnad districts in Tamil Nadu.

Ancient Historical References to Coastal Villages

Tracing the history of the coastal village communities still remains interminable. One of the earlier records claim that the ancient inhabitants of the villages (Kanyakumari and Rajakkamangalamthurai) came here after having fled from the Himalayan region to escape the invasion of the Aryans in seventh century AD. Mullimunai (Ramnad district) village claim that the village existed even before the time of Christ. Seventeen villages account that their villages have been there for more than 5–9 centuries. Oral history claims that the Rameswaram temple dedicated to Lord Rama was built in the beginning of the twelfth century (1173 AD), and in 1168 AD people began to migrate to Rameswaram.

3.1 The Fishing Communities of Tamil Nadu

Fishing as an occupation is said to predate settled agriculture. Marine fisheries have always been part of the market system as it was never only subsistence-based. In the Indian context the entire occupation of a single caste is geographically located in a single village, unlike agrarian multi-caste structures (Vivekanandan 2007). They did not, till the tsunami, have much contact with the outside world, except with relation to the fisheries economy (Vivekanandan 2006). There is also very little anthropological and ethnographic research and documentation on fishing castes and communities in India.

The Tamil Nadu coastline can be divided into four belts or stretches: the Bay of Bengal or Coromandel Coast, the Palk Bay, the Gulf of Mannar and the Arabian Sea. There are three major castes, each more or less dominating a stretch or ecosystem: the Pattinavars of the Bay of Bengal coast, the Paravas of the Gulf of Mannar coast and the along the coast of the Arabian Sea, the Mukkuvas. Pattinavars are Hindus while Paravas and Mukkuvas are Catholic Christians. The Palk Bay and the northern end of the Gulf of Mannar are also occupied by an assortment of other fishing castes: Vallyars, Muthurayar, Kadaiyar, Karaiyars (Parvatharajakulam), Konars (Edayar), and, some non-fishing castes (Padayachi Thevar, Vanniyars, Nadars) as well as Muslim fishing communities/villages.

This section gives a synoptic presentation of the village profiles and fishing castes summaries along the coasts of Nagappatinam, Gulf of Mannar and Palk Bay of India stretching from Kanyakumari to Dhanushkodi and from Dhanushkodi to Devipattinam. It covers historical references to villages and community organisations, caste compositions, origin of different caste communities and their livelihoods down the centuries of the coastal fishermen communities in Kanyakumari, Thirunelveli, Tuticorin and Ramnad districts of Tamil Nadu.

3.1.1 History and Age of Villages

More than three-fourths of the villages were formed prior to India's independence with only seven being formed post-independence.

3.1.2 Formation of Villages

Modernisation and mechanisation caused a rapid increase in population, so also in the formation of new coastal villages. In the modern age many villages came into being as the population increased in their mother villages. Due to congestion and livelihood limitations in villages, many people moved and migrated in search of livelihood into coastal areas. Many of the new villages were formed initially by a few families and later on others followed. In some cases this moving out from the mother village took place due to a dispute or disagreement with siblings in the family or members of the village, as a result of which some members were sidelined by their mother villages. In the last case the whole group of families moved out together to new places. Figure 1 gives the distribution of villages by age.

Figure 1: Age of the village

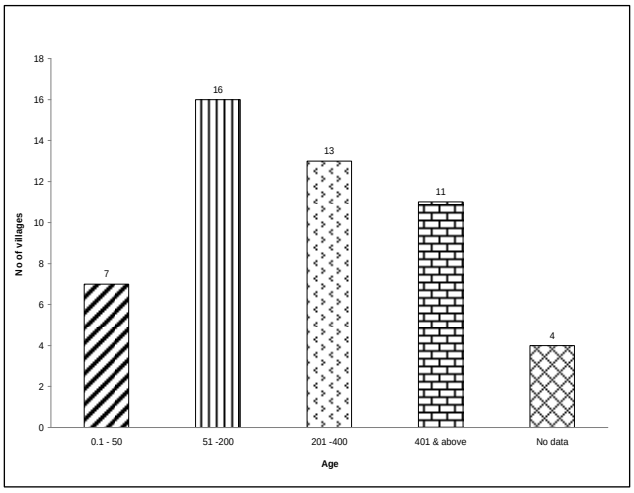

Figure 2: Type of village by formation

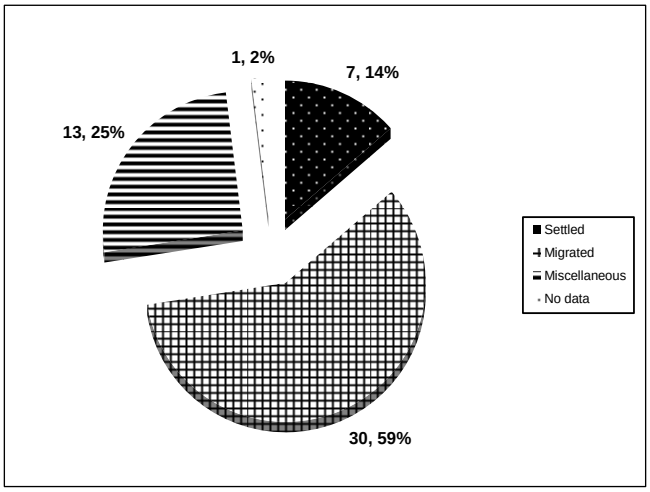

Figure 2 reveals that 30 villages were formed due to migration with seven of these being old settled villages. This also reveals that historically through time a large number of villages have

formed organically and have settled in new coastal beach spaces. However, in the modern context of state land tenure and coastal development, there is very little scope of this happening as it would restrict and actually prevent a new group of fisher folk from migrating to form a new settlement thus breaking a historical organic process.

3.2 Overview of Fishing Castes of Tamil Nadu

3.2.1 The Pattinavar Community

Pattinavars are a fishing community who inhabit the Coromandel Coast from Pulicat in north Tamil Nadu till the southern end of Nagappatinam district. They also refer to themselves as Pattinachettiars; the reference to Chettiars (another trading caste) perhaps being the aspiration of the community to a social status within the Hindu social caste hierarchy in Tamil Nadu. Early accounts claim them to be original inhabitants who fled from the village of Poompuhar with the wealthy Chettiars fleeing inland and toward the west and the poorer ones settling on the coast and taking up fishing (Pattinavars).

They are basically related to each other and kin groups and inter-caste marriage is not encouraged. They are characterised by strong traditional internal governance institutions and structures that resolve and prevent conflicts called the *ooru panchayat*. This *panchayat* maintains community structure, rituals, village membership, resource distribution, dispensing of justice and grievance redressal.

3.2.2 The Paravar Community

From the available history of the studied fishing communities it is evident that Paravars or Paravas were engaged in pearl fishing and trading with Ceylon (present day Sri Lanka) from time immemorial. It is only in the recent centuries after colonisation that they stopped pearl diving and fully ventured into fishing. Paravars were at one point rich as a result of their trade with Ceylon.

There is a general belief among the Paravars that their original country was Ayodhya or Oudh; and that prior to Mahabharata they inhabited the territory bordering on the River Yamuna1. There are different opinions about the origin of the Paravas. Some of the Tantras represent them as descendents of a union between a Brahman and a Shudra woman, while the Jatibedi Nul (a work of some note among the Tamils) states they are the offspring of a Kurava (a basket-maker) begotten secretly by a woman of the Chettiar or merchant tribe. But the Paravas give a different mythological version about their origin2, which states that their ancestors belonged to the race of Varuna (the god

[1] It is said in the Mahabharata that Adiparva, the king of the Paravas, who resided on the bank of the River Jamuna (or Yamuna), having found an infant girl in the belly of a fish, adopted her as his own daughter, giving her the name **Matsyagandhi** . When she grew up, she was employed, as was customary with the women of the Parava tribe to ferry passengers across the river. On a certain day, the sage Parashara met her at the ferry and fell in love with her. She became with child by him, and delivered a son, the famous Vyasa, who composed the Puranas. In later years she married King Shantanu of the lunar race, and by him she became the mother of Vichitravirya, the grandfather of the Pandavas and the Kauravas, whose battle for the throne of Hastinapura forms the subject of the Mahabharata

[2] Paravars relate that their ancestors were of the race of Varuna (the god of the sky, of rain and the celestial ocean). They say that when Lord Shiva created Kartikeya (god of arms), to destroy the overwhelming power of the Asuras (evil spirits), the Paravas sprang up along with Kartikeya from the sacred lake Sarawana and were like him nursed by the group of Kartikas. At the close of the last *kalpa*, when the whole earth was covered with flood, they constructed a *dhoni*

of the sky, of rain and the celestial ocean). The Paravars were once very powerful and had much knowledge of navigation. They had a series of kings among them, well known by the title of Adiyarasen some of whom had resided at Uttra Kosamangay, called at that time the city of Mangay, in the neighbourhood of Ramnad. In *Valevisu Puranam* there is story[3] which states that Parvathi, the wife of Lord Shiva, and her son Kartikeya had to undergo transmigration as a punishment, and as a result she was born as a daughter of Triambaka, king of the Paravas.

Conversion to Christianity

Paravars were Hindus before their conversion to Christianity. (Some say they were not Hindus though they did practice idol worship). At the end of the fourteenth century Vasco de Gama and a number of Portuguese traders arrived in Mannar to trade in pearls. 'The Paravars were the original holders of fishery rights prior to the arrival of the Portuguese. There was a strong competition from the restless Muhammadan settlers of the coast who had come from the Persian Gulf and knew only pearl fishing' (Hornell 1922). The Portuguese helped the Paravar community by giving them back the right to pearl diving. In gratitude the Paravars converted to Christianity. Five Portuguese missionary priests came from Kochi and Christianised around 30,000 Paravar community members. The community though continued with their traditional ways of worship and did not adopt Christian rituals and worship. Hence later in 1542, many of the Parava villages in Kanyakumari, Thirunelveli, Tuticorin and Ramnad district including Rameswaram, Devipattinam were reconverted by St. Francis Xavier.

3.2.3 The Nadar Community

For centuries the Nadar community had been thriving by tapping Palmyra, making jaggery (candy made from palm juice) and trading in jaggery with Ceylon and other places. The Nadars began fishing just two centuries ago. Even now they do Palmyra tapping for 6 months and fishing for another 6 months if there is sufficient catch available. With reduction in catch and non-availability of palm trees some of them go in for construction and other coolie work. There is a legend about the origin of the Nadars. The Nadars are the descendents of Kshatriyas, sons of Sapta Matrikas, begotten by Veda Vidyadhara (Lord Vishnu or Hari), and brought up by Goddess Mahakali[4]. They

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or big boat, and by means of it escaped the general destruction. When dry land appeared, they settled on the spot where the *dhoni* rested. Hence this place is known as Dhonipura.

[3] Parvathi, the wife of Lord Shiva, and her son Kartikeya, had offended the deity by revealing a secret. Both were condemned to leave their celestial mansions and pass through an infinite number of mortal forms, before they could be re-admitted to the divine presence. On Parvathi's entreaty, however, they were allowed as a mitigation of the punishment, each to undergo but transmigration At about this time, Triambaka, king of the Paravas, and Varuna Valli his consort were involved in *tapas* (penance) for a child. Parvathi consented to be incarnated as their daughter under the name of Tirywer Madente. Her son Kartikeya, transformed himself into a fish and roamed for some time in the north sea. Leaving to the south sea, he grew to an immense size and attacked the vessels employed by the Paravas in fishing thereby threatening to destroy their trade. The King Triambaka made a public declaration that whoever would catch the fish would have his daughter as a wife. Shiva, now assuming the form of a Parava, caught the fish and was thus re-united with his consort Parvathi.

[4] The central core of this myth tells of seven celestial virgins who, while bathing in a stream, caught the eye of Lord Indra. Collecting their saris, Indra sat down behind a bush to watch and wait for the virgins to emerge from the waters. As they did so, Indra caught and consorted with each one of them. The seven virgins each gave birth to a male child, and returning to their celestial world, they abandoned their sons. The Goddess Bhadrakali took pity on them and brought them up as her own sons. One day, the River Vaigai near Madurai breached its banks, and as the city was

held titles such as Santor, Nadar, Valam Kai Usar Uyir Kondor (*bahu bala dhanyakas* or the right hands) and Ila Veera Rajar (kings of Ezham), etc. A number of areas are mentioned as the place of the Nadars' origin: the Cauvery region of the Chola country, Madurai and southern Travancore. Robert Caldwell[5] tried to establish the Nadars as 'emigrants from the northern coast of Ceylon. They appear to have, in the earliest times, settled down as rulers in several parts of the country' (Caldwell 1961). Regarding the historical, racial and dynastic links of the Nadars (Shanars)[6] Aiya writes in the State Manual of Travancore: '[t]he Shanars are a class of Hindus inhabiting Thirunelveli and southern taluqs of Travancore'(Aiya 1989). Nadars are indigenous people. According to Dr. Robert Hardgrave Jr., Nadars and Maravars had a common heritage (Hardgrave 1969)[7]. In different regions Nadars are known by different names. For instance, in Andhra Pradesh, Nadars are called Idigas, in Karnataka Billavas, in Kerala Eezhavas and so on.

Conversion to Christianity

When the European missionaries came to India, a section of Nadars were converted to Christianity[8]. It is also learnt that some of them learned fishing after they began to go fishing along with the fishing community.

3.2.4 The Valayar (Muthurayar) Community

It is said that Valayar communities were hunters in ancient times and started fishing, and collecting conch and oyster when they made their home in the coastal areas. It is truly an amazing sight to see Valayar women collect sea moss (*kadal pasi*) from the sea and at times when male crew is absent,

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threatened with flooding, the Pandyan king ordered all males to carry earth in baskets upon their heads to rebuild the bund. The seven sons refused to obey the king saying, "We were meant to carry crowns upon our heads, not baskets." The king was furious and ordered that one of them be buried in the sand up to his neck and that his head be kicked off by an elephant. The order was obeyed, and the head, as it was cast into the flood waters, cried, "I will not touch the basket." In a rage, the king ordered that a second brother be treated likewise, and as the head floated away, it cried, "Shall this head prove false to the other?" The king was greatly frightened by these strange happenings and freed the remaining five sons, from whom the Nadar race is said to have originated. To this day, the Nadars say, they will not touch the basket.

[5] Robert Caldwell (1814–91) Scottish missionary, the first Bishop of Thirunelveli.

[6] Nadars belong to one of the races that are commonly classed as Dravidians; Tamil being their mother tongue. The correct form of the name of this race is Shandrar which is derived from a Tamil word Sal. The expressions Shandror and Shandravar are also derived from the same root, but are different forms of Shandrar.

[7] Nadars and Maravars claim lineage from Padiyan rulers. Even today both possess the common name Pandiyan. Due to the invasion and domination of the Aryans, Nadars were added in the caste ladder as untouchables. The Aryans and their agents took away the lands depriving them of their source of income. The Nadars who settled in the sand dune areas planted palmyra trees that gave them livelihood, through toddy tapping, making jaggery and other palm products that were sufficient to meet their needs. Another section of Nadars took to business. Nairs who were politically and economically dominant tried to oppress the Nadars and there have been a continuous feud among these two communities for centuries.

[8] Of the early European missionaries in India, the Jesuits working among the pearl fishers of the Tuticorin coast were the first to encounter the Nadars. In 1680, the first congregation of Nadars was started at Vadakkankulam, in what is now Nanguneri taluk, with the conversion of a Nadar woman. A church was built in 1685, and a permanent mission was established in 1701. By 1713, there were more than 4,000 Christians in the Vadakkankulam parish, nearly all of whom were Nadars (Western c.1950).

women go for fishing (Valayarvadi at Vedhalai and Thevar women in Thoppuvalasai of Ramnad district. This started since 30 to 40 years ago). It is common in many of the Valayar communities' for women to go for collecting seaweed and oyster. There are different views about the origin of the Valayar community. One story says that the Valayar come from the race of Guhan who was a fisherman in the period of Lord Rama. Guhan helped Rama cross a river, as a result of which Rama accepted Guhan as his brother. Valayar (Muthurayar) community is a sub-group of hunters called Vedavar. Kannappanayanar[9] comes from the race of Vedavar. They are the descendants of Kannappanayanar who was a devotee of Lord Shiva[10]. Kannappanayanar had come from Thirukaalahasthi in Andhra Pradesh. Valayar's forefathers are thus believed to have come from Andhra Pradesh. They were staying in the forest and lived by hunting, collecting roots and fruits found in the forest in the ancient period. As ages passed they settled in the coastal areas and started fishing for their livelihood.

Muthurayar (Valayar) Rulers

Perumbidugu Muthurayar who ruled Trichy centuries ago was the descendant of Pazhavettarayar[11]. All the Muthurayars are the descendants of this royal community. A booklet published by one Professor M. Rajashekara Thangamani, on the occasion of 1330th birth anniversary of Perumpidugu Muthurayar-II, offers some information about this community. According to this research paper, the Muthurayar community had their golden days in the seventh, eighth and ninth centuries AD. Even though there is no conclusive proof about the origin of the community, the said paper claims that there were Muthurayar kings like Perumpidugu Muthurayar-II, who ruled a part of Tamil Nadu, with the capital at Tanjore. The paper also claims that Muthurayar kings functioned as rulers under the major kings of Chola, Pandya and Pallava dynasties. There is also an intriguing reference about the Muthurayar kings, who at one stage supported the Pallavas against the Pandya kings and then took over the rule from the Pallavas. However, the reign of the Muthurayars was short lived due to the resurgence of the rule of the Chola and the Pandya kings. Another interesting feature in the said paper is that their counterparts are found in West Bengal, Bihar, Uttar Pradesh, Madhya Pradesh, Orissa, Maharashtra, Andhra Pradesh, Karnataka and Kerala under different names[12].

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[9] Kannappanayanar was one among 63 Nayanmar who were the promoters of Saivite religion.

[10] Kannappanayanar was a hunter, and an ardent devotee of Lord Shiva. One day he found a *lingam*, the phallus shaped symbol worshipped as Shiva, in the forest. Each day after his daily hunt he worshipped the *lingam*, spitting on the statue in order to clean it and offering it whatever he had caught. Shiva wanted to test him and his devotion. One day an eye appeared on the *lingam* that began to bleed. Kannappanayanar, thinking that Shiva had hurt one of his eyes gouged out his own and placed it on the site of the wounded eye. Soon he noticed that the other eye on the *lingam* too had started bleeding. He removed his other eye as well placed it on the second eye of the statue after feeling the statue with his leg. Shiva was pleased with his devotion and he appeared to Kannappanayanar. Thus Kannappanayanar gained enlightenment and composed many devotional songs in praise of Shiva. Then Shiva took Kannappanayanar by his Pushpakavimanam (aerial chariot) and kept him on his right hand side. So hence forth they are called Valayar (*valathu purathil*)

[11] During the period of the Chola dynasty, when Uraiyoor was the capital of the Chola kingdom, the Cholas had many local kings who were their supporters. One among them called Pazhavettarayar (from the Muthurayar community) was the king of Pazhuvoor.

[12] Muthurayar are also known as Muthuraja, Muthiriyar, Amblam, Amblakkaran, Servai, Servaikkaran, Valayar, Kannappar kula valayar, Paradhavalayar, Paleyakkarar, Kavalkkarar, Thalayari, Vazhuvadiyar, Poojari, Muthiraj, Muthiria Mooppar, Muthiria Mooppanar, Muthiria Nayakar, Muthiraja Naidu, Vanniakula Muthuraja, Muthiria Oorali Kounder, Muthia Rao. In these names there are Christians as well as Hindus.

Muslim Communities

Abraham's (the patriarch of the Israel nation in the centuries before the birth of Jesus Christ) son Ishmael's decedents are known as Ishmaelite. The forefathers of Muslims were thus Jews. Even the prophet Muhammed Nabhi and his three generations were not Muslims. Prophet Muhammed Nabhi preached during the sixth century AD and his followers were known as Kurasi Vamsam; and they were Muslims. There are also divisions (caste) among Muslims[13]. The Jews, who converted to Islam after hearing his preaching, followed the four way form of worship (Imaam). But there is no difference among the different castes in Muslims–the Quoran teaches equality among them and there are no big or small or rich or poor.

Entry into Fishing

Around 1,000 years ago, Muslims came to India from Egypt in search of work. Muslim men are evicted from Egypt, Syria and Yaman countries and taken Paravar girls in marriage in the early years. From the account of J.Hornell (Hornell 1922) there seems to have been a strong competition among the Muhammadan settlers on the coast for pearl fishing, an activity that they had earlier been involved with in the coast of the Persian Gulf. The descendants of these Arabs and their proselytes, known as Moores to the Portuguese, are the Moormen of Lubbais of today. Their chief settlement in southern India was Kayal, a town situated near to the mouth of the river Tambraparni (Tamarabharani), and which in Marco Polo's time (1290-91) was a great and noble city. It shared with Tuticorin, for fully 500 years, the honour of being one of the two great pearl markets along the coast—the other being the Paravar headquarters. The majority of the present Muslim population are involved in fishing—quite few of them do fishing in the coast of Gulf of Mannar and Palk Bay—or working in countries in the Middle East.

3.2.5 The Kadaiyar Community

The name Kadaiyar is formed from the Tamil word *katai* which means to 'grind or churn'. Some of the researchers like Ponnampalam Regupathy identify the community as lime plaster grinders .There is a vibrant tradition which says that the Kadaiyars were assigned by gods to monitor the 'churning of Amrith' from the legendary Thirupparkadal. A few social scientists and certain lexicons consider the name Kadaiyar as derivative form of *kadai*, which means the 'last or lowest'. So Kadaiyars are defined as 'men of the lowest rank or status'. But Kadaiyars dislike this interpretation and consider themselves to be the descendants of Kuhan the last (Kadai) brother of Lord Rama. Kadaiyars were also known as Pattamkatty[14] , which is their caste title. Francis Houtart says that 'Kadaiyars were not caste Hindus but animists in the past' (Houtart 1969). But today they practice both Hinduism and

[13] The different castes among Muslims are Safi who addresses their parents as *vappa* and *umma*; Anafi addresses their parents as *atha* or *appa* and *umma*; Mali and Comply addresses their parents as *bava* and *ma*. It started during the time of Muhammadu Nabhi. There is, however, no difference among the different castes. The only difference is in the way of Imaam. Imaam is the number of times of worship. Safi worship five times per day (Sunnath Thozhukai-2, Fur Thozhukai- 3) and Anafi worship six times a day (Sunnath Thozhukai-4, Fur Thozhukai-2). Muhammed Nabhi introduced the four way form of worship.

[14] There is a story which says that Kuhan the last brother of Lord Rama who was also a fisher, assisted him at the coronation ceremony and got the title Pattamkatty and this title is passed on to his descendants who are Kadaiyars. This title is used by other castes such as Paravar, Kaikilavar, Nulaiyar, Mukkuvar, Karaiyar and Velaiyans to refer to their headman in the past. But generally it is used by Kadaiyars as their caste title. Yet there is another tradition which says that the kings recognised their expertise in lime grinding by dressing them with headband (*thalaipagai*) and giving them the title Pattamkatty inscribed on copper plates.

Christianity. Hindu Kadaiyars worship Goddess Santhana Maraiamman in many places. Hindu revivalism could be seen among the Kadaiyars in the recent past.

Conversion to Christianity

The ancestors of Kadaiyars lived in Punnakkayal and Kayalpattinam coastal villages. They were engaged in pearl diving like the Paravar community. They formed the minority in the village, and were often in conflict with Muslims in pearl diving. Pattamkatties thus approached Portuguese for help. On the condition that they would convert to Christianity, the Pattamkatties were given the license for pearl diving by the Portuguese. In gratitude for this help 85 Pattamkatties converted to Christianity. As mentioned earlier five Portuguese missionary priests had came from Kochi and Christianised around 30,000 Paravars community members. During these periods the Kadaiyar might have also converted to Christianity. Paravar communities were more powerful than Kadaiyars because they were more in number. Kadaiyar are also known as 'Fernandos'.

Spread of Kadaiyar in the Ramnad District

As the population increased some Kadaiyar families moved and settled in Kayalpattinam. There was, however, considerable religious tension among the people. So the Kadaiyar community escaped to Vedhalai in Ramnad district and lived there for many years. Anthony Criminali S.J, a Jesuit priest from France, converted the people in Vedhalai during St. Francis Xavier's visit to some places in 1548. In 1549 the ruling Sethupathi kings ordered the killing of Kadaiyars and beheading of Anthony Criminali. The Kadaiyar community fearing for their lives scattered all over Rameswaram Island. Many went to Devipattinam, Thiruppalaikudi, Karangadu, Puthupattinam (old name Kankollanpattianm), Thondi, Akkalmadam, Ariamkundu, etc., and settled there. They were later taught Christian rituals by St. Francis Xavier who stayed there for a while.

Occupation

According to the Kadaiyars, they were pearl and oyster divers and traditional fishermen like the Paravars in the ancient past (before their conversion to Christianity), in Tuticorin district. Early researchers, however, identify them as lime burners. The Gazette of Ramnad refers to the Kadaiyar as fishermen renowned for conch fishing. Today, fishing is their main occupation. Some Kadaiyar who own land have coconut plantations and cultivate jasmine. Some villages like Thanneeroottu and some houses in Thirupalaikudi are involved in net making due to the depletion of fishery resources.

3.2.6 Konars, Karaiyar (Parvatharajakulam), Padayachi and Thevar

Other castes communities were also studied such as Konars who were shepherds by profession and entered fishing about one or two centuries ago. At present, some of them work as construction labourers in the season when fish catch is low. Padayachy and Parvatharajakulam (Karaiyar) are traditional fishermen. The Thevar community entered fishing recently. They were earlier farmers or body guards of kings.

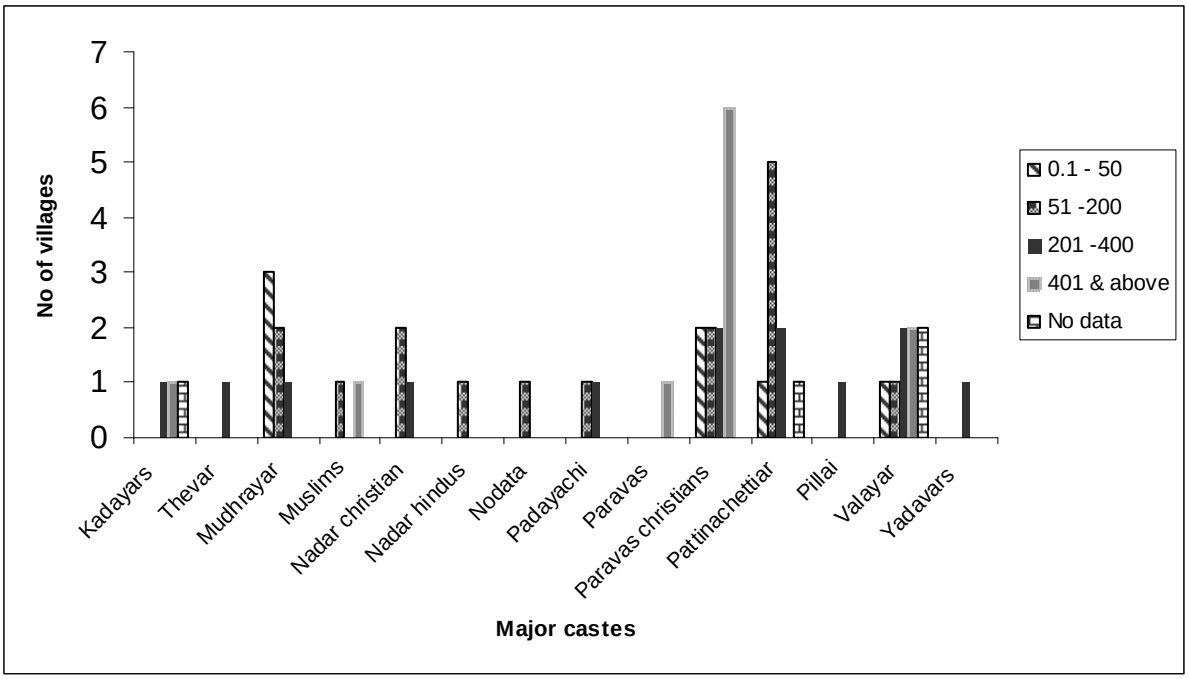
3.3 Age and Caste Details of Sampled Villages

If one combines the age of formation of villages by caste in the sample set, Pattinavars (Pattinachettiars), Valayars, Paravars and Kadaiyar fishing communities are the oldest along the coast and probably the traditional fisherfolk of the Tamil Nadu coast. This is also illustrated in Table 1 and Figure 3.

Table 1: Age and majority caste in sampled villages

S. No	Major caste	Age				
		0.1– 50	51–200	201–400	401 & above	No data
1	Kadayars	0	0	1	1	1
2	Thevar	0	0	1	0	0
3	Mudhrayar	3	2	1	0	0
4	Muslims	0	1	0	1	0
5	Nadar Christians	0	2	1	0	0
6	Nadar Hindus	0	1	0	0	0
7	No data	0	1	0	0	0
8	Padayachi	0	1	1	0	0
9	Paravas	0	0	0	1	0
10	Paravas Christians	2	2	2	6	0
11	Pattinachettiar	1	5	2	0	1
12	Pillai	0	0	1	0	0
13	Valayar	1	1	2	2	2
14	Yadavars	0	0	1	0	0

Figure 3: Age vs. majority caste of village



3.3.1 Sampled Villages and Beach Distances

If one looks at the distance of villages sampled from the shore, 42 percent (22) are within 50 m from the shore, 70 percent (36) within 200 m and 92 percent (47) within 500 m. The same is illustrated in the Figures 4 and 5.

Figure 4: Distance of villages from the seashore (in m)

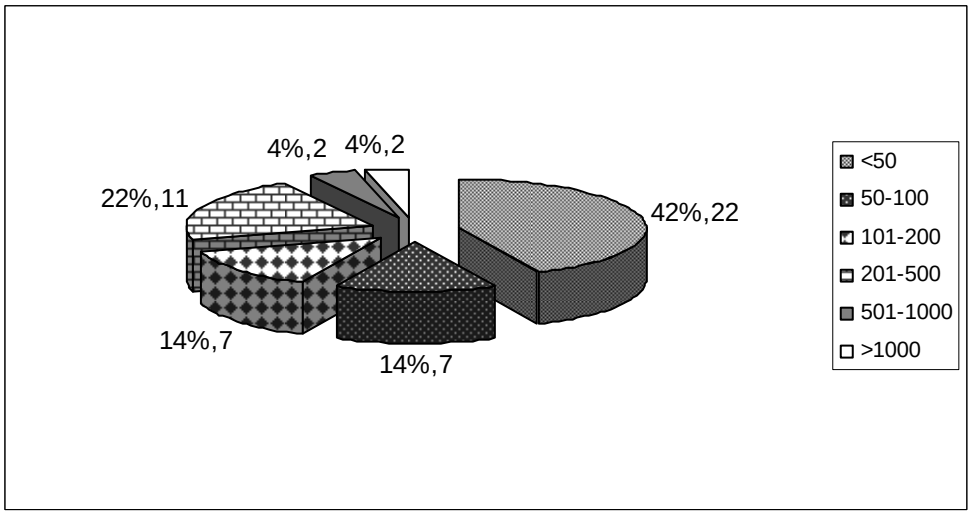
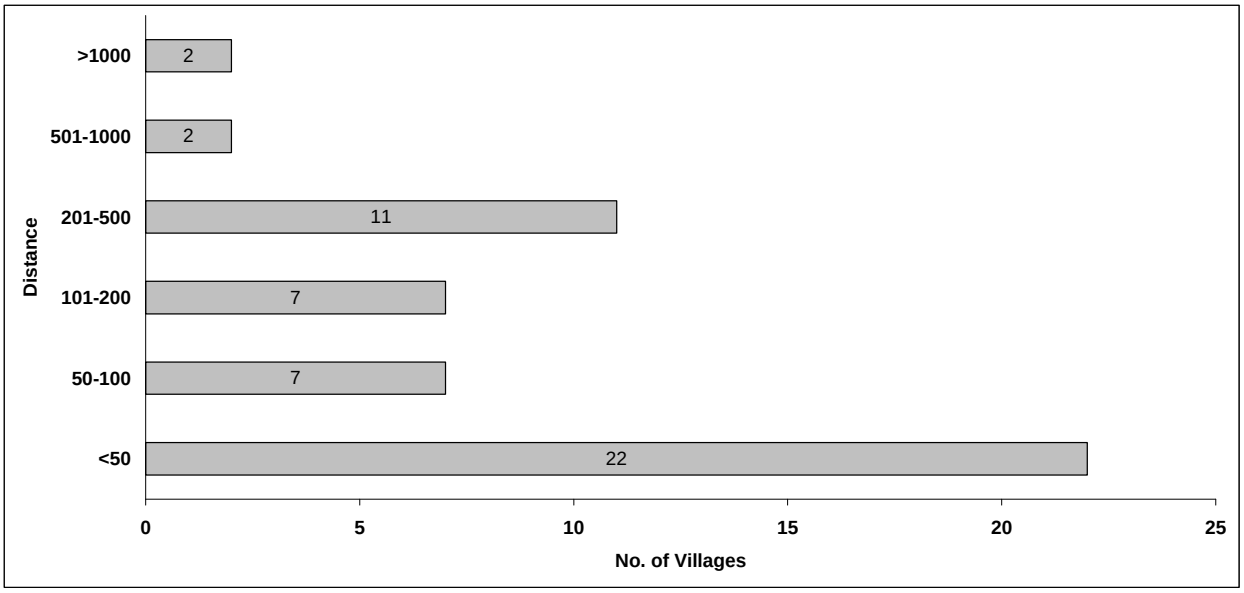


Figure 5: Distance of villages from the seashore (in m)



Traditionally fishing communities live close to the shore. Observing the sea for changes before going on fishing trips is an integral part of their traditional knowledge and is essential for planning their fishing. In addition, the seashore is central to their social, cultural and economic fabric, i.e. the way their communities are organised. Historically, communities have evolved an intimate relation with particular stretches of coastline that they use, primarily in front of their settlements and extending on either side. The boundaries of these stretches for each community are clearly demarcated traditionally, geographically and culturally.

4. Community Perceptions of Resources, Policy and Development

4.1 Community Perceptions of Policy

4.1.1 Community Awareness of the Coastal Regulation Zone Notification 1991

The CRZ Notification of 1991 was specifically aimed at protecting coastal habitats by regulating or prohibiting the use of these areas or its resources (Menon & Sridhar 2007). While it has been more than 17 years since the notification, there have been no studies documenting community perceptions of the notification and the level of awareness of the same among the community.

All the villages sampled have heard of the CRZ with more than 30 (59 percent) of the response being 'yes'. Figure 6 illustrates the responses. A detailed break-up of the kind of responses is shown in Figure 7.

Figure 6: Community awareness of the Coastal Regulation Zone Notification

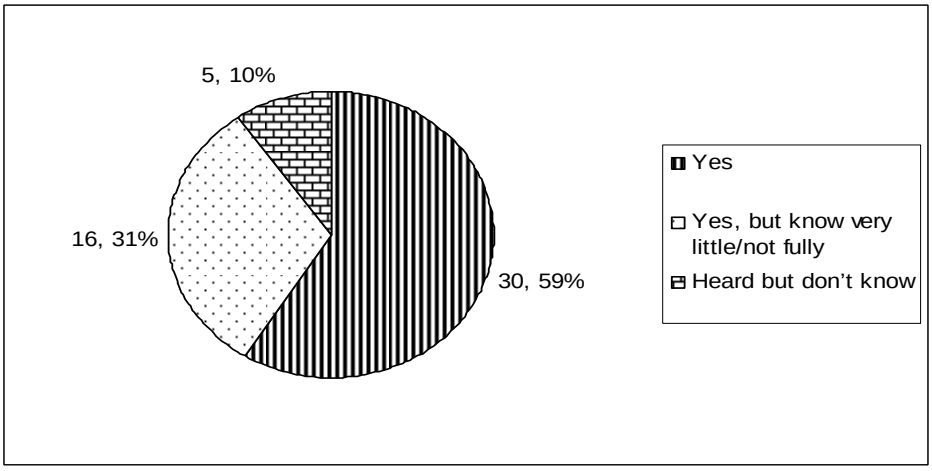
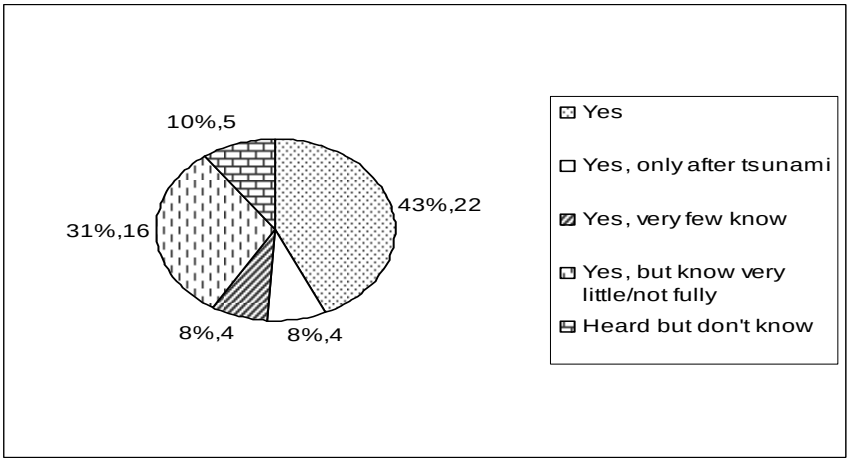


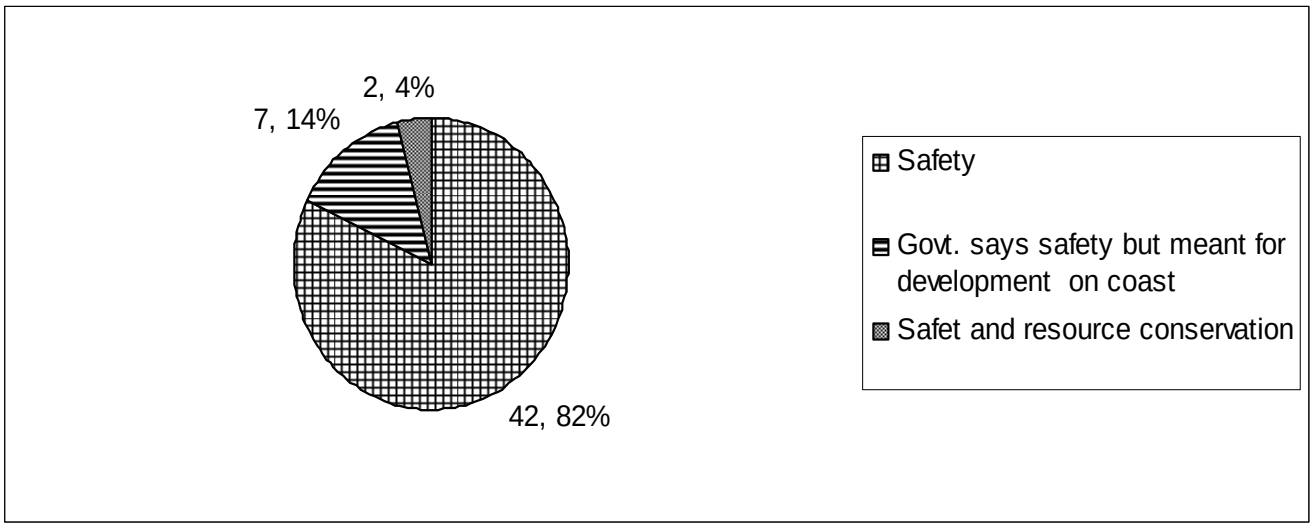
Figure 7: Detailed breakup of responses on the community's awareness of the Coastal Regualtion Zone Notification



Perceptions on the Purpose of the Coastal Regulation Zone

However, on the question of the purpose of the CRZ Notification, most of the communities—82 percent (42 of 51 villages)—cite safety as it main purpose with 14 villages specifically mentioning the tsunami. Only 4 percent (2) villages cited resource conservation as one of the purposes of the CRZ. Interestingly 14 percent (7) villages attributed the CRZ to be in favour of development, and of private and vested interests (Figure 8). These communities seem to be aware of the changes in the CRZ over time with its various amendments and divergence in interpretation of its clauses which in their view diverted/changed the from the original objective of the notification. There is shift in the understanding about the purpose of CRZ. Communities are not aware of the purpose of conservation and protection of ecologically sensitive and productive habitats such as estuaries, mangroves, sand dunes, coral reefs and fish breeding areas. Instead CRZ's purpose is now understood as protecting lives of coastal peoples.

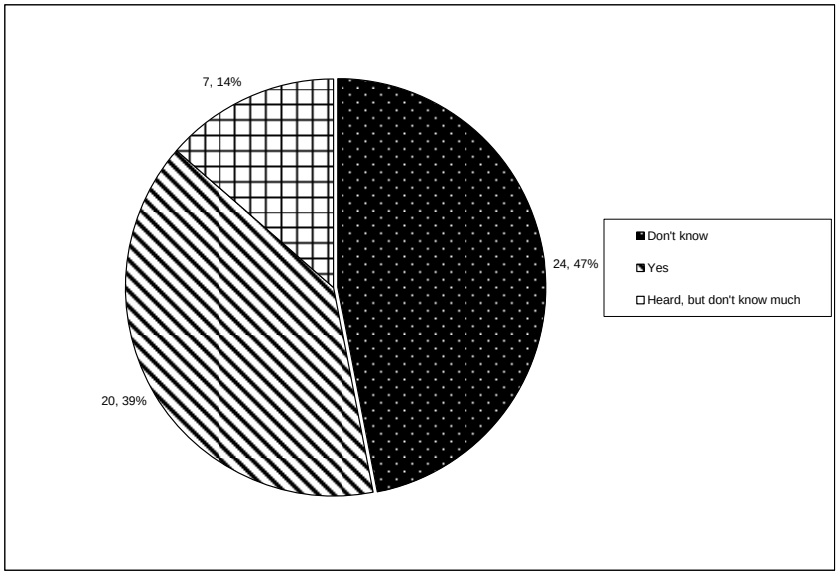
Figure 8: Community perceptions on the purpose of the Coastal Regulation Zone Notification



Coastal Management Zone and Swaminathan Committee Report on the Coastal Regulation Zone Notification

On the Coastal Management Zone (CMZ) and the M.S. Swaminathan committee report on CRZ an overwhelming 47 percent (24) villages had not heard of either. All the villages sampled in Nagapattinam district had heard of the same as the data collection was done during the recent Centre for Environment Education consultations in Tamil Nadu. However, they attributed the knowledge of the same due to the efforts of a local NGO SNEHA that has been active on CRZ awareness and issues in the district for many decades. The responses are shown in Figure 9.

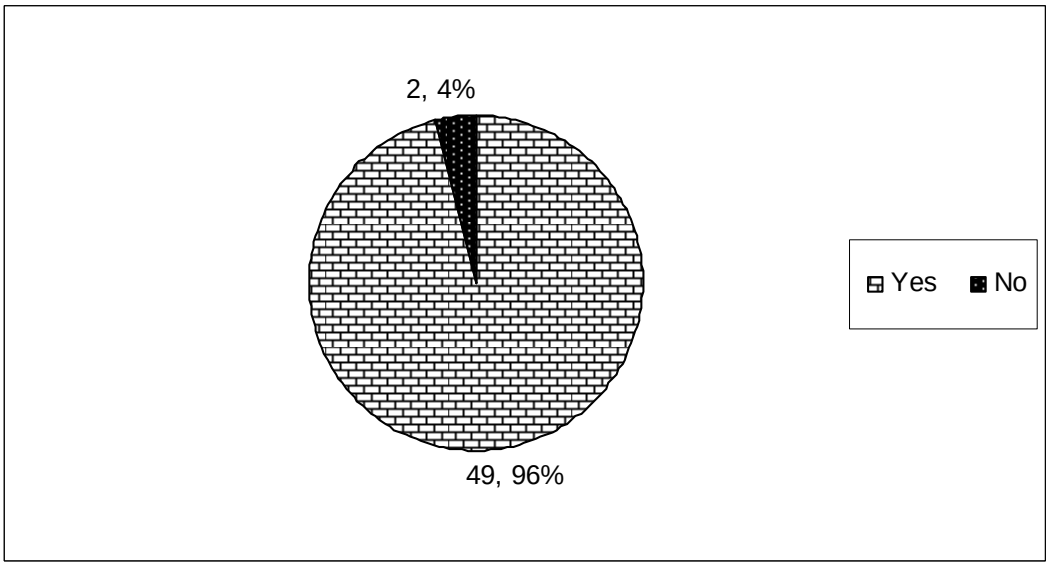
Figure 9: Awareness about the Coastal Management Zone and the Swaminathan Committee on the Coastal Regulation Zone Notification



Community Participation in Coastal Policy/Legislation Making

On whether the community should be involved in coastal policy/legislation making, almost all villages very strongly emphasised that they must be consulted for the same. Ninety-six percent (49 of the 51) villages have responded 'yes' to this question (Figure 10).

Figure 10: Community view on consultation process

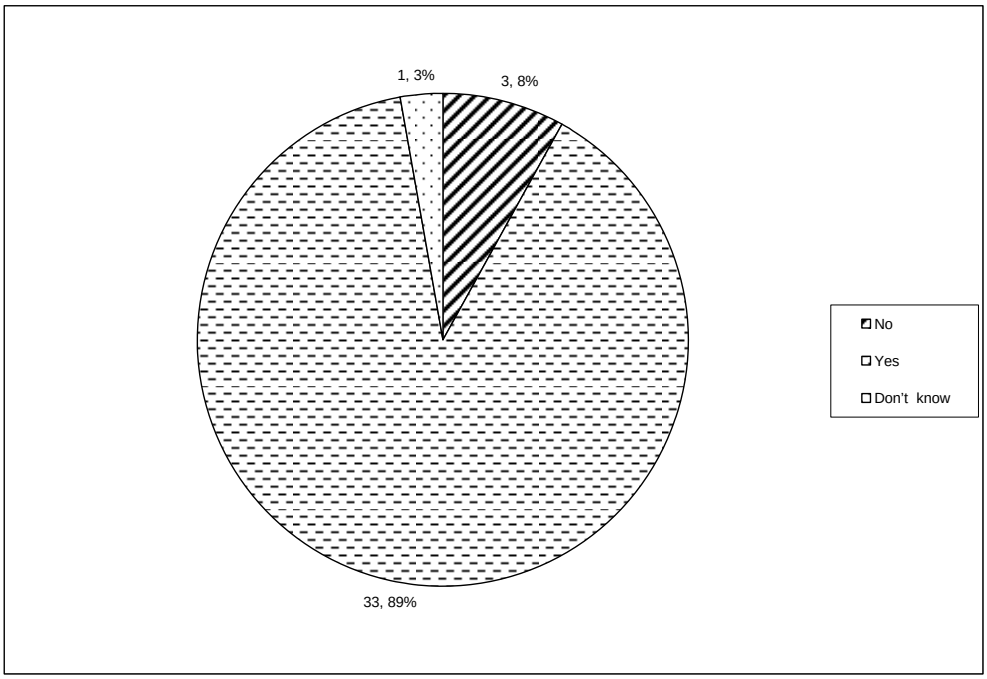


4.1.2 Community Awareness of the Fisheries Laws

In the case of fisheries policy two questions were asked: first was if there should be a fishing holiday and second was on the right time for a fishing holiday. To the first questions there was more or less

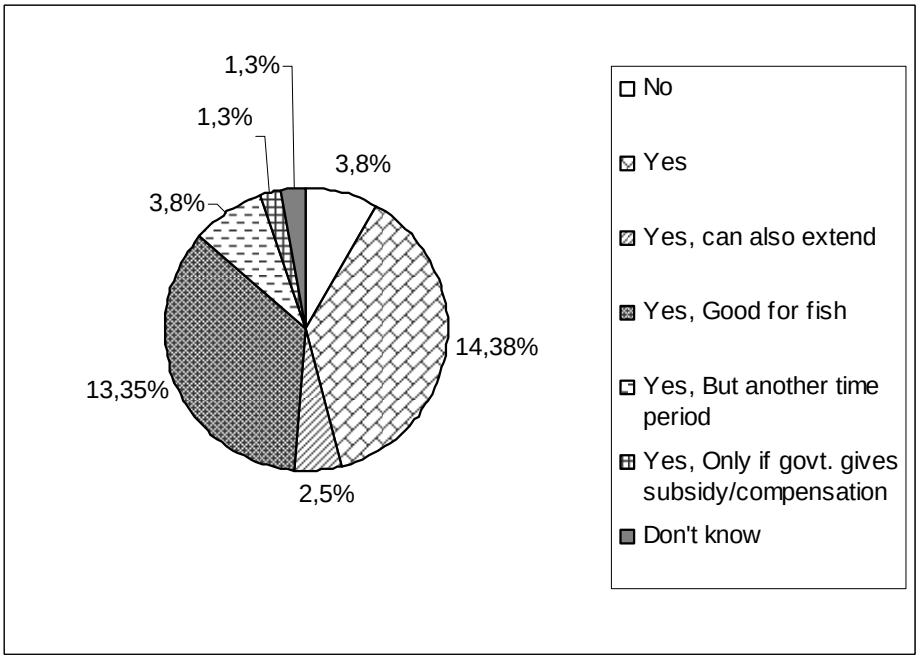
unanimous agreement that there should be a fishing holiday—89 percent (33) villages saying 'yes' to a holiday—which is shown in Figure 11.

Figure 11: Community view on whether there should be a fishing holiday



A detailed sub-classification of the responses is show in Figure 12.

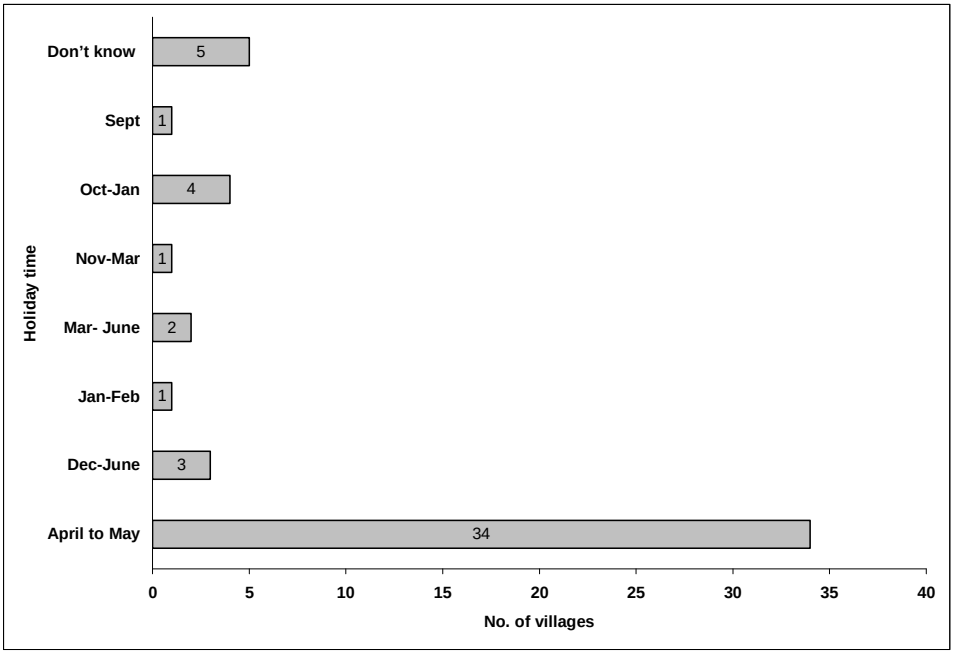
Figure 12: Details of community's response on whether there should be a fishing holiday



The responses have been surprisingly positive towards the fishing holiday. Despite the decline of catch (and hence income) of fishing communities over the past years, this positive response reveals an inherent opening to resource management measures.

On the question of the right time for the fishing holiday, the responses did not show any region wise variation. The overall results are shown in Figure 13.

Figure 13: Right time for a fishing holiday



4.2 Community Perceptions of Resources

4.2.1 Perceptions and Uses of Beaches

Beaches are an extremely important and crucial fabric of the socio-cultural and socio-economic landscape of fishing communities. The various broad classifications of the responses given on beach space are given below:

Livelihood

- Boat landing and storage
- Boat repair and maintenance
- Catch drying (includes fishes, seaweed and conches)
- Pulling nets, shore seine
- Storage of nets
- Making, mending and maintenance of nets (also cleaning and drying)

Social

- Sports

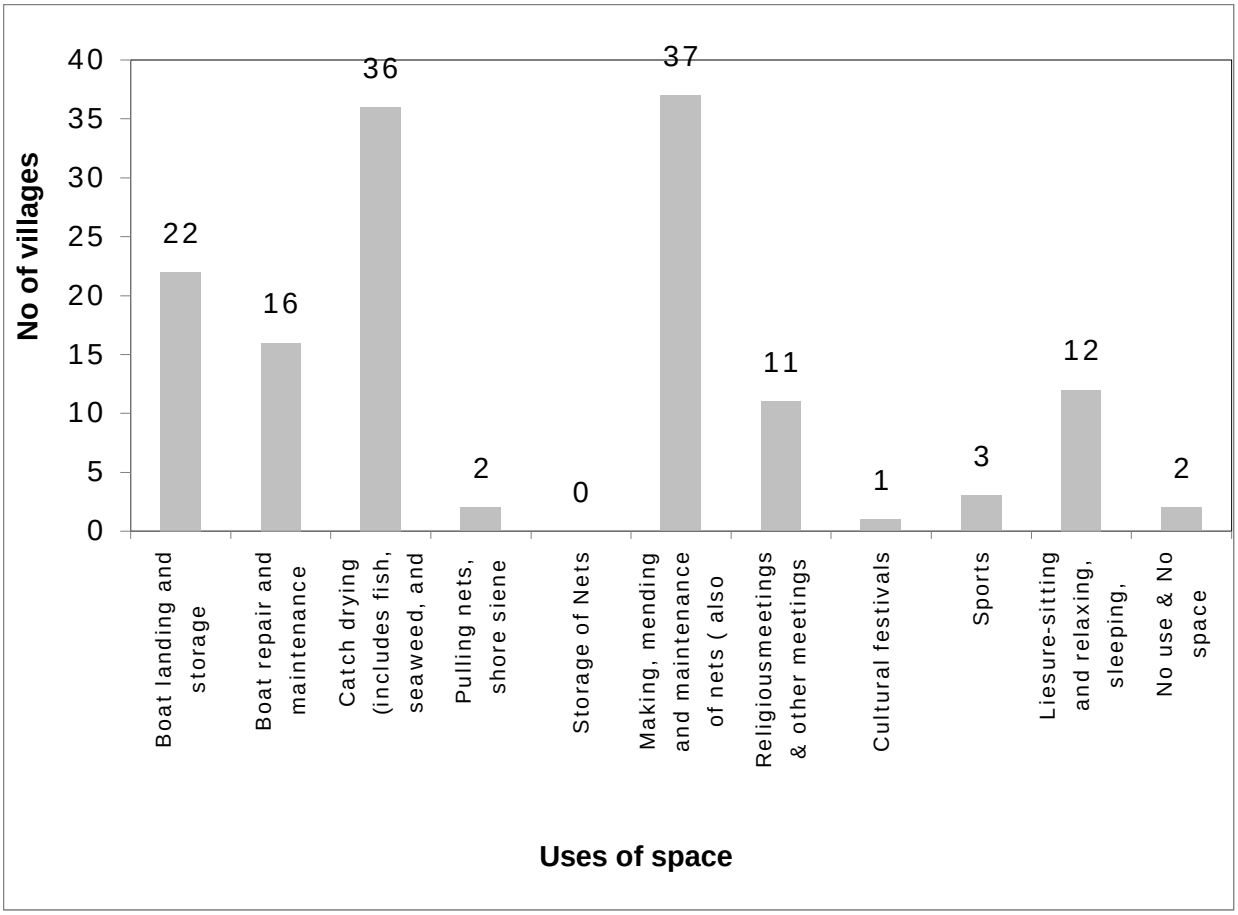
- Leisure-sitting and relaxing, sleeping, talking
- Meetings

Cultural

- Cultural festivals

A quantitative and graphic representation of the responses is shown below in Figure 14.

Figure 14: Use of beach space

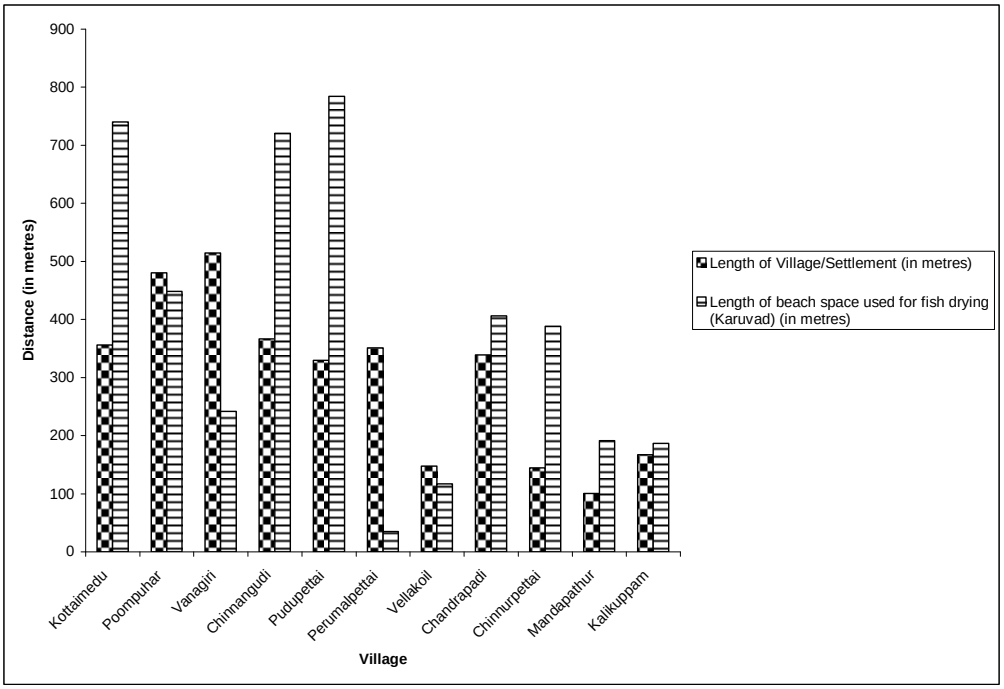


It is important to emphasise here that the boundaries and uses of beaches by villages extend far beyond the shore area in front the settlement itself. This is illustrated in the tables and charts below depicting the length of shore space used for boats and fish drying. [1]

In the case of boat space use (Figure 15), the mean and median of the difference is 77.3 m and 24.91 m. The mean percentage difference when compared to village length is 28 percent (28 percent more than village length).

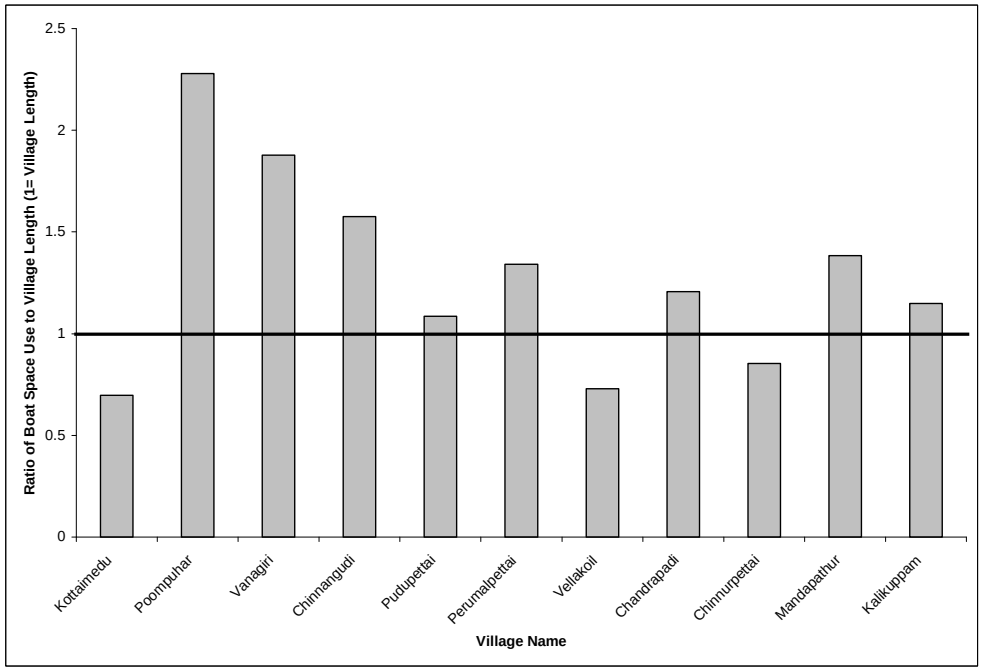
[1] This is not comprehensive but illustrative. This data was captured only during the weeks the data was collected. Ideally to get a better understanding, data would have to be collected over a full annual cycle.

Figure 15: Use of beach space for boats along with length of settlement along the shore



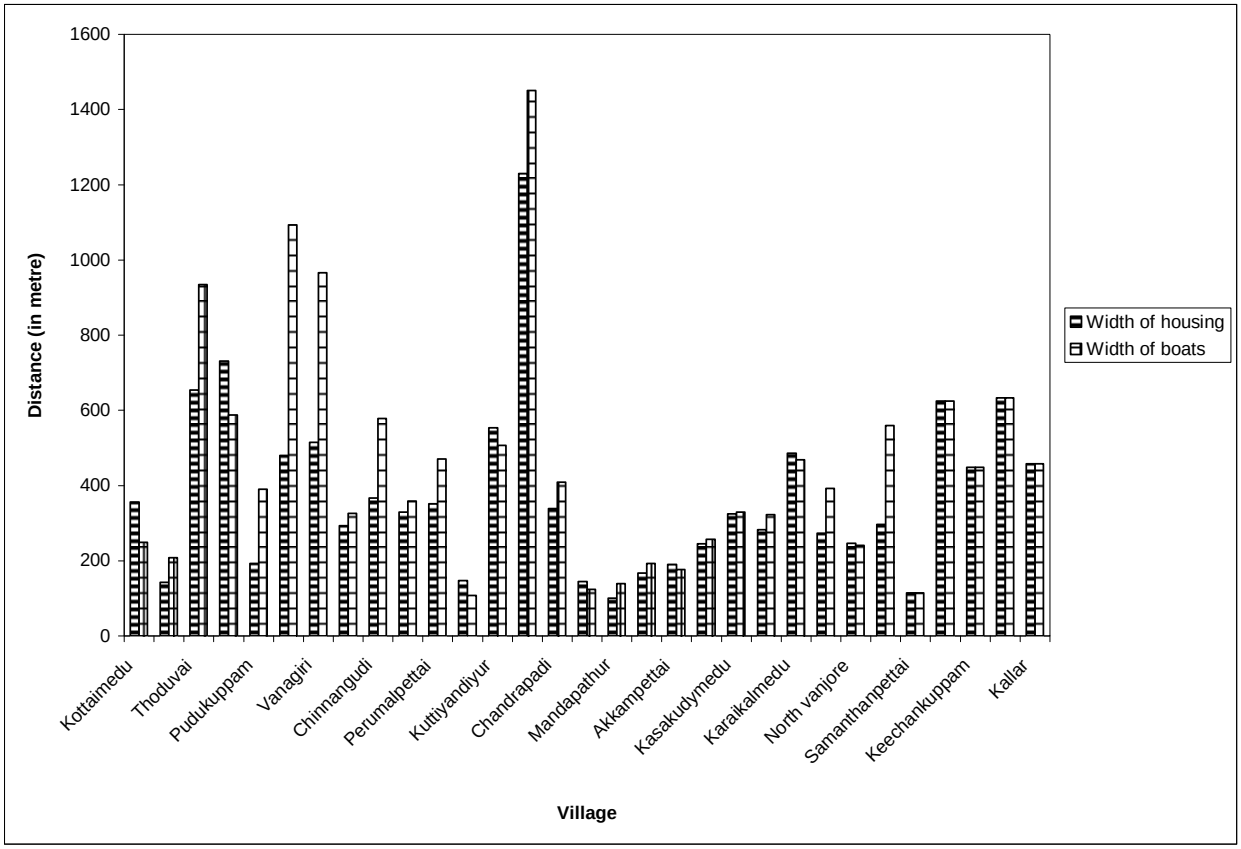
Basically when normalised as the village length being one, the length of boat space use is sometimes as high as two and a half times the size of the village. The length of boat space use as a ratio to village size is shown in the Figure 16 (the ratio of 1 means that the use of boat space is equal to the length of that village).

Figure 16: Boat space use as a ratio of village length



In the case of fish drying, the figure is much higher with the mean percentage difference when compared to village length being 42 percent (42 percent more than village length) with the median percentage difference being 20 percent (Figure 17).

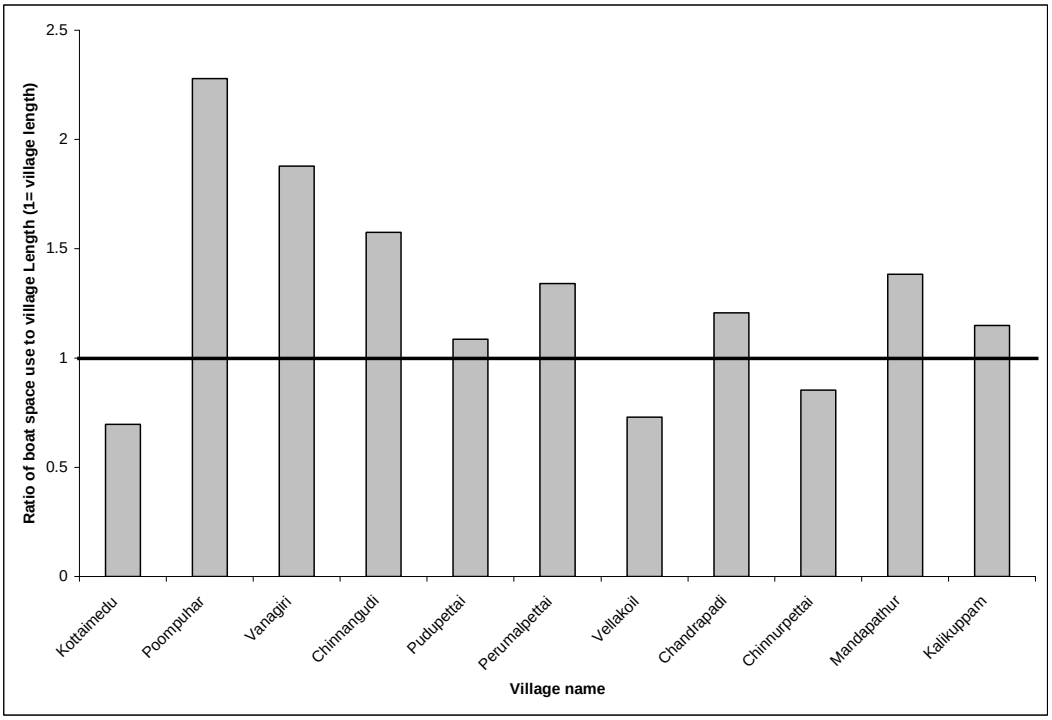
Figure 17: Length of shore used for fish drying along with length of the settlement



The length of fish drying space used as a ratio to village size, is also as high as 2.5.

This is shown in Figure 18 where a ratio of one means that the use of fish drying space is equal to the length of that village.

Figure 18: Ratio of beach space used for fish drying (Karuvad) to village length



For example, in the case of Chandrapadi the entire beach space between the village and the next village, Tharangambadi, that spreads over a stretch of 1.8 km was used up for fish drying; though the total length of space use was on only 406 m. This was because the fish drying was hampered by stretches of casuarina (*Casuarina* sp.) plantations where the communities could not dry their catch. They could thus dry the catch only on open beach stretches and sand dunes (length of Chandrapadi village shore is only 340 m) (Figures 19 and 20).

Figure 19: Casuarina plantations on sand dunes obstructing fish drying
Courtesy: Sudarshan Rodriguez, 2008

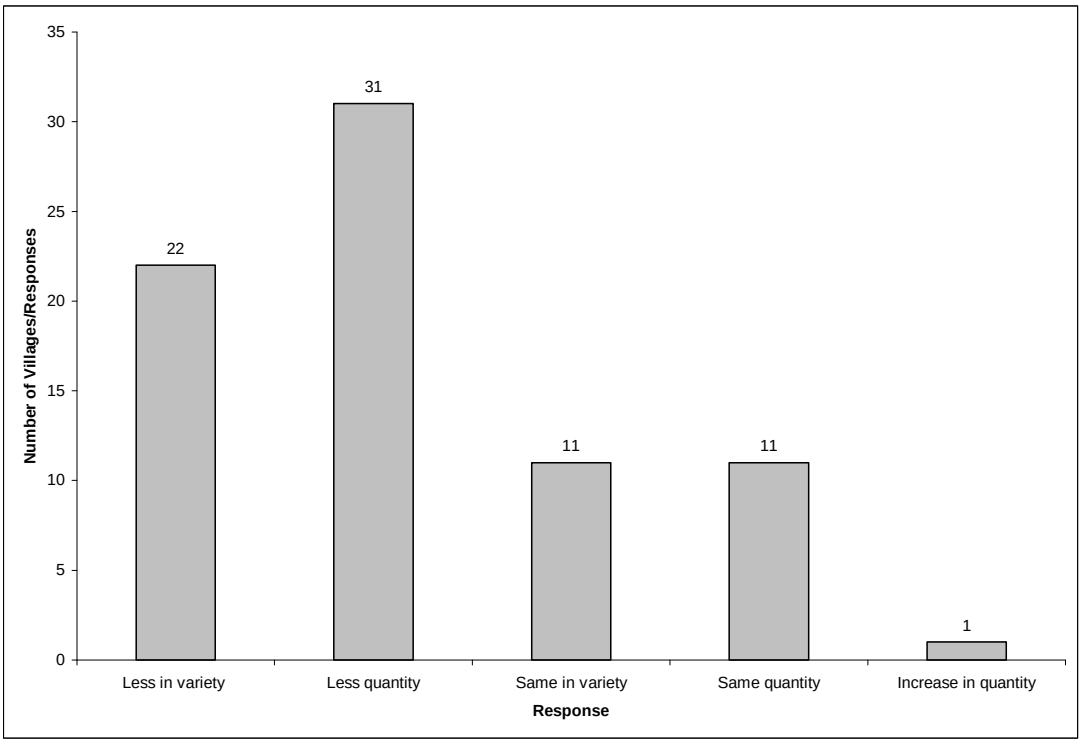
Figure 20: Casuarina plantations on sandy beaches obstructing fish drying
Courtesy: Sudarshan Rodriguez, 2008

This data on beach use also explains why, in the previous section on community views on plantations, communities are generally not positive about casuarina plantations as they encroach on their socio-economic and socio-cultural space. But more importantly it also illustrates that large tracts of beach space beyond the village shore is used by fishing communities for their livelihood. This should be kept in mind for all development planning, coastal management legislation and any intervention on the coast. Platforms and mechanisms for consent, consultation and participation of fishing communities should be evolved for interventions on the coasts. It should be noted here that the above data on beach space use for boats and fish drying was based on a very rapid study that captured one snapshot of beach space use over a survey of a few days in each village during one season. The value could be much higher especially if the study of community use of beach space is done throughout the year.

4.2.2 Perceptions on the Fishery Resources

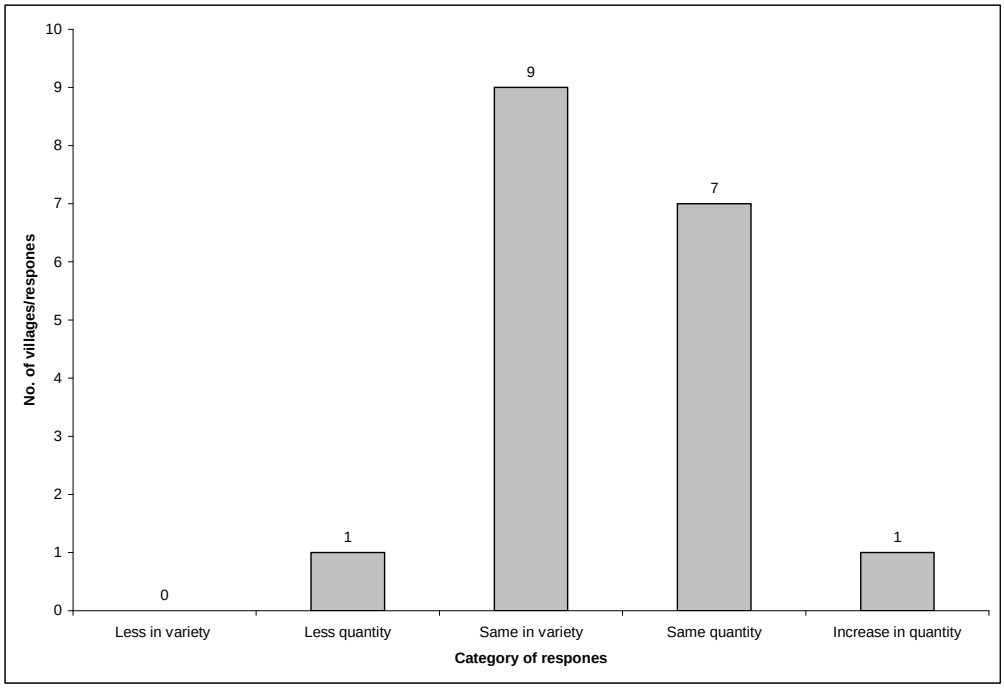
There has been considerable discussion on the background trend of the decline of fish resources over the past decades. The overall responses are shown in Figure 21.

Figure 21: Community view of fish resource over time



However, when one looks at the responses for the Coromandel Coast alone i.e., villages of Nagappatinam district along with Karaikal the data shows that most of the respondents were of the view that there has been no change in fish resources (Figure 22).

Figure 22: Community view of fish resources over time (Nagapattinam district and Karaikal)



The same can be seen on community view of fish resources post-tsunami. There is variation in responses between regions with the Coromandel Coast reporting very little changes post-tsunami when compared to the Gulf of Mannar. This is illustrated in Figures 23 and 24.

Figure 23: Community responses on changes in resources post-tsunami, Gulf of Mannar

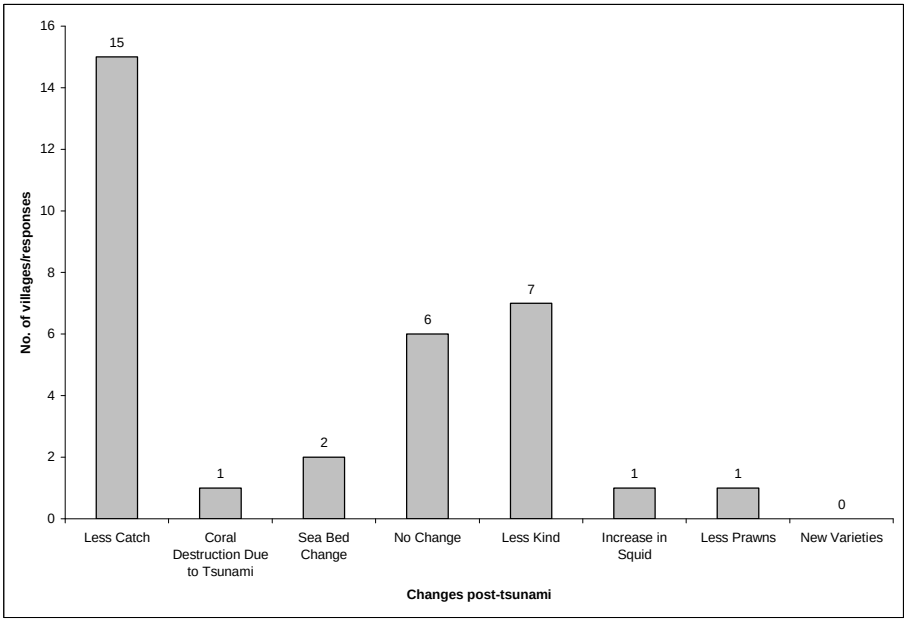
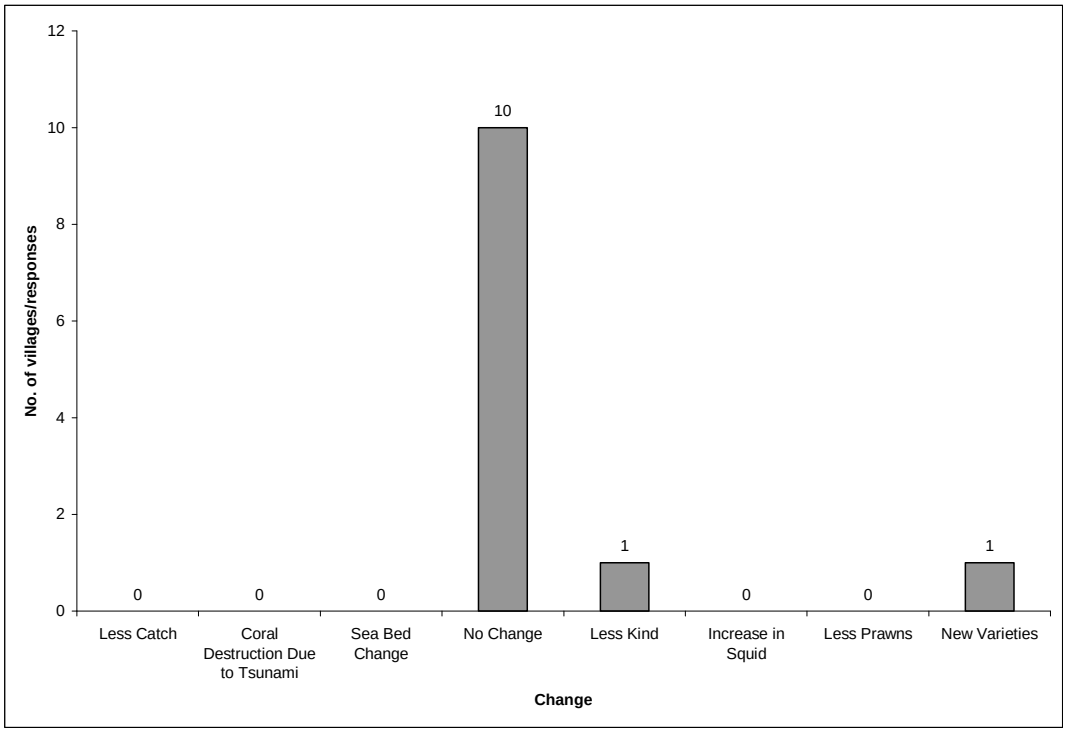
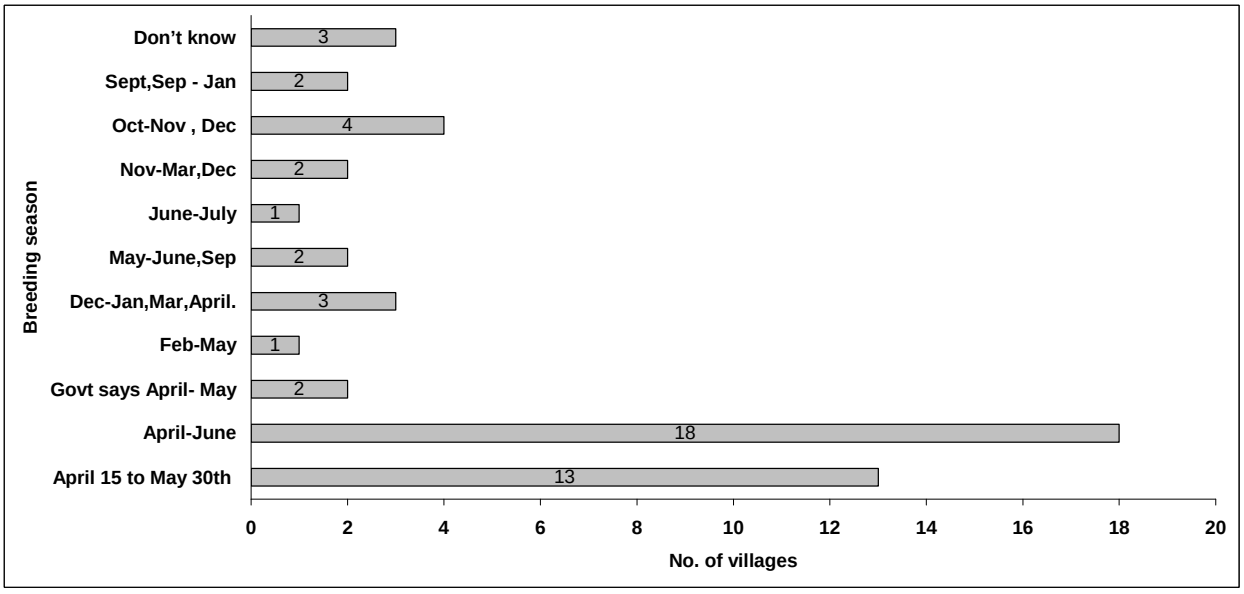


Figure 24: Community responses on changes in resources post-tsunami, Coromandel coast



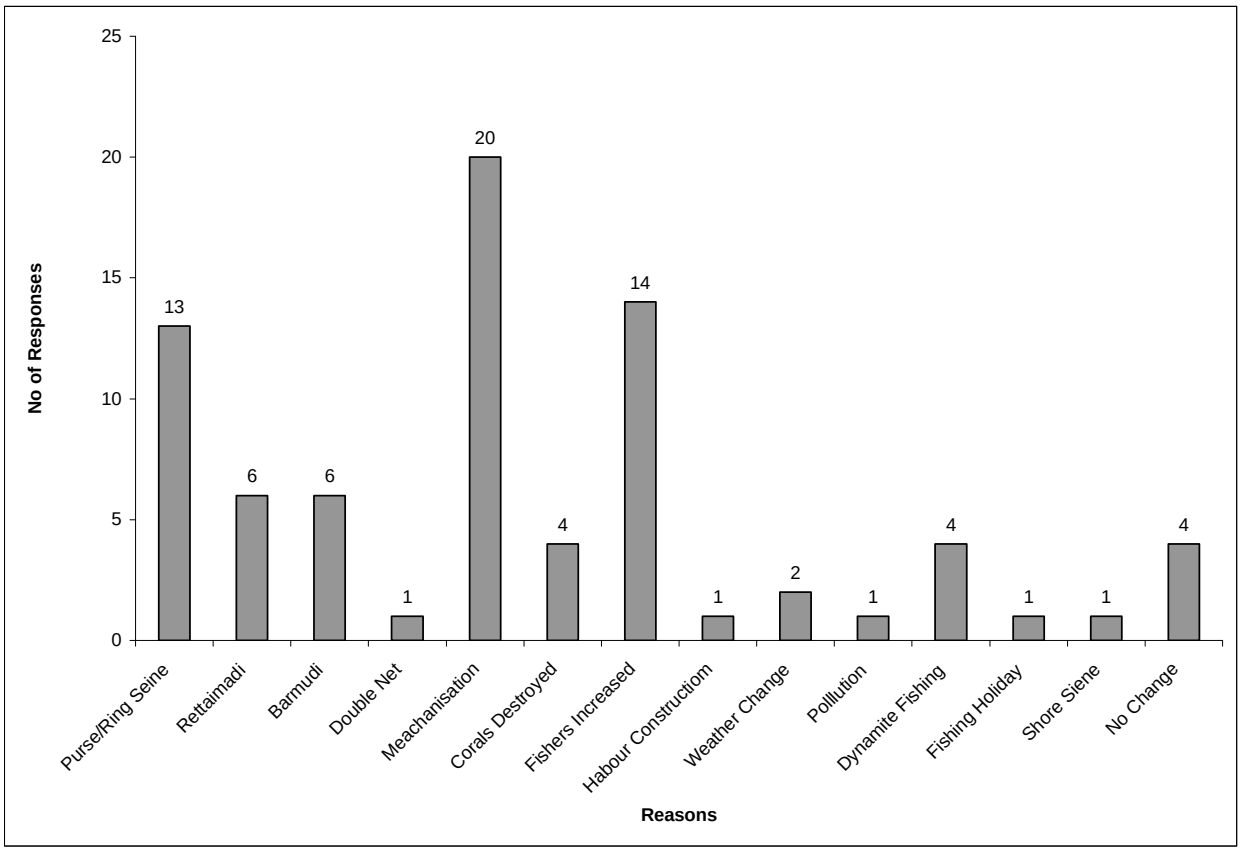
To the question on when the fish breeding season was, the majority of responses have been more or less towards April-May. This might also be because of the government monsoon ban declared during this period. A few communities have particularly mentioned that it varies depending on the fish species and the part of the coast under consideration (Figure 25).

Figure 25: Fish breeding season



However, on the question of over-exploitation of resources there is uniform agreement in all the regions with harmful fishing practices, mechanisation and increase in fishers as the three main reasons cited. This is shown in Figure 26.

Figure 26: Community view on reason for over-exploitation of fish resources



Shore Seine

On shore seine nets most villages reported a decrease in numbers from the past. The number of nets in use currently shown below with 0-5 nets being the most common. 22 villages reported having it past but having none now. Twelve villages don't use the nets at all (Figure 27 and 28).

Figure 27: Number of shore seine nets in use

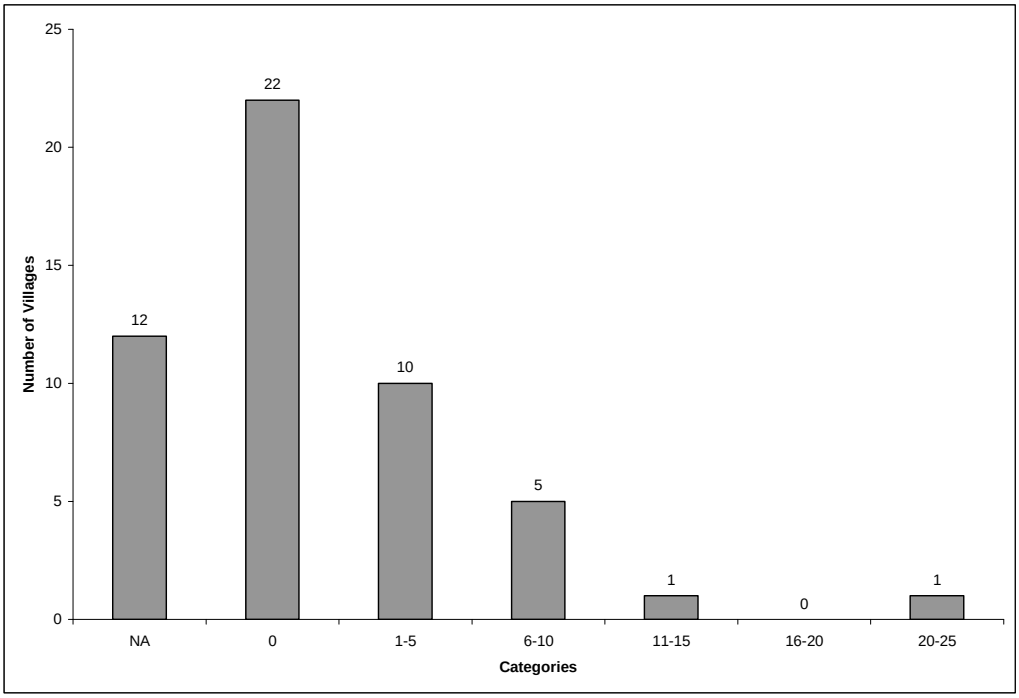
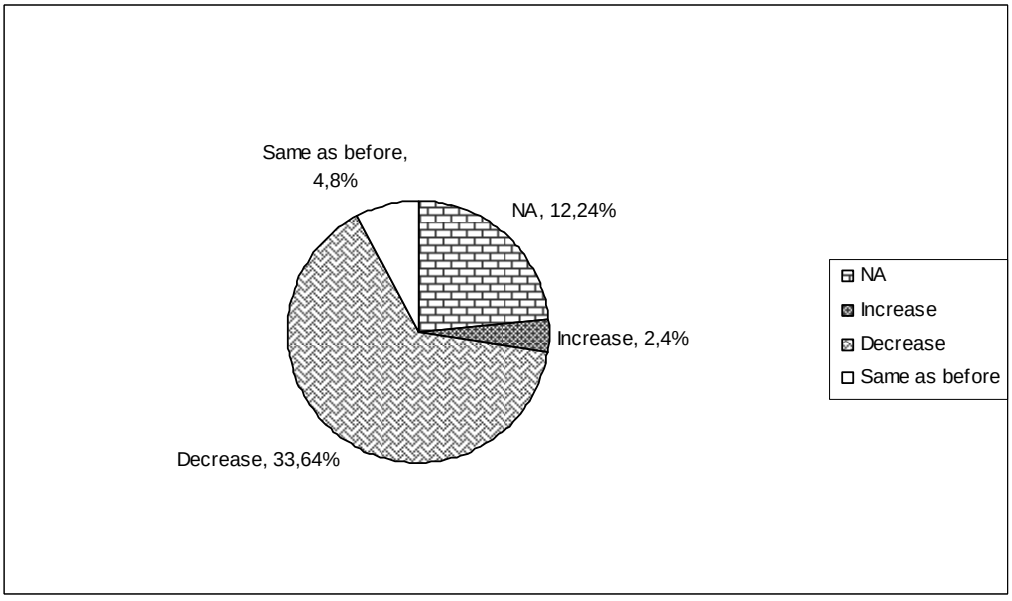
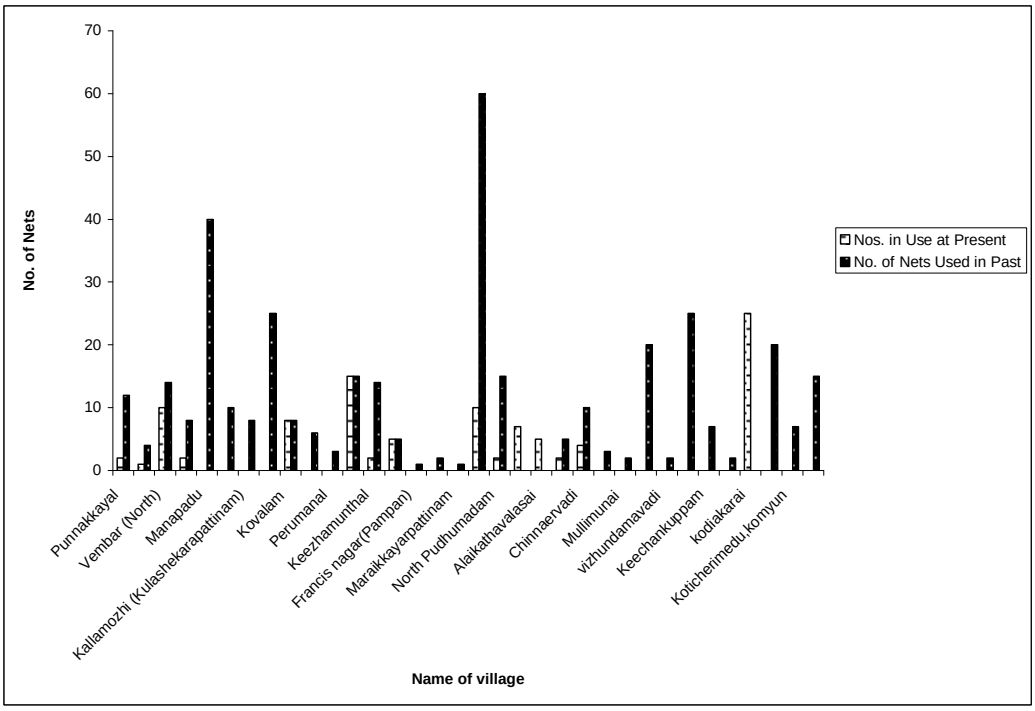


Figure 28: Changes in use of shore seine nets



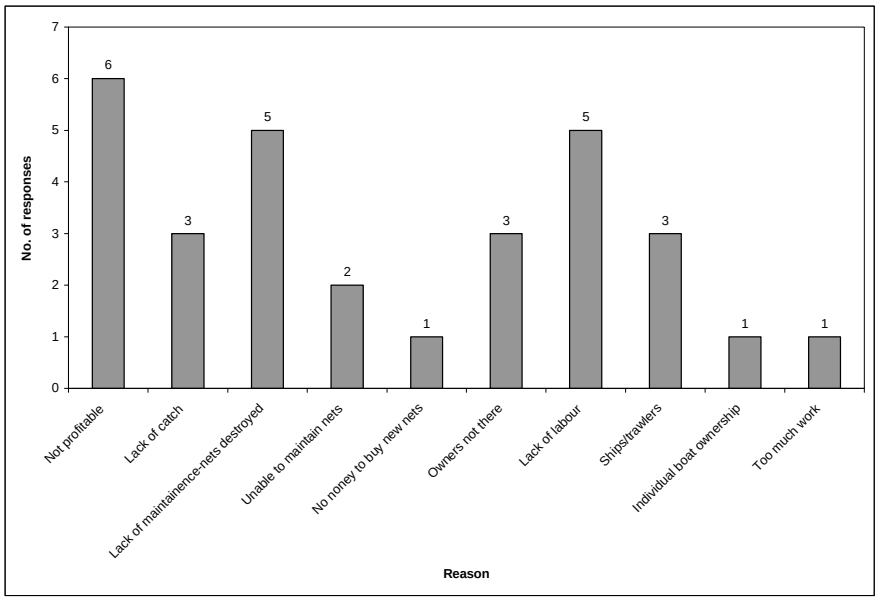
Thirty-seven of the 51 villages had reported using shore seine nets in the past with 33 of them reporting a decrease in use. The decrease of the nets is shown in Figure 29 through comparison with past and present use of nets.

Figure 29: Changes in shore seine nets over time



This has been quite a dramatic decrease in the number of nets. The main reasons attributed to this by the community were lack of lack of catch and profitability, lack of labour and destruction of nets due to lack of maintenance.

Figure 30: Reasons for decline of shore seine



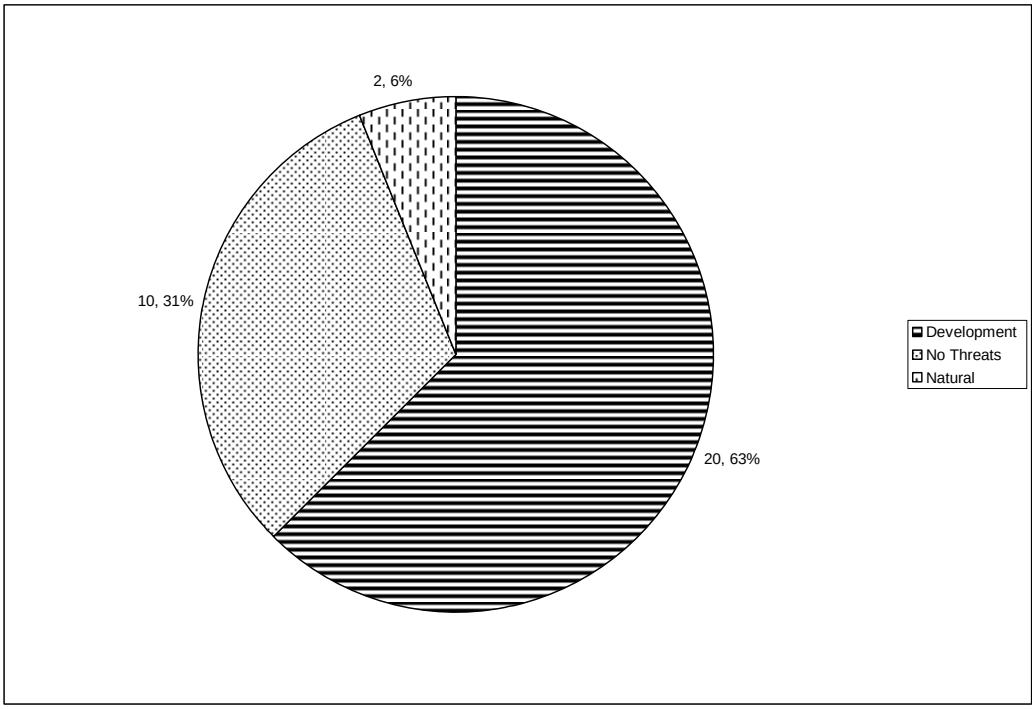
However, the data shows the continued prevalence of shore seine (though declining compared to past usage). Thus beach space use for this continues to be important. This is also prevalent in fishing villages in urban areas. Figure 31 is from Pallavakam in Chennai where available beach space is limited or is on the decline. In the past, ideally, a lot more space and much bigger nets would have been used.

Figure 31: Shore seine nets in Pallavakam
Courtesy: Sudarshan Rodriguez, 2007

4.2.3 Perceptions on Sand Dunes

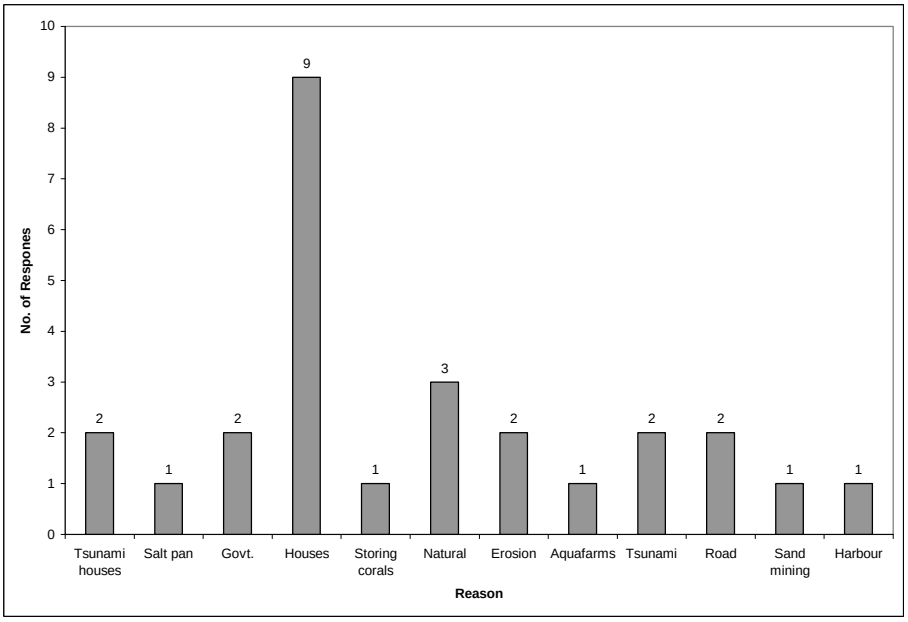
Of the 51 villages sampled, 32 villages reported having sand dunes either at present or in the past, of which 63 percent (20) of them had decreased, as a result of being levelled due to anthropogenic/development activities (Figure 32).

Figure 32: Sand dunes and their decrease



The main reasons for their decrease in size/levelling happen to be construction of houses (Figure 33).

Figure 33: Reasons for decline of sand dunes



In some hamlets, communities have traditionally located their hamlets on sand dunes and elevated places, and many of the village names end with the word '*medu*' which, in Tamil, means 'an elevated place' (Rodriguez 2007).

One village, Maraikkayarpattinam, reports that their entire village is on sand dunes and in a storm in 1964, the sand dunes had protected the village from destruction. While many literature cite elevation/sand dunes being a key coastal defence, it is important to study if locating traditional or modern forms of house architecture has any implications on the ecological and environmental sustainability i.e., impact on the ecology and natural dune formation in the surrounding areas of the villages. It is also important to document and research the traditional settlement patterns and locations of coastal hamlets in sand dune areas over space and time (since the past 50 years or so).

Use of Sand Dunes

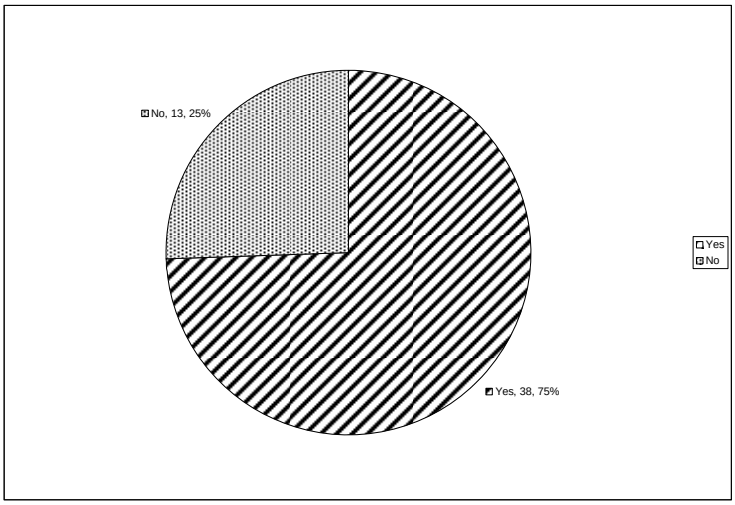
There is also a lesser known and hardly documented socio-economic use of sand dunes of fisher communities—the use as a space for fish drying. The use of sand dune areas for plantations by the Forest Department (see sand dune policy note) also encroaches on this space and its use by communities. Figure 34 shows the use of sand dune spaces for fish drying and also shows plantations encroaching onto the sand dunes.

Figure 34: Casuarina plantations encroaching on sand dune formations that are being used for fish drying Courtesy: Sudarshan Rodriguez, 2007

4.2.4 Perceptions on Beach Erosion

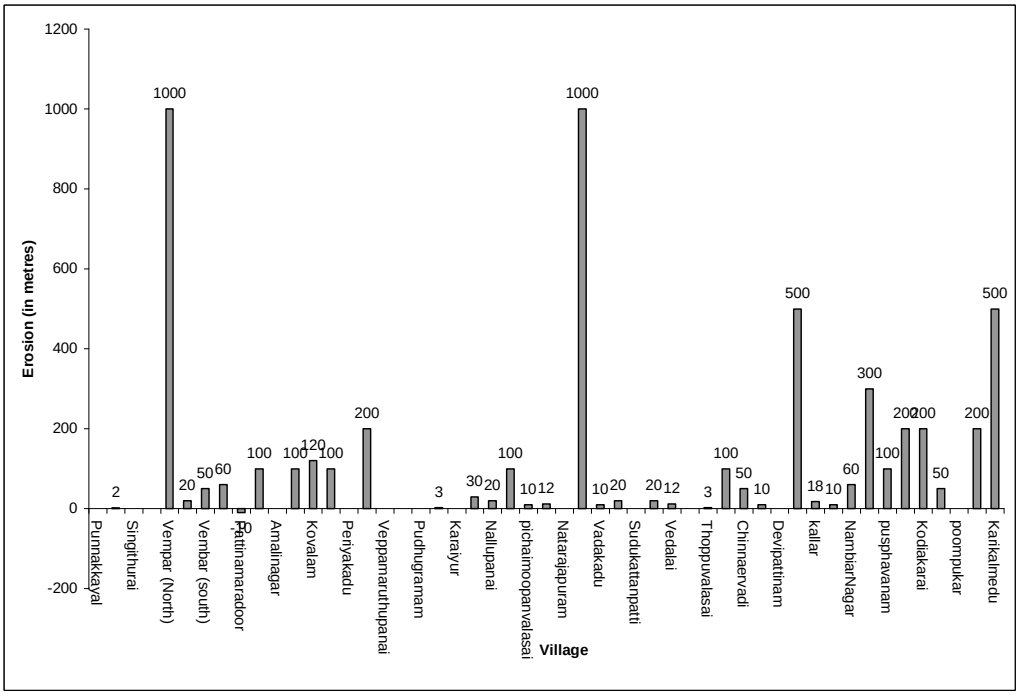
Communities were asked if they have observed beach erosion. Seventy-five percent (38) villages) have reported beach erosion in their villages (Figure 35)

Figure 35: Community responses on whether beach erosion is affecting their village



The average erosion is about 150 m; and the median measure is 50 m (one or two villages have reported beach erosion of 1 km). This is a significant factor to take into account given the average distance of the settlement from the coastline. The distance of shore that has eroded is shown below in Figure 36.

Figure 36: Community observations on distance of beach erosion



Interestingly communities have given very detailed responses on the distance of shore that has eroded in time along with what they attribute the reasons for the erosion to be. Climate change and sand mining (in most of the villages of Gulf of Mannar) have been primarily attributed to be the

reason for erosion. It is perhaps for the first time that traditional knowledge of erosion as well as awareness of climate change has been recorded. The responses are shown in Figures 37 and 38.

Figure 37: Beach erosion reported by communities

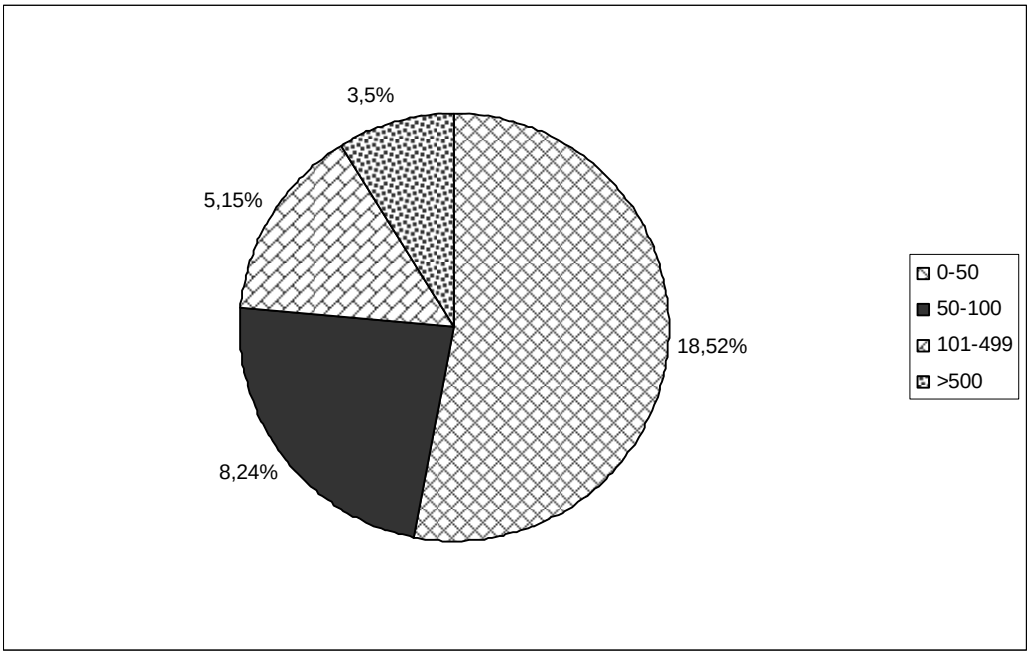
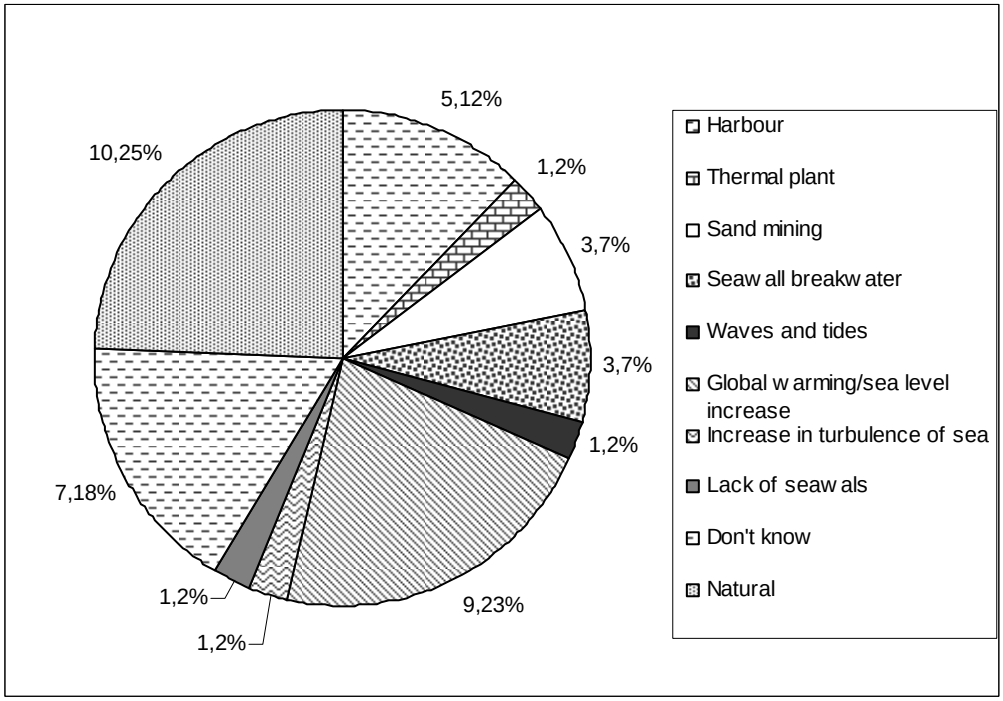


Figure 38: Community view on reasons for beach erosion



The responses on climate change show that perhaps it is not only timely to initiate dialogue and awareness programmes on the implications of climate change with the community but also build on the people's repository of traditional and local knowledge on the same. After initiation of dialogue on climate change and its implications, it would be necessary for communities to discuss and debates the issues adaptation strategies and mitigation measures that government and global stakeholders are proposing.

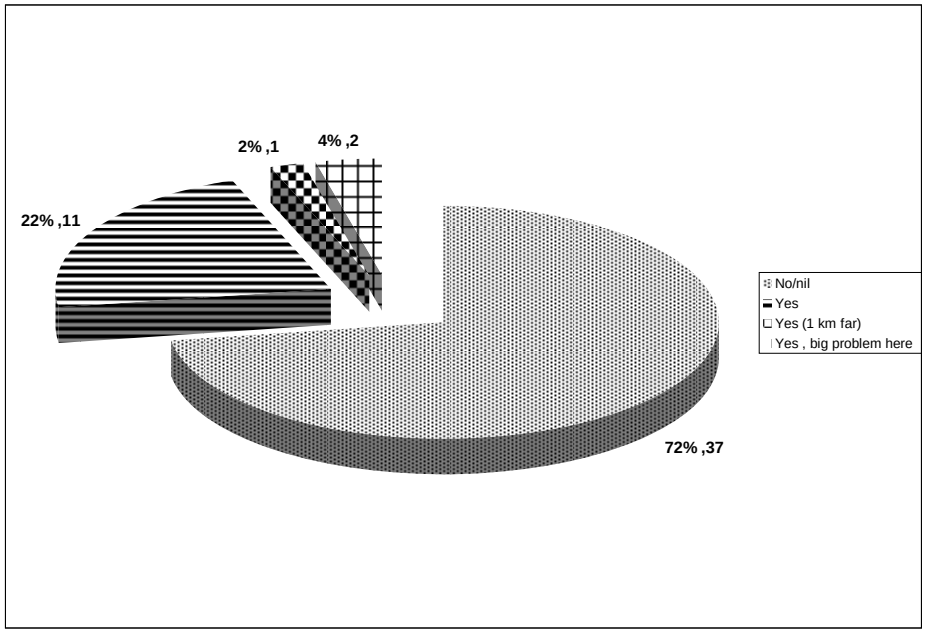
4.3 Fisher Communities and Coastal Development

There are many major development projects started on the coast of Gulf of Mannar and Palk Bay especially in Kanyakumari, Thirunelveli, Tuticorin, Ramnad, Nagapattinam and Karaikal districts of Tamil Nadu. Sand mining and dredging, shrimp farms, resorts and tourism, nuclear and thermal power plants, and the Sethusamudram Ship Canal Project are the significant ones in these districts. This study explores the community dimensions of coastal development. It also focuses on the role of governance structures especially in Thirunelveli district.

4.3.1 Sand Mining

Sand mining is one of the flourishing industries in Thirunelveli, Tuticorin, Nagapattinam, Ramnad and Kanyakumari districts. Sand along the Tamil Nadu coast is rich in garnet, titanium, thorium and other minerals. The government allows sand mining on beaches with some restrictions. Based on tenders floated by the government, mineral companies take up land for mining. Regarding sand mining central government has given permission only to mine sand that has garnet, and that too only in specific areas; however, contractors and mining companies remove mineral sand and export it illegally. Sand mining is done in 14 out of 51 villages; three of these villages are in Nagapattinam and 11 villages are in the Gulf of Mannar. Details of this are shown below in figure 39

Figure 39: Beach mining and dredging



Sand mining is done by two major companies that have exceeded the area for which the government has given permission. A large area of coastal land including sea *poramboku* has been bought/taken for sand mining across the districts.

One of the four companies has been mining for more than 20 years and others since 4–5 years. Communities have reported that illegal sand mining is supported by caste *panchayats*, *Gram Panchayats* as well as by local officials. The sand mining companies specially VV and BMC cause divisions within communities by getting some leaders to support their activity. Hence, governance structures cannot address the issue of sand mining.

Areas of Sand Mining

Sand mining is done in three villages in Kanyakumari district and other villages seeing the consequences of sand mining here have prevented mining in their own villages. For more than 20 years, the VV Mineral Company has been mining sand in many villages—Periathazhai, Uvari, Panchal, Perumanal, Koottappuli and later on in Vellappatty, Pattinamarathoor, Keezhevaippar, Kallamozhy, Manapadu and many other areas as well. There are other villages such as Chinnapalam, Thoppuvalasai, Bharathinagar, Chinnaervadi of Ramnad district, and Kallar, Pushavanam, Aarkatuthurai, Kaveripoompatinam (Poompuhar) of Nagappatinam district where sand mining is carried out by mining companies, the government, by tsunami house constructors and also by local people. On the way to Punnakkayal, in Sernthamangalam, both VV and BMC had started a sand processing unit and another unit was started in Melevaippar by VV alone. VV is also mining in Kalloorani, Sippikkulam, Vembar and Kalainjanapuram villages since plenty of garnet and black sand is available here. They have also ventured into Ramnad district**.** Coastal land from Koottappuli to Thiruchendur and most of the land in Thirunelveli district are being bought by VV Mineral Company.

Consequences of Sand Mining

Sand mining in the coastal villages of Thirunelveli, Tuticorin, and Nagapattinam and Kanyakumari districts has resulted in the threat of erosion by the sea and habitat destruction. Sand mining has caused beach erosion, as a result of which houses and coconut plantations have been submerged in the sea in many coastal villages (Rajakkamangalamthurai, Perumanal, Chinnaervadi, etc.). Health hazards are also common among the coastal villagers especially where mining is done. In Periathazhai and Uvari of Thirunelveli district, many fishermen are suffering from kidney failure and related problems. In Perumanal and other neighbouring villages fish catch is also reported to have decreased. In Punnakkayal, Aathur and other neighbouring villages air and water pollution is high. The sewage from industries directly mixes with the sea water and villages have reported a decrease in fish catch.

Protest against Sand Mining

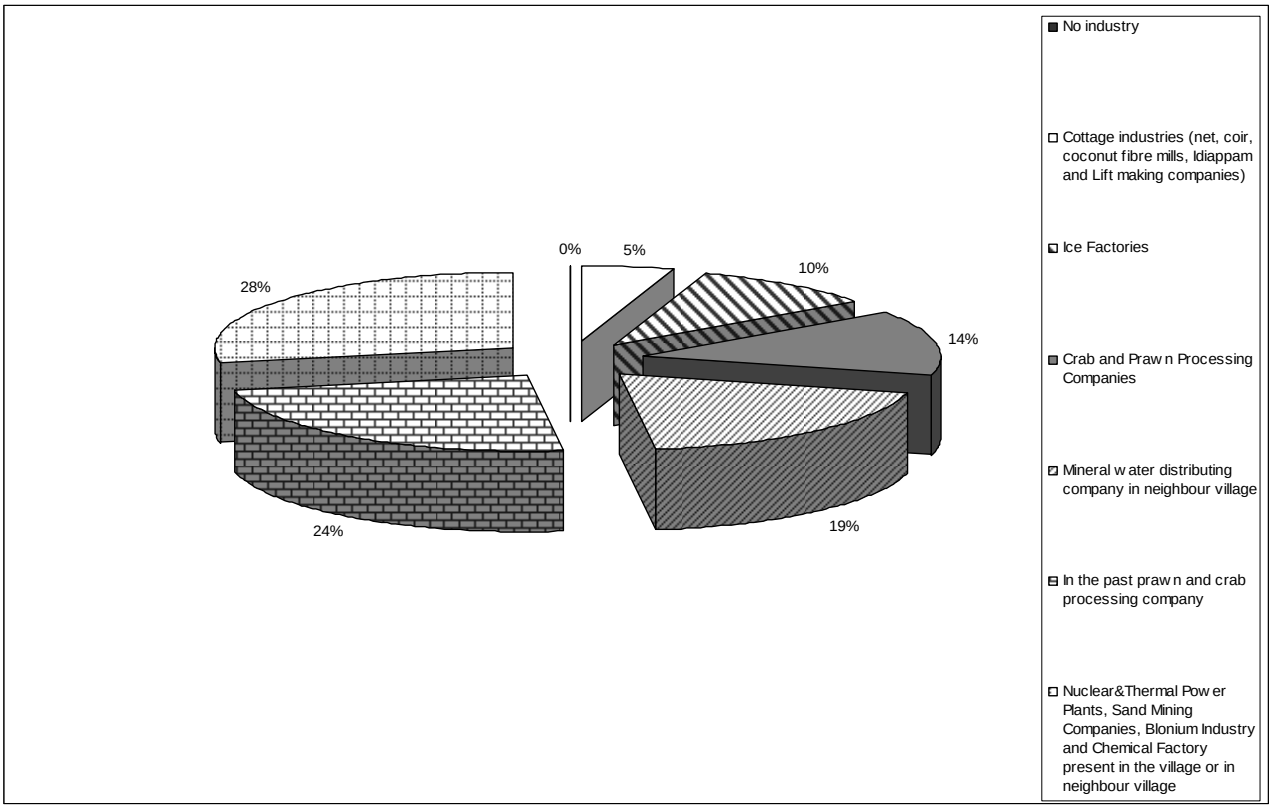
There are a few villages across the districts, especially Kanyakumari, Thirunelveli and Tuticorin, where the youth and the local governance bodies are taking a firm stand against sand mining. In Kamarajapuram of Ramnad district sand mining has been carried out for the past 10 years, but it was stopped by the *panchayat* a year ago. There are a few other villages were sand mining is strictly prohibited. For instance Kovalam, Rajakkamangalamthurai (sand mining was done here earlier but strictly prevented later), Periyakadu (sand mining is done here secretly but the youth catch the

culprits in the night while mining is done) and Valinokkam [here all members of the fishermen *sangham* (committee) approached the court and got a stay order against sand mining in the village, since it was affecting their beach]. In 1996 many of the coastal villages in Thirunelveli came together to fight against sand mining in the villages of the district. Mr. Pushpin Aryan, an assistant parish priest in Koothankuzhy of Thirunelveli district, had formed small groups of youth in every village where sand mining was being carried out. With the support of the youth, awareness was created among coastal villages about coastal issues and problems. On 16 December 1996, villagers came together and held a peaceful protest rally in Perumanal. In a dastardly act the priest, and the men, women and the youth who participated in the rally were beaten mercilessly by the police and were also shot at. Even handicapped youth were not spared. It seems that the people had been cheated by the village committee leaders and a few prominent priests who were members of the Diocese of Tuticorin.

4.3.2 Power Plants and Other Industries

Six out of 51 villages have nuclear/thermal power plants and other chemical industries in villages or in the neighbouring village. Five are on the coast of the Gulf of Mannar and one is in Kodiakkarai of Nagappatinam district. These are shown below in Figure 40

Figure 40: Industries present in the study villages or in the neighbouring village**s**



There have been considerable changes in the marine biosphere of Gulf of Mannar. This is due to industrialisation and other development activities along the coastal belt. Tuticorin is under severe pressure due to increasing number of industries on the coast. The major industries located in and around Tuticorin are Tuticorin Thermal Power Station, SPIC, TAC, Dharangadhara Chemical Works (DCW) Salt Marine Chemicals, sand mining industry in Aathur which is near Punnakayal (1.5 km from Punnakayal) and many more expected to come up in the near future. The people living around villages of the atomic power station are very worried about their future. Apart from the future effects, currently too the facility is affecting the rights and livelihood of the Perumanal *kattamaram* fishermen. In the monsoon season, with the sea being rough, the fisher folk here go fishing in the southern side, where the river meets the sea. However, the large pipes installed in the sea by the atomic power station are causing accidents of small boats and *kattamarams,* and tearing of their nets directly affecting the income of the villagers.

4.3.3 Crab/Prawn Processing Centres and Ice Plants

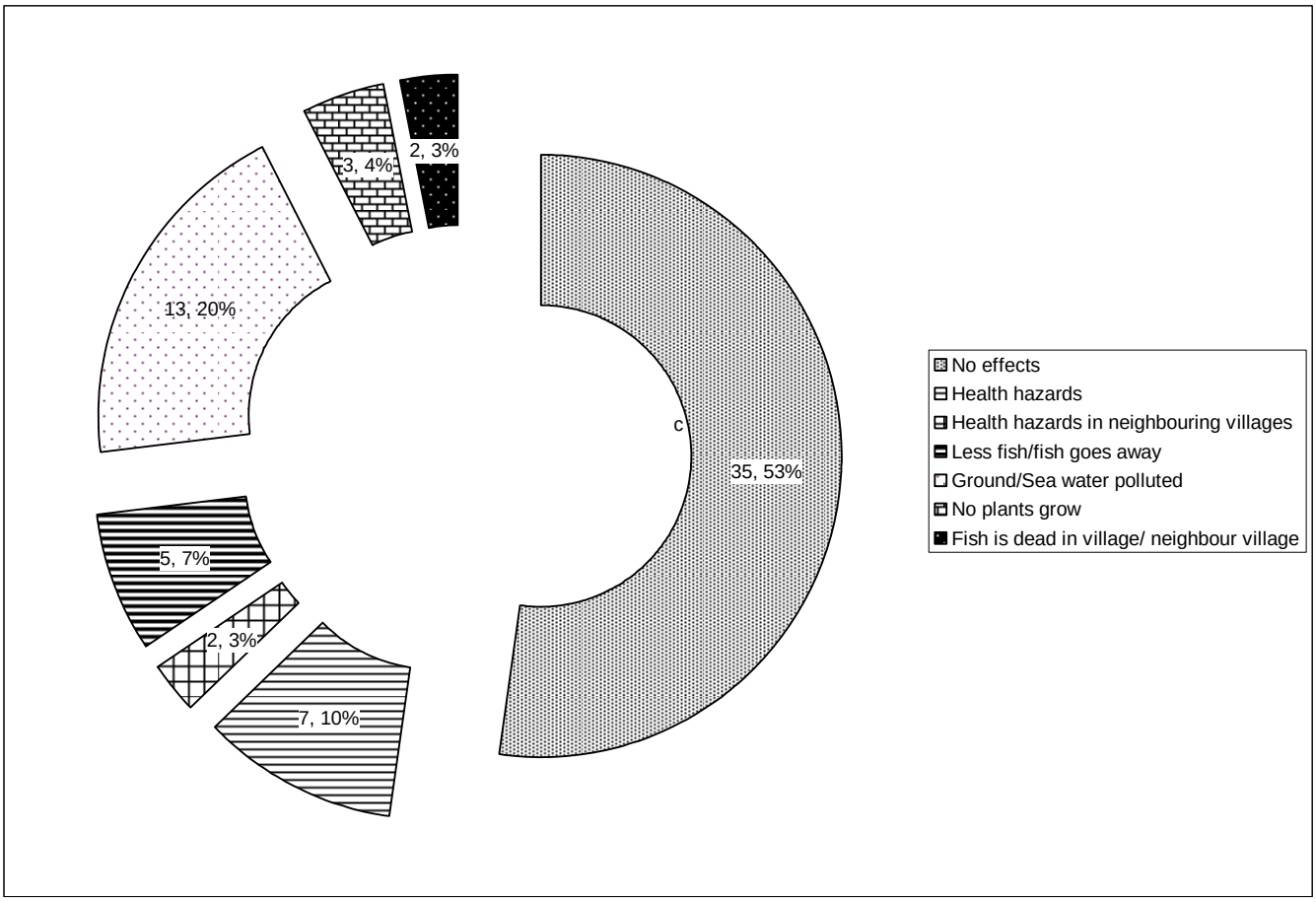
There are 14 crab/prawn processing centres and ice plants across the coastal villages in the districts that were studied. The community reports a foul smell emanating from the crab and prawn processing centres. The waste water from these centres is also released into the sea and the ground. In Pattinamarathoor there was a prawn and crab company that used to clean prawn and crab and export the same. Though operations were stopped 5 years back, by then the water sources in the region had became salty. With the help of NGOs the villagers had organised strikes and public meetings and forcing the owners to close the centres.

Ice plants use plenty of water causing ground water levels to fall. Most of the villagers get drinking water from elsewhere by tankers since there is no ground water available. For instance in the Pampan *panchayat*, where there are more than 10 ice plants, people find it difficult to get good quality and sufficient quantity of drinking water since these plants have started functioning.

4.3.4 Consequences of Coastal Development

A total of 18 villages out of 26 that had development projects claimed that the health or natural resources (water, plant, fish) were affected. Sixteen villages out of the 22 villages in Gulf of Mannar region claimed that health or resources were affected by the development projects. Two of four villages in Nagapattinam claimed that resources were affected. This is represented in Figure 41 below

Figure 41: Effects on community health/fish and water resource as a result of development projects in village



Health hazards are evident in seven villages because of development projects. Thirteen villages show indication of pollution and salinisation of ground and sea water. In three villages no plants are growing because of ground water salinisation (pollution). In two villages dead fish and crab were found floating in areas where the effluent water mixes with the sea. Five villages reported that there was a decline in fish catch and two villages claimed that there were health hazards in neighbouring villages as well.

The ash discharge from the power plant and chemical waste effluents from industries are badly affecting the sea moss, small plants and coral ecosystems in the surrounding area. There is also increasing levels of air pollution and radiation in industrial areas. DCW releases effluents into the sea that is contaminating sea water and ponds. As a result of this the sea water and water in the rivers and ponds are getting increasingly polluted. People also report problems with drinking water in these areas.

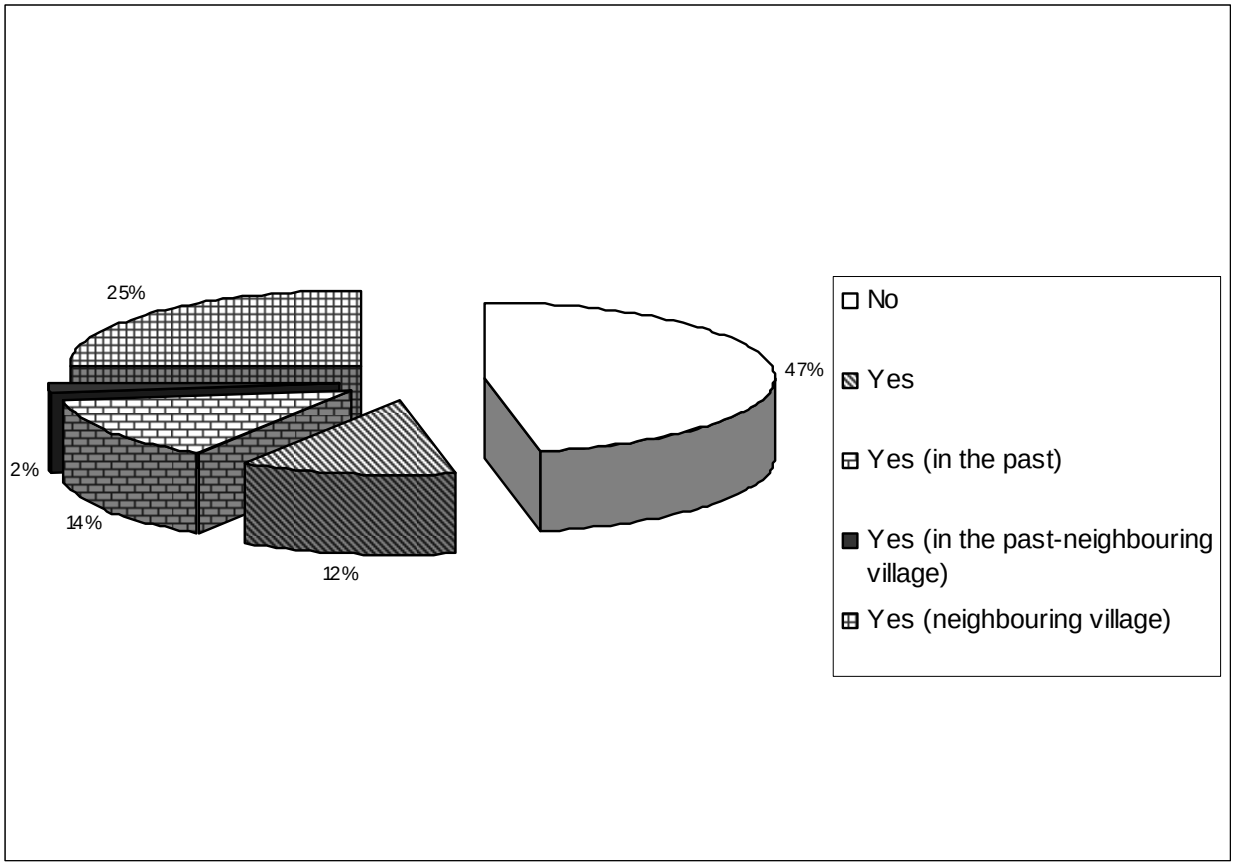
Pollution from industries is causing the destruction of mangroves and other trees. When chemical waste water mixes in the sea, the fish are being forced to move out of their current home waters. In Manapad and near by villages, communities report that sea water near the shore has turned reddish due to the mixing of red oxide waste released by DCW. The people living around villages of the atomic power station are very concerned about the possible impacts and pollution.

Since the establishment of the Koodamkulam nuclear project, the fishermen of the area have been prevented from fishing from a particular rocky area which was an important fish breeding site especially for lobsters and prawns. The power station thus affects the daily income of these villagers.

4.3.5 Perceptions on Shrimp Aquaculture

Shrimp farms are another thriving industry in the coastal villages and are a major source of foreign exchange for the country. Shrimp farms were functioning in 23 villages, but were stopped after opposition from the community. Many acres of agricultural land were bought from local villagers, or *poramboku* or village common land was taken on lease from the *Gram Panchayat*. Thirteen villages have reported the presence of aquafarms currently or in the past in the village and 14 were reported in the neighbouring villages. Aquafarms currently exist in six villages (two in Nagapattinam and four in Gulf of Mannar). Seven villages had aquafarms in the past (Figure 42).

Figure 42: Presence of aquafarms in the villages



Consequences of Aqua Farms

Shrimp farms have caused severe ecological problems. In many areas the effluent water from shrimp farms released into the sea through pipelines and other areas mixes with the water in the rivers or is made to flow into the sea and rivers via canals. Due to this ground water and water used for bathing (pond, river and lake) has become salty and sea water too is contaminated. Prawn culture contaminates water and also causes water borne diseases. After the rains water logging takes place in the farms that become breeding grounds for mosquitoes. Ground water has become salty after one year of starting the aqua farms (Mettuppatty). With shrimp farming, a new industry expanded into coastal areas and started to make exclusive use of public resources such as excessive use of fresh water which caused decreasing of water table and leading to the salinisation of freshwater aquifers by an inflow of salt water. In some areas, the rapid expansion resulted in the local coastal population being denied access to the sea coast (Mettuppatty).

Plantations especially coconut tree and other trees are decayed, cemented buildings got damaged, people were getting skin ailments and allergies[5]. Not alone the land of the village became waste but also the neighbouring villages too. In some villages (Pichaimooppanvalasai, Dharga) though aqua farms are stopped still palm trees and coconut trees are destroyed and well water remain salty and still continues to be so. Due to release of effluent water to sea from shrimp farms the fish is dead and poisonous to eat (Pattinamarathoor).

Protest against Aqua Farms

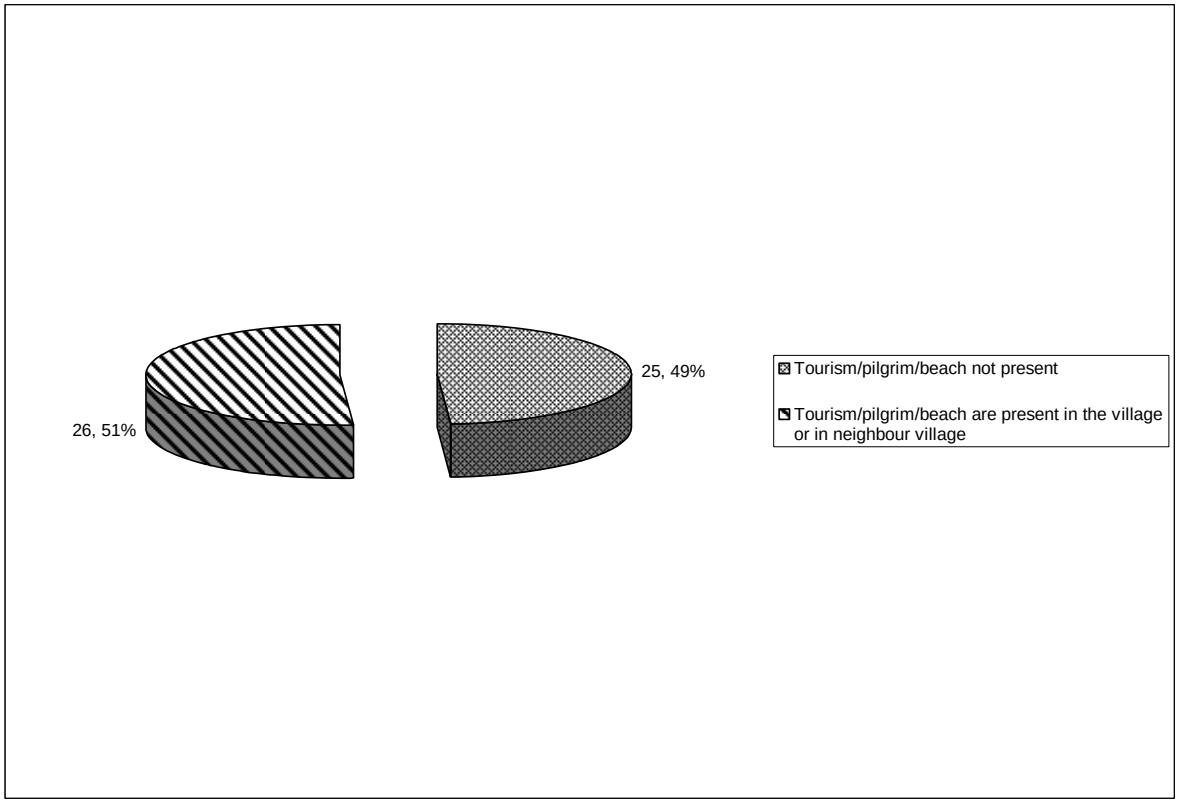
There are ten villages which protested against starting or for stopping the aqua farms that destroys their village land, water and environment. These protests were done by people themselves and in two villages Non Governmental Organizations helped the villagers to organize against aqua farms. In Ariangundu of Ramnad district, the whole village had to endure the consequences of having aqua farms in the village. There ground water became salty, coconut trees, palm trees and other plantations decayed, houses were damaged and people were getting skin ailments and allergies. Then the villagers went and destroyed all small prawns that were in the aqua farms and cut opened all the bunds where prawn grown. Then many were arrested and put in the prison. The case went on for many years. Then the owners in the village changed their stand and gave money and employment to many members of the villages. Then slowly cases were withdrawn and the farms still runs in the collaboration of the members of the village.

Competition with Local Livelihoods

There is a strong competition and tensions between the shrimp and sea prawn in market and for exports. Fishermen across the districts have stated that the prawn that caught from sea get less market than that grown in aqua farms. There mixed view as to which is tastier some say that farm grown prawn is tastier than sea prawn and in some villages vice versa. Shrimp farming in many cases has far-reaching effects on the local coastal population. Changes in the distribution of wealth tend to induce changes in the power structure within a community. Mostly there is a widening gap between the general fishing population and shrimp farm owners who have easier access to credits, subsidies, and permits from Government departments and it is unimaginable for the general fishermen who struggles to get even their identity card.

4.3.6 Tourism and Resorts

Figure 43: Presence of tourism, pilgrimage centres in villages

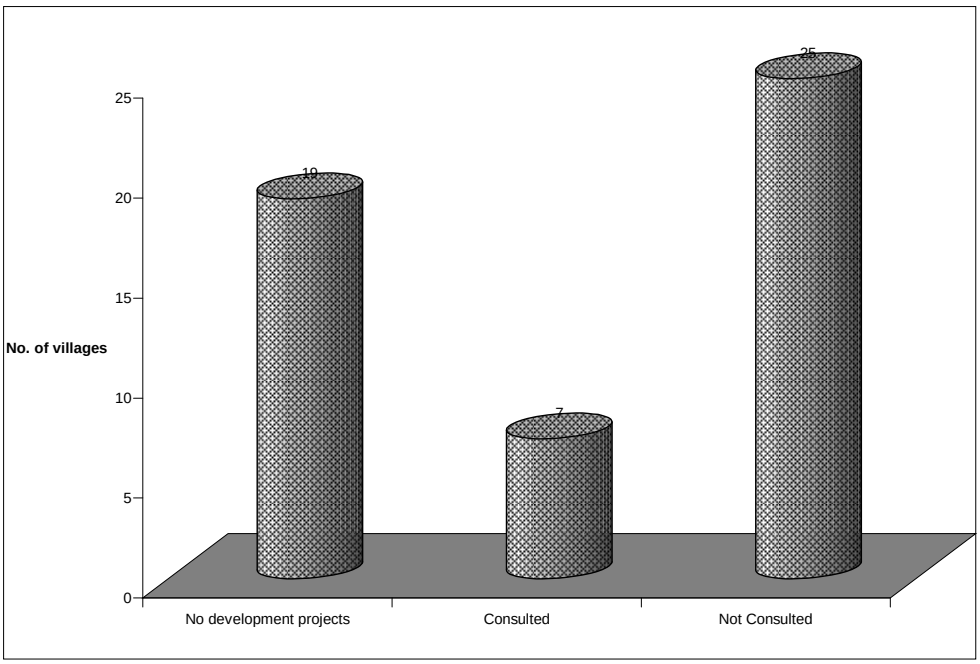


Thousands of acres of coastal land is being bought and encroached by private partners. 8 out 11 villages in Nagapattinam and 18 out of 40 villages in Gulf of Mannar have tourism near their village. These include pilgrimage centre, sandy beach stretches, and a bird sanctuary.

In Ramnad district villagers said that these lands are going to be converted into resort, beach, and park and for hotels. Since lots of visitors continue to flow to Rameswaram temple and Dhanushkodi, Karaikal, Nagapattinam, Kanyakumari and Tuticorin districts, private partners and government sees a lot of scope for tourism industry across the region. As result of this in Ramnad district Ariyaman beach near to Thoppuvalasai, Kilakarai beach, Small Park in Mandapam, Rameswaram temple, Thonithurai near to Pampan bridge, Ervadi Dharga, Navapasanam temple in Devipattinam had come up as tourist centres (some of it are pilgrimage centre that earns money to Government) by government and by private people who are outsiders. In Nagapattinam district, Velankanni, Vedharanyam temple, Kodiakarai Birds sanctuary and Ramar patham, and Poompuhar; and in Karaikal district Karaikal Beach; Baywatch (some sort of tidal park) in Kanyakumari etc are the main tourist centres that had come up in coastal areas as part of tourism industry. Environmental consequences of these tourism and resort are piling up of plastic mineral water bottles and plastic covers in the sea and hotel-resort premises. Many of these restrict beach space use.

Consultation with the Villagers

Figure 44: Consultations with regards to development projects in villages



25 villages were not consulted out of 32 villages have development project initiatives. 22 of 28 villages in Gulf of Mannar that had development projects were not consulted; of 4 villages in Nagai, one was consulted and 3 were not. Only 7 villages were consulted before implementing the projects. Out of seven villages, most of the consultation done was with the gram panchayat and caste and not all the members of the villages.

Majority of the villagers were not consulted and not part of the decision making when developmental projects were implemented in the villages. Only eight villagers had the privilege to be part of decision making when industries, harbour, aquafarms and other developmental activities in the villages began. Punnakayal village was narrating that when DCW planned to come near to Punnakkayal village, the fishermen opposed it. But they promised to give job opportunity to them and made an agreement to give job to five members every year. So, the Panchayat allowed them. But DCW came 45 years ago in the village but only three members are employed in DCW so far. In another village (Vellappatty) when Ice factory came in the village the industry people consulted the Ooru Committee members.

There are villagers who do not trust their Gram Panchayat leaders because such leaders were insensitive to the needs of the villagers. In such cases those leaders might have given permission to start aqua farms in the village (Pattinamarathoor). Some village came to know about the Nuclear Power Plant, Thermal Power Plant etc through news papers. Bionium industry came without the consultation or public hearing. Government gave license for 99 years to run it but now it extended for another 100 years.

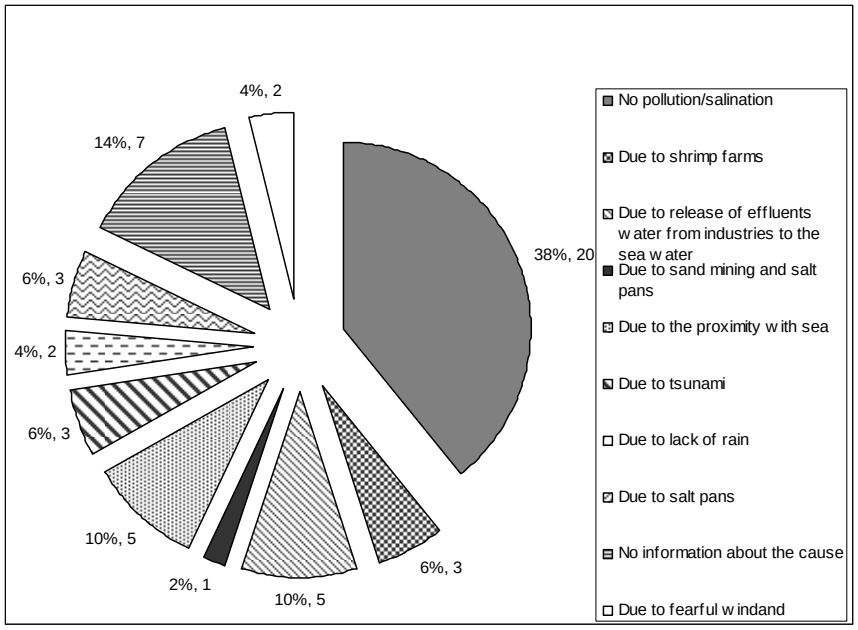
People Driven Developmental Projects

When the local fishermen planed to construct a harbour in the village (Rajakkamangalam), the whole members are part of the decision making and it is people driven. Koticherimedu, Komyun villages at Karaikal district the villagers were present for the public hearing when Government planned to make aqua farms.

4.3.7 Perception on Water Resources

Good potable water is not available in majority of the villages and people are struggling for drinking water especially all the coastal villages of southern districts. Natural sources of drinking and bath water- almost all the villages are depending on pipe water that comes from different rivers for drinking water and for bathing except four villages in Ramnad district and two villages in Nagapattinam district. Most of them use the same water for bathing or use salty water from the village itself or go afar to wash cloths.

Figure 45: Pollution/Salinization of water resources



Water Pollution

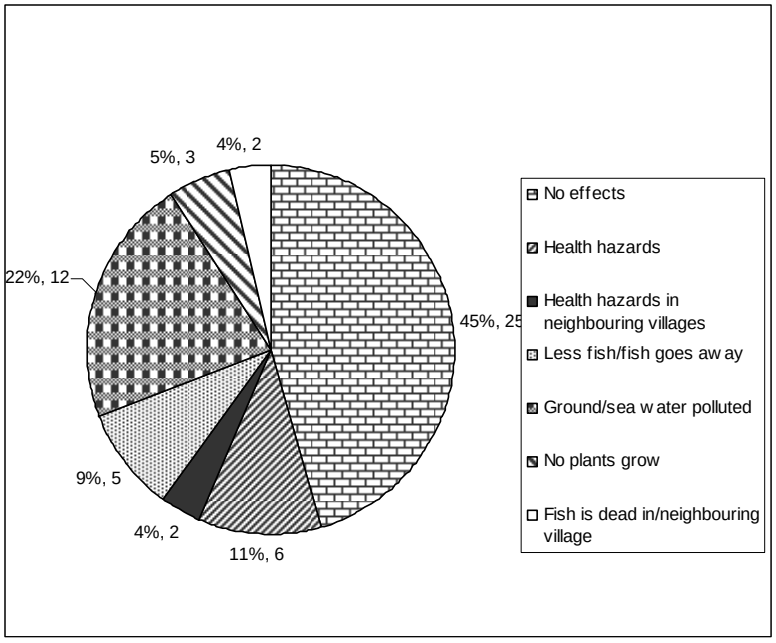
31 villages showed that there is salinisation of water resources; 3 out of 11 villages in Nagapattinam reported salinisation; an overwhelming 70% [28 out of 40] villages in Gulf of Mannar reported salinisation of water. There villages report salinisation of ground and sea water from release of effluents in the sea from shrimp farms and industries. 3 village water sources got salinised due to the tsunami. Water sources in three villages were salinised because of salt pans.

In three villages drinking water well covered and well water became salty because of tsunami. All other villages' drinking water sources became salinised due to development project such as Sand mining, salt pans, misplaced aqua farms, release of sewage and waste from factories, power plants and prawn/crab processing centres. Lack of sufficient rain and over consumption of ground water by Ice plants and industries are another known reason for salinisation of water sources. Sand Mining reduces the water holding capacity of the soil. Artificial pumping of ground water in the coastal

towns lead to salinisation of ground water. Insufficient rain gradually decreases water or sometimes dries off in the rivers, and unregulated transformation of fresh water ponds, fields and lakes for house construction leads to declining of ground water levels and scarcity of water in the districts.

4.3.7 Effects of Development Projects on Community Health and Fisheries

Figure 46: Impacts on community health/fish/water/plants by development projects in Gulf of Mannar



Proposed Projects

Now thermal power plants are going to come in Manapadu, Kulasekarapattinam, Arasaradi, Vembar, Pattinamarathoor, Udankudi and Tuticorin. In Manapad a desalination plant is also going to come. Manapad is going to become Exclusive Economic Zone (EEZ). From the shore up to 12 nautical miles (22 km) will be occupied by the EEZ. Then fishermen will have to get special ID card to do fishing there. In Kulasekarapattinam three thermal power plants are going to come. One by TATA and other two are for BHEL and TNEB. Then in Tuticorin another two more thermal power plants are going to come, one by TNEB and another one by Neyveli Lignite Corporation and the Tamil Nadu Electricity Board. Both have signed an agreement for setting up a 1,000-mw thermal plant at Tuticorin in Tamil Nadu. The Rs 4,000-crore plant will become operational within four to five years. The Plant is going to come in Periasamipuram (on the way to Vembar).

Role of Village Organizations

Several village committees and Gram Panchayats do not have much power to act when outside forces dominates them. In villages across Thirunelveli and Tuticorin districts, Village committees and Gram Panchayat are forcefully prevented from doing their duties. Mining companies do not allow new village committees to be formed all over Thirunelveli district coastal villages. From Tuticorin to Periathazhai, the mining companies do canvassing indirectly for people who supports sand mining to become village leaders as well as Gram Panchayat leaders.

5. Review of Post-tsunami Interventions

This section looks at the many intervention post-tsunami and their influence and implications on communities and socio-ecological resilience. One of these is coastal shelterbelt plantations.

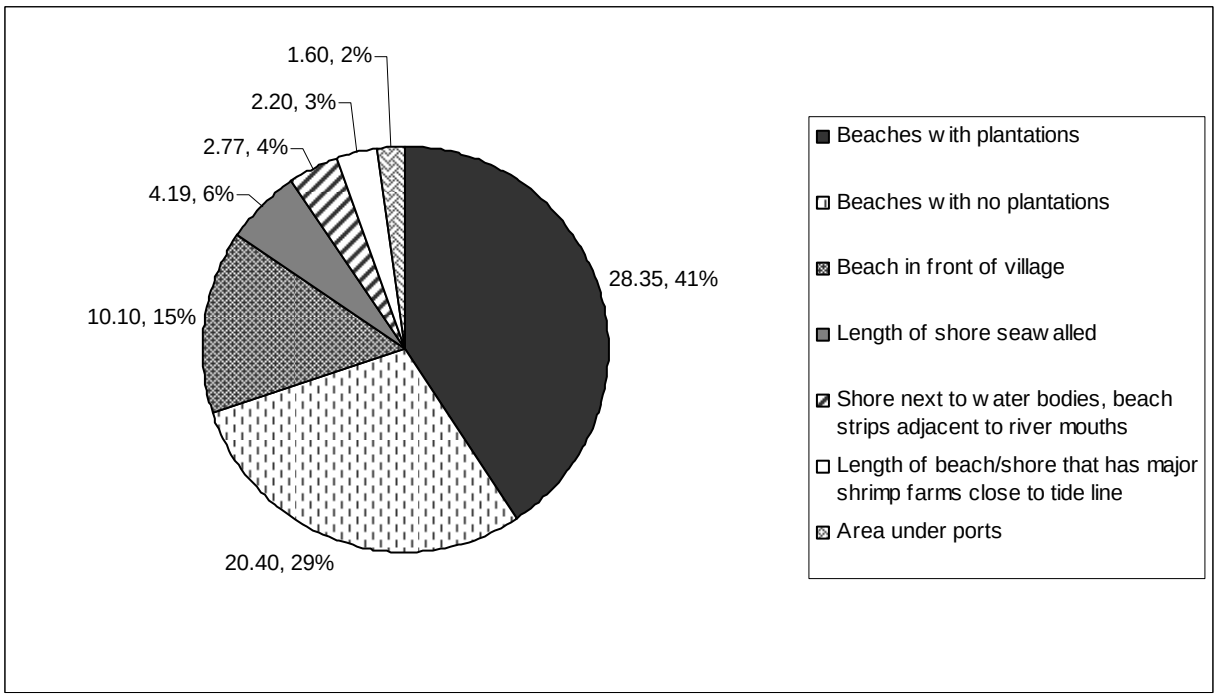
The Government of Tamil Nadu, under the Emergency Tsunami Reconstruction Project with World Bank assistance of Rs.10.17 Crores have undertaken the task of raising 2000 hectares of shelterbelt plantations and 700 hectares of mangrove plantations in the coastal areas of Tamil Nadu for the year 2005-06 (the same target was executed for the subsequent year) (Govt. of Tamil Nadu, 2006). This has predominantly been Casuarina mono-crop plantations. Till date there is no comprehensive or scientific study on the efficacy of Casuarina plantations in any of its claimed purposes – tsunami, cyclones or beach erosion (see the policy note on bio-shields).

Out of the 41 villages of Nagapattinam in the stretch between Kallar and Pazhayar only two villages (North Vanjore and Karukalacherry) had Casuarina plantation directly in front of the settlements. Again these two happened to be mixed villages with very few fishing households and boats (and hence less beach space use). Thus even if there was scientific evidence to show that Casuarina protects villages against cyclones, the current plantation pattern and locations by the Forest Department defeat this purpose argued by it, namely protection.

Most of these plantations are on sandy beaches and sand dunes which in addition to being unique habitat/ecosystems (see policy note on sandy beaches and sand dunes), also reduce the beach space available for fishing communities.

An overview of beach space of the sampled stretch between Kallar and Pazhayar is shown below:

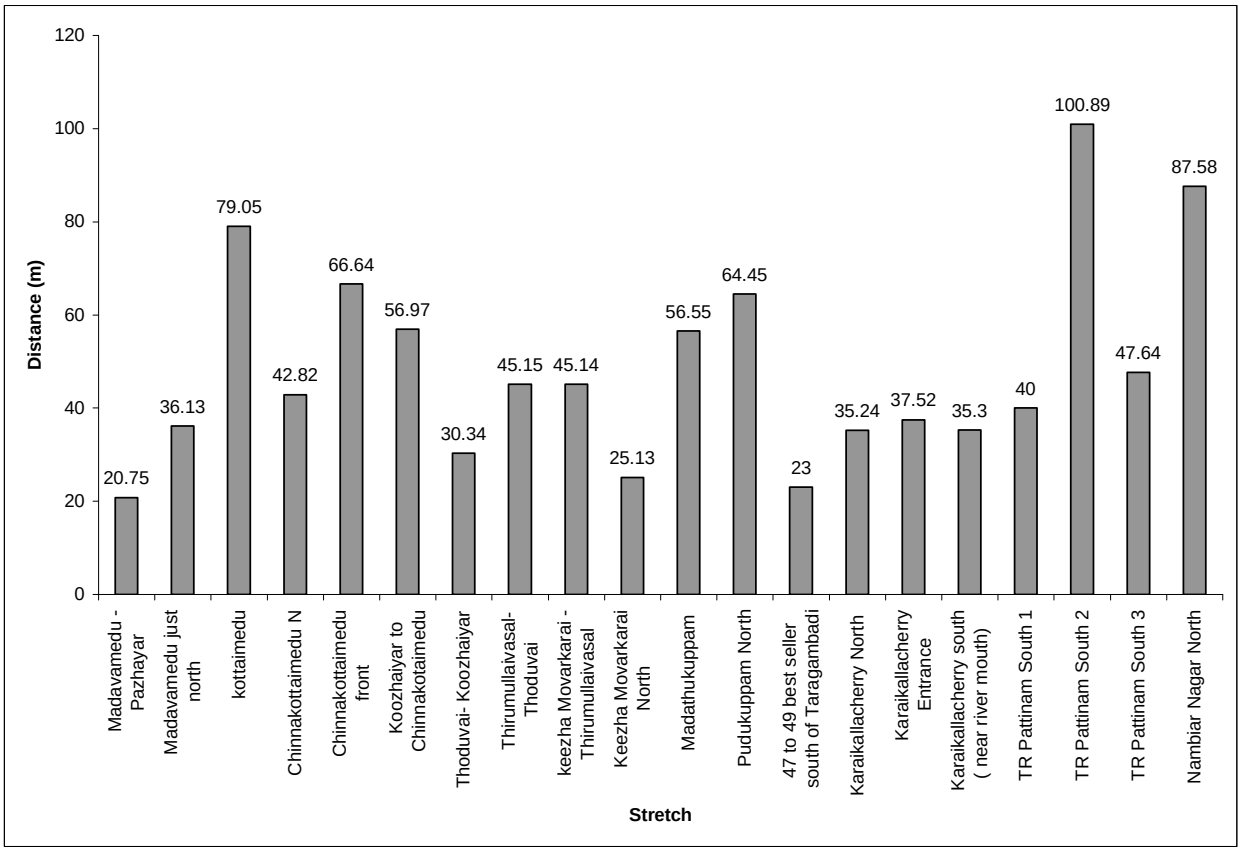
Figure 47: Shoreline between Kallar and Pazhayar, Nagapattinam District



It shows 41% (28.35 km) of beach length having plantations. This includes pre and post-tsunami plantations) with only 29 % of shore having sandy beaches with no plantations with 15 % (10.1 km) making up open beach space in front of village. Thus only 44 % of the shore is open space with rest occupied by either plantations, sea walls, ports , shrimp farms or next to rivers and are not used by communities.

The figure below shows the distances at various sampling point of the plantation from the approximate tide line at the time of sampling. The average is distance is about 48.81m with the median being 43.98m.

Figure 48: Distance of plantations from approximate tide line at various sampling point

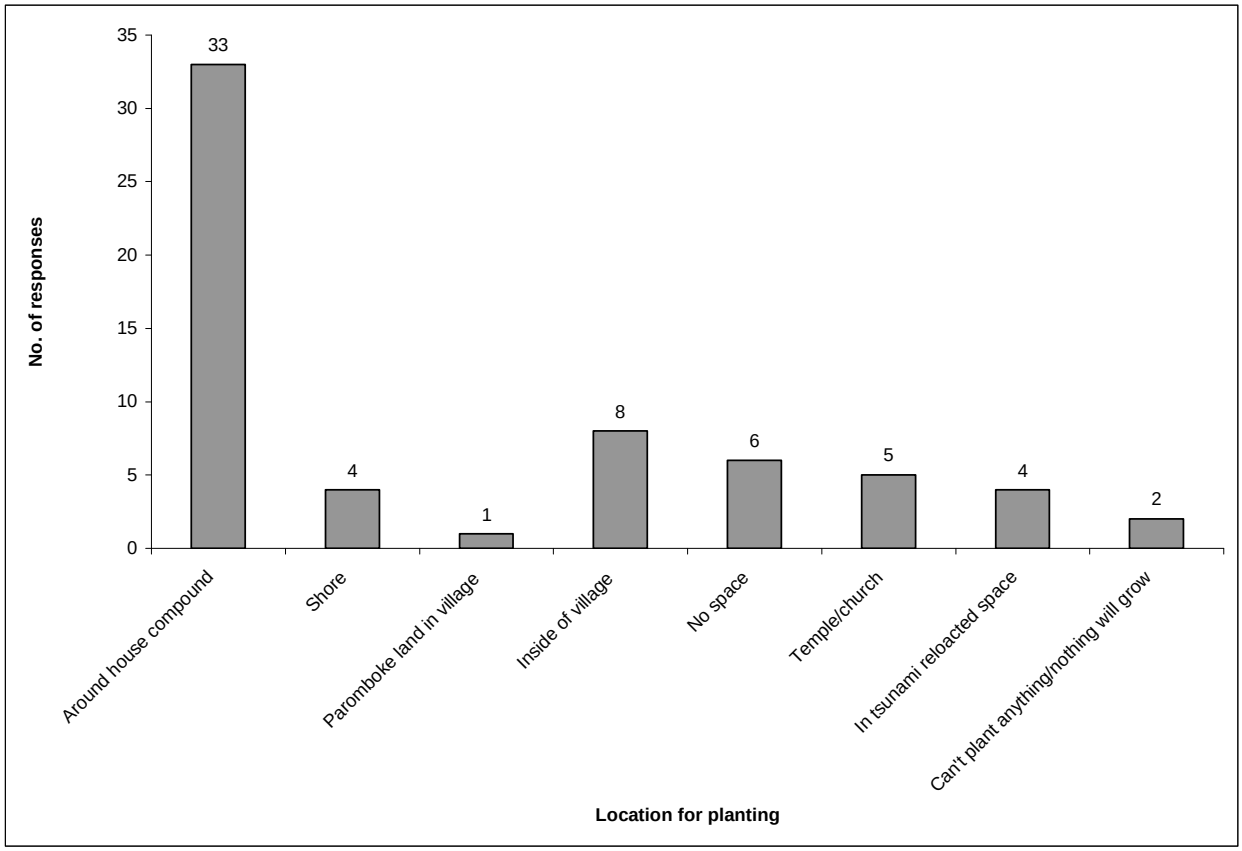


This shows that a significant amount of space that would otherwise be sandy beach (and would have been used communities) by is now occupied by plantations.

5. 1 Community Views on Plantations

In fact as mentioned in the Phase I report, it is also well known that the communities do not want shelterbelts plantations in front of their hamlet. On the choice of locations of the plantations most community prefer other species as well as the planting to inter-dispersed either within the village or within their own house compound. In fact one of the villages (Rajakkamangalamthurai) mentioned that though it would be good to have a tree within the house compound, it would be very difficult to find space for planting and that they don't even have space for fish drying.

Figure 49: Preferred location for planting of trees and plant by communities

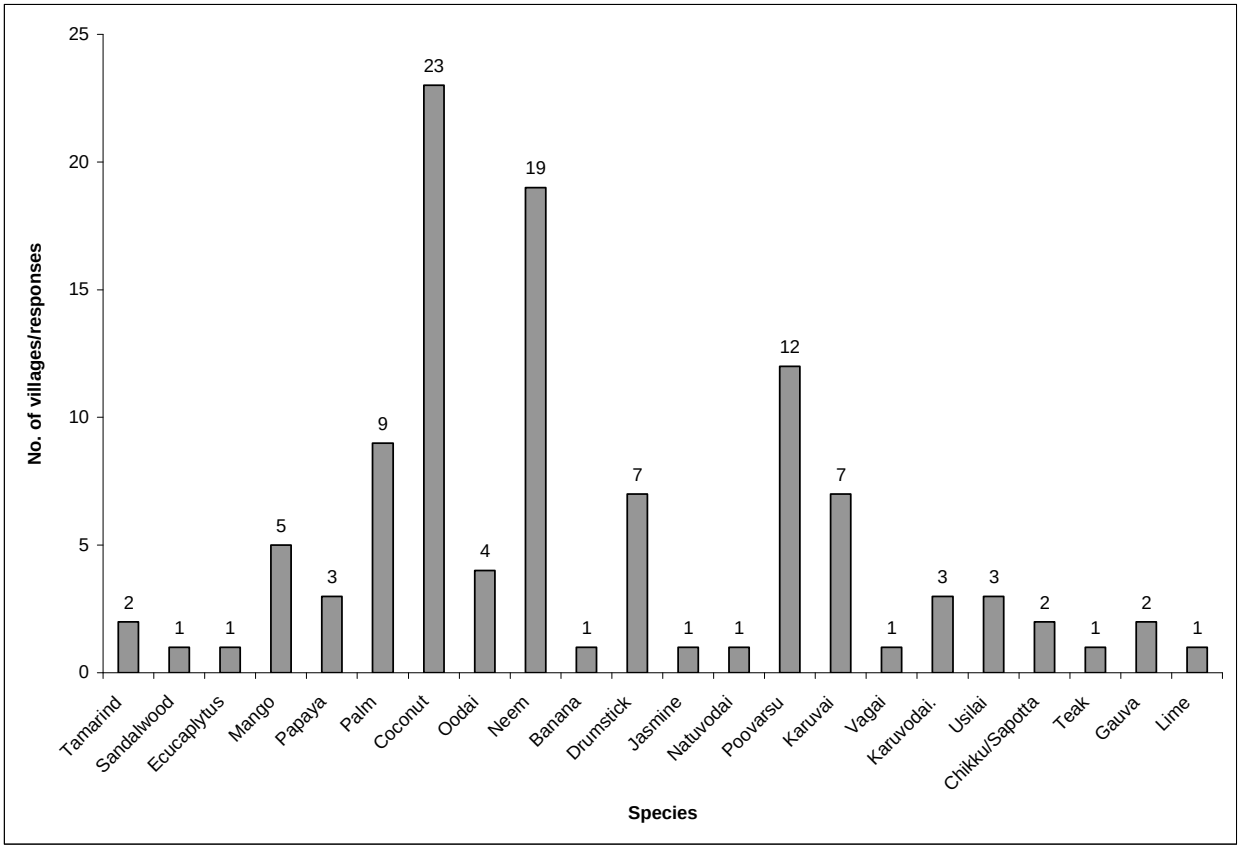


Out of the 51 villages sampled only four villages that mentioned planting on the shore, two of them actually preferred species like coconut, neem and not casuarina. Most preferred (33 responses) planting around their house compound as well as common spaces inside the village such as temple/church land and poramboku land. The most common species occurring/planted by the communities were:

• Tamarind • Sandalwood • Eucalyptus • Mango • Papaya • Palm • Coconut • Oodai • Neem • Banana • Drumstick	• Jasmine • Natuvodai • Portia *(Poovarsu*) • Babool Tree (*Karuvai)* • Vagai • Karuvodai. • Usilai • Chikku/Sapotta • Teak • Guava • Lime

The chart below clearly reveals that neem, palm, mango, drumstick and coconut trees are the most preferred/occurring/planted species in the villages.

Figure 50: List of species presented/planted in village

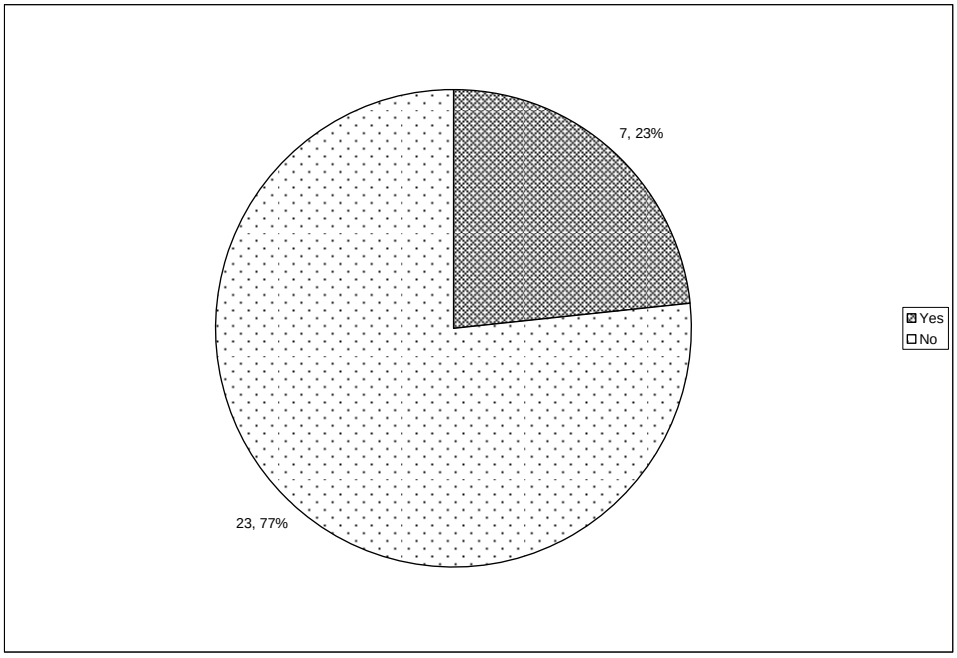


5.1.1. Casuarina Plantations and Consultation

The model being followed by the Forest Department is mixture of Joint Forest Management & Social Forestry programmes. The Forest Department in each hamlet needs to take up a PRA based on which a village level micro-plan is developed along with formation of Village Forest Committees (VFC) (See Phase I report, Rajeshwary, 2006).

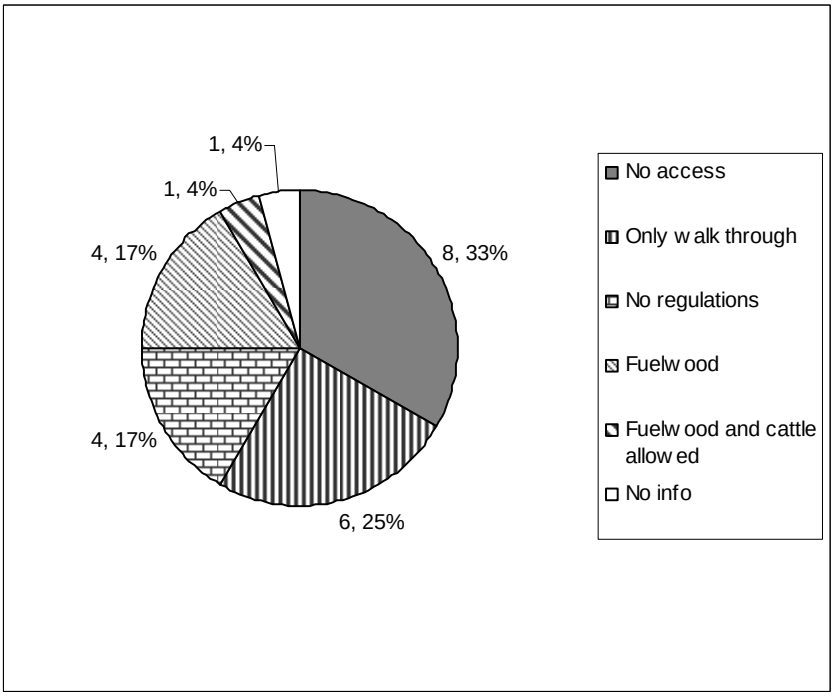
In most of the cases where communities report Forest Department plantation they have said that they were not consulted. 30 of the 51 villages sampled had plantations with 24 of them being Forest Department plantations of which only 2 villages confirmed that they were consulted.

Figure 51: Community consultation for plantations



In fact in the most of these plantations there is restricted access. This is show in the figure below:

Figure 52: Regulation on use of plantations



These are quite contrary to the Forest Department programme /policy on coastal plantations which states that not only that there will community participation and consultation, but also agreements in the form of village micro-plans on benefit sharing and use agreements.

It is quite possible that as per the government/legal land tenure in the locations of these plantations might be outside the "official" boundary of the village or might even be forest/revenue land and hence the Forest Department perhaps did not feel the need to consult the nearest/neighbouring village.

5.1.2 Plantations and Villages

Plantations also encroached on the village boundary and space in some villages. Below is illustrative case study of Madavadmedu in Nagapattinam district. It is important to note that this village has an ***in-situ construction*** of housing. The new plantations marked in green on an old satellite image illustrate how much space is lost to plantations thus limiting the scope of the village to expand with time. The village cannot grow westwards because of being flanked river and shrimp farms behind it. There are many such examples in the sampled stretch from Kallar to Palazhyar in Nagapattinam.

Figure 53: View of Madhavamedu flanked by river and shrimp farms behind it.
Photo: Google Earth

Figure 54: New post tsunami plantations marked in box and green occupying significant open sandy beach space in front and side of villages. Photo: Google Earth

One village, Kovalam, have reported that 20 years ago, there were casuarina plantations in the village, but as they needed to construct more houses over time, they cut all the trees and occupied the land. After tsunami, forest department planted Casuarina plantations. They said that they plan to cut the trees and occupy as much of land they can, as it on Kadal Poramboku land which belongs to them. They are particularly expressed concerns about available land for expansion of village for newer generations. They emphasized that there was no land available other than the one occupied currently by the casuarina forest.

Another village, Karaiyur, reported that earlier they could walk into the casuarina plantations and collect dried branches for fuel wood. However, in the last 15 years, they have been prohibited entry into the plantation. They still try and go to collect firewood risking being fined Rs.50 to 100, if they are caught.

A third village, Natrajapuram reported that its village boundary was reduced many years ago when 5 acres was converted to forest land and fenced off.

As one will see the next section on beach space uses that traditional village boundaries and uses of beaches by villages extend far beyond the shore area in front the settlement itself. This along with the previously illustrated fact that evident that communities prefer planting inter-dispersed within the village along with some inside their house compound can create a conflict for space use and tenure in these areas.

5.2 Community Views on Relocation

5.2.1 Importance of Settlement Proximity to Shore

As mentioned in the Phase I report as well as the section on beach space use (see Phase I report pages 172-174 Rodriguez, 2007), the beach front is plays a crucial socio-economic and socio-cultural role in the lives of fishing community. The access and visibility of the seas is very crucial for fishermen as part of their daily decision making, traditional ecological knowledge, and basic livelihood activities such as launch of boats, shore seine, drying of fish, mending of nets, berthing of boats and many other social functions (Bharathi, 1991; Salagrama, 2006; Praxis, 2005l). Furthermore fishermen have odd hours of fishing and also make unplanned trips based on other's landed catches which is possible only if they live on/near the shore (Kuriakose, 2006).

Fishing communities have historically been autonomous and self governing and their interactions with other communities have been minimal. The relocation does increase the problem or tensions related to caste and problems with the non-fishing communities after relocation and there have been some reported cases of this (Mathew, 2005a). In fact, relocating "west wards" is generally looked down upon by fishing communities and mingling with outsiders is seen as a threat to community's inherent nature and customs (Kannam, 2005).

Plantations and Relocation

When reviewing some of the location of the Tsunami rehabilitation sites and the locations of plantations in many of the sites it seems the locations that were adjacent to the original location but were beyond the 200M from HTL which would have been ideal for the community while conforming to G.O 172 were not chosen at all (even though the authors disagree with the 200 M set back in tsunami housing sites in G.O 172).

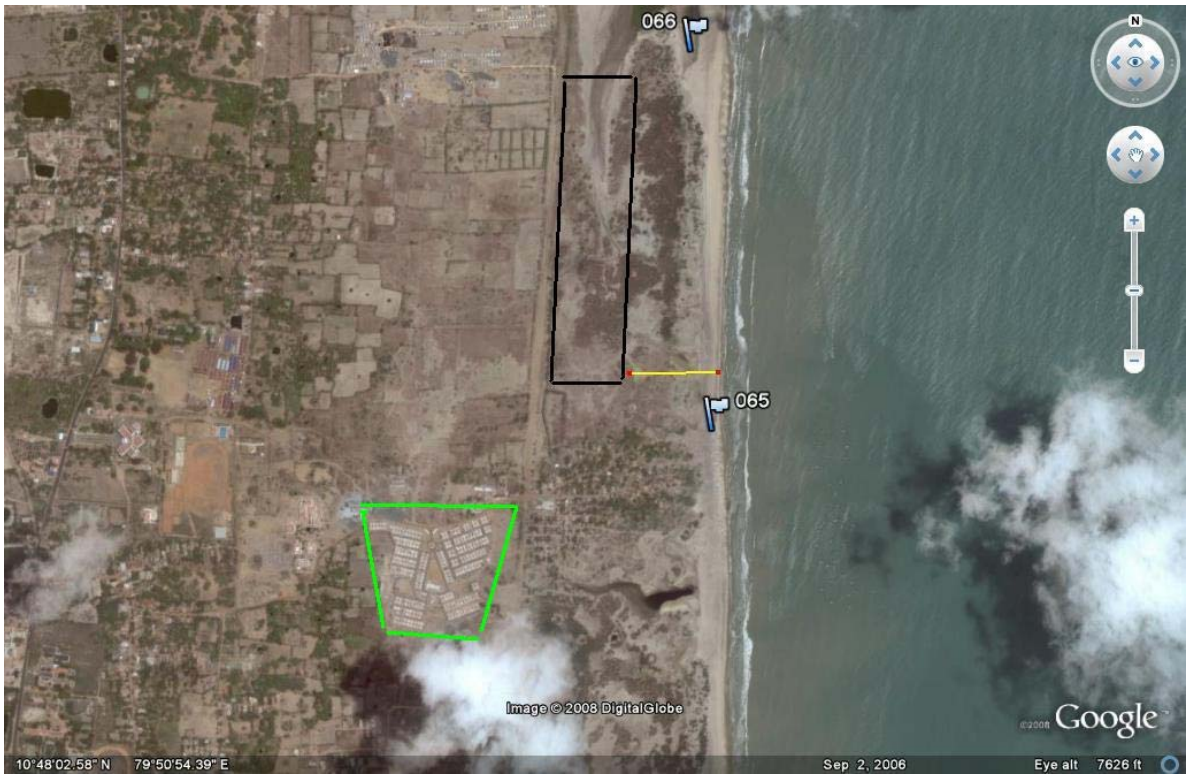
These locations were either vacant immediately after the tsunami and were used for plantations or already had plantations. One possibility of win-win situation could have been that the plantations continue to exist or a new plantation executed within the 200 M zone[1] and the housing site could have been located beyond the 200 m. This would have then truly been a "bio-shield" as per original intention of "coastal shelterbelt plantation programme" of the government.[2]

Below are illustrations of how the above possibility was ignored. In fact in some sites beyond 200 m instead of considering them for housing sites, they were used for plantations.

[1] With some 100m buffer or a thumb rule of no planting on a sandy beach or sand dune

[2] As mentioned before in the section on plantations almost none of the plantations are in front a village/settlement

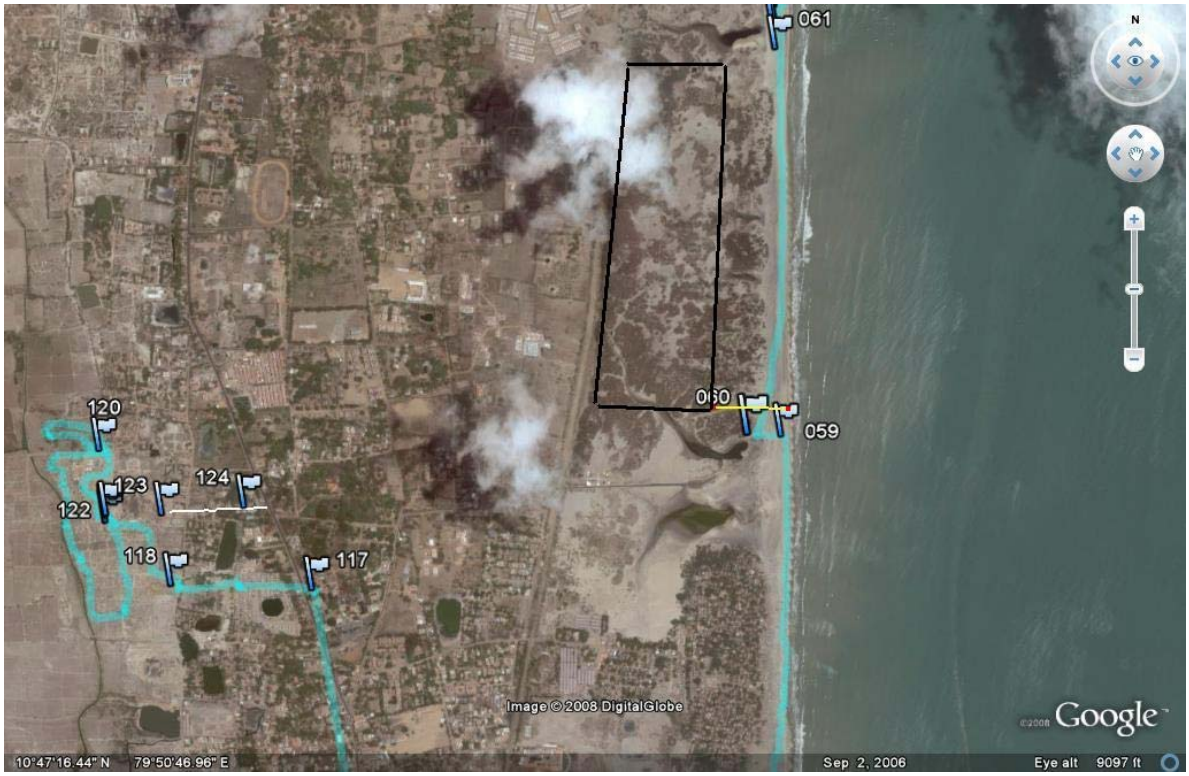
Figure 55: Satellite image showing post-tsunami rehabilitation site and other available land closer to shore that were not used for housing
Source: Google Earth



The black box is to land which behind the 200m HTL which was used for plantations by forest department, post-tsunami instead of being used as a tsunami housing site. Instead the actual tsunami relocation site represented by the green polygon which is around 525 M away from the shore/HTL

In another example below is a view of the Nambiar Nagar original village location and the tsunami rehabilitation site.

Figure 56: Satellite image showing post-tsunami rehabilitation site and other available land closer to shore that were not used for housing
Source: Google Earth



The black box is a large tract of Casuarina behind 200 M HTL which is pre-tsunami plantation but was not freed up for housing. The polygon in blue is tsunami housing site for Nambiar Nagar however the waypoint 117 represents on set of houses of Nambiar Nagar which is 1355 m away from the coast.

Basically these sites are just behind the 200 M would have been ideal for the community. It would actually seemed logical with the (unproven) "government rationale" of coastal shelterbelt plantations but yet this has not happened. (It was earlier that out of the 41 villages of Nagapattinam in the stretch between Kallar and Pazhayar only two villages had Casuarina plantation directly in front of the settlements.) In fact one of the reasons why most of the already existing coastal plantations were behind the 200 m zone was not freed up for housing and vacant spots which were behind 200 m which could have been used for tsunami housing sites were used for Casuarina plantations instead is perhaps that the Forest Department was under pressure to meet the targets of 4000 Hectares of plantation under the Emergency Tsunami Reconstruction Project with World Bank assistance of Rs.20 Crores. This pressure is best illustrated by one a case where the ETRP plantation was executed on a river bed more than 4 km inland!

Relocation would normally disrupts this and decrease their resilience, but in most cases communities still have access to the old settlements and houses which increases their resilience. The continued access, use and rebuilding of the old settlement should be viewed as an excellent mitigation and adaptation measure. This actually points to the resilience and the ability of fishing community to rebuild their settlement on their own.

6. Findings and Conclusions

Based on the data and analysis from the prevision sections given below are the main findings of our research arranged according to specific headings:

Village Formation

- 7 villages reported that they have been on the coast historically and their origins were not known
- 30 villages reported that they had migrated in the past 400 years. This migration has shown consistent trend and pattern over these 400 years. This shows a need of beach space fisher communities. for expansion and formation of new settlements
- There is indicative evidence drawn from the age of the village that the Pattinavars, Paravas, Vallyars and Kadiyars are the oldest fishing communities on the Tamil Nadu Coast

Fisheries Policy

- People report that the 45 day fishing holiday is useful and is needed
- 34 villages report that the fishing holiday time and the fish breeding season are the same.
- 15 villages report that the fish breading season is different from the monsoon ban period. 2 Villages specifically mentioned this was would vary depending on the coastal variations in fishing sites down the coast and the particular fish species.
- 12 villages report that the monsoon ban should be moved to a different month. There did not seem to be regional variations in Mannar and Coromandel Coast.

Fish Resources

- Most fisher communities claim that there is over-exploitation of fish in the sea.
- Main Reasons for over exploitation include lack of control on the use of mechanised means of fishing; increase in number of fishers; use of harmful nets; deterioration of coral reefs and therefore fish breeding and presence; and dynamite fishing [destructive fishing practices].
- Fishing villages in Gulf of Mannar report that the amount of catch as well as variety of fish has significantly reduced; this is so after the tsunami. Nagapattinam and Karaikal villages report no such reduction. This might be because of two reasons. The Gulf of Mannar coastal eco-system is much more complex, sensitive and rich. Hence, they have greater fish productivity. Hence intensive fishing practices may create a more severe perception of decline. The Nagai stretch on the other hand, while having pockets of rich fishing zones have for most part less (comparatively). Else, it might be a social reason, wherein when asked about change in fish presence for the first time, villages in the Gulf of Mannar area report a perceived reduction of fisheries resources that has not been validated. The Nagai villages have however reflected on this question because of the impact of the tsunami and have arrived on the conclusion that there have been no significant changes because of it. [refer to the Pattinavar study, Gomathy, 2006a]

Shore Seine

- Shore seines require a large number of fisher people to pull the net. It also requires the maintenance of the large nets cast. Traditionally a few of the households [usually the heads of extended families and village chieftains owned shore seines and boats. The continued use of shore seine is an indication of the kinship cohesiveness and preservation of traditional hierarchies within the village.
- One third of all villages studied still use shore seine.
- In the remaining two-thirds of villages, the use of shore seine has either significantly reduced or is absent.
- Some of the reasons for the reduction in shore seine is breakdown of kinship relations; increase in individual ownership of boats, overall decline of open sandy beach spaces; erosion of beaches because of state intervention and modern development [sea wall, plantations, sand mining].

Sand Dunes

- Sand dunes protect people from natural disasters. They prevent coastal erosion and preserve open sandy beach spaces.
- All villages on sand dunes claim that this elevated location helped decrease the impact of the tsunami in their villages
- People use sand dunes for fish drying and livelihood related reasons (lesser known/documented use)
- Sand dunes have been reported in 60% [32 out of 51] villages in the past. They were significantly prevalent.
- Of this 40% [20 villages] have reported that sand dunes in and near their villages have been levelled completely or decreased due to anthropogenic activities [A major reason and cause cited among the anthropogenic threats and causes was for village housing)

Plantations and Disaster Mitigation

- There is no evidence to show that Casuarina plantations protect villages from natural disasters like cyclones and tsunamis.
- Only two villages have plantations in front of them in the Nagai stretch. All the other plantations are to the side of the villages.

Plantations, Land Tenure and Benefit Sharing

- Plantations define land tenure and generate income through sale of wood and forest produce.
- 40 percent of coastal stretch from Kallar to Pazhayar in Nagai and Karaikal have plantations.
- 29 percent of the coastal stretch from Kallar to Pazhayar in Nagai and Karaikal is sandy beaches with no plantations; and 15% is beach space in front of settlements; about 15% to 20% of land is not usable beach space [river mouths, estuaries, shrimp farms].
- The average distance of plantations from the shore line is 45 to 48m.
- Thus significant open sandy beaches have been used grow plantations.

Consultations for Forest Department Plantations

- 30 out of 51 villages had plantation in or near their village. 24 of these have been planted by Forest dept.
- The remaining 6 were planted by NGOs and individual owners.

- Of the 24 villages with forest dept. Plantations, only 2 had been consulted while planning the plantation. One reason for this very low number could be because of the definition of government land tenure boundaries of the villages. Thus villages with plantations, not directly in front of them or on land not owned by them, may not be officially recognised as beneficiaries.
- Of the overall 30 villages, 7 villages were consulted.

Plantations and Benefit Sharing

- Of the 24 villages with forest dept plantations, 8 villages had no access; 6 could walk through; 4 are allowed fuel wood; 1 had fuel wood plus cattle that were allowed ; 4 had no regulations as they were just planted;
- In one village, access rights earlier granted to the community [dried wood] was rescinded 15 years ago; and a fine of 100/- is imposed on each person.
- Two villages indicate that their village boundaries have been constrained by plantations*
- These communities with forest dept. plantations expressed concern about land availability for village growth. Usually the land for accommodating increasing populations within the village came from common lands such as the Kadal Poramboku. If such common land is used by forest dept. for plantations; communities can no longer expand or even determine the use of this common land.

Preferred Species for Plantations

- All villages had an understanding of which species are likely to survive in their village, given the particular soil and water conditions
- The species preferred are those with some socio-economic value and are indigenous with a greater chance of survival in the region; In order of preference, the species of trees and plants wanted are coconut, neem, drumstick, karuvai [babul tree] and poovarasu (gives shade).

Location of Plantations

- Communities showed clear preference towards interspersing plantations amongst houses in the village.
- Communities preferred to have plantations around their own house in their land [33 villages]. The other preferred site was in the common land in the village [13 villages]. 57 responses [out of 64] wanted plantations either in their house compound; or in their common land [temple, church, poramboku]; 6 say that there is no space in the village.
- Only 4 wanted in front of the shore- of these 2 wanted coconut or palm(other two didn't specify what species)
- It is likely that the more proximal the trees are to the houses, the greater the chance of their survival.
- 4 responses wanted plantations in their tsunami houses.

Beach Land

- The median distance of villages from the shore line is 80m.
- A large number of the communities live within the CRZ; 22 villages are less than 50m from the shore line; 36 villages are within the 200m mark; and (92%) 47 villages are within 500m distance.
- Traditionally fishing communities live close to the shore. Seeing the sea for changes to go fishing is an integral part of their traditional knowledge, essential to planning their fishing. In addition,

the sea shore is an integral part of their social, cultural and economic fabric; the way their communities are organised. It is called *Kadal Poramboku.*

- Historically, communities have evolved an intimate relation with particular stretches of coastline that they use, that is in front of their settlement and extends on either side. These boundaries of these stretches that each community is clearly demarcated, traditionally, geographically and culturally.
- Communities use the beach land for making and mending nets, drying catch, landing and storing boats, repair and maintenance of boats, community and governance meetings; cultural festivals; leisure activities. Thus fishing communities use beach land for livelihood related as well as community cohesiveness reasons.
- For some of these activities, fishing communities use more shore space than what is immediately available before their settlement
- Thus, the length of sea shore used to store boats is on average 28% more than the length of the beach in front of the settlement. In one instance, it extended to twice the length of the beach in front of the settlement.
- Fish drying tends to use more beach space than storing boats. The length of beach used for fish drying can be as long as two and half times the length of the village. On an average, fishing villages use 48% more beach space than the length of their communities. In one instance, a length of 1.8 kms of contiguous sea shore [sand dunes and sandy beaches] was used to dry fish except in those areas where community access was blocked by plantations.
- Tracts of fish drying in the coast were obstructed by casuarina plantations.
- The coastline has seen a steady expansion in the number of communities along the coast. This is because of increase Space for this expansion comes from the commons such as Kadal Poramboku land.

Village Boundaries

- Out of 51 villages, 20 village show increase in the village boundary; 6 showed decrease and 25 had no changes over time.
- Villages tend to expand with increase in population and houses. One of the critical reasons for increase in village boundaries is for housing [15 villages], tsunami relocation [4 villages]. In the 15 villages, two had bought additional land for the housing.
- One hypothesis about the 25 villages that show no growth, is that house expansion is still within the existing village boundaries. More enquiry is needed into this.
- Of the 6 villages that showed decrease, 4 villages reported natural reasons [tsunami, erosion], one sold land and one was decreased for plantations.

Internal Regulations on Beach Space Use

- Communities have internal regulations of how this beach space is to be used. These regulations vary down the coast depending on the site of the settlement and the nature of near shore fisheries.
- For instance, communities had clear regulations about boats from other villages that used their beach space. 7 villages don't have external boats that come in and hence they have no regulations. All the remaining 44 villages, at least 32 villages had clear regulations on access of their shore. Of the 32, 14 don't allow boats; 9 are allowed with payments / fee; another 9 insist that the crew coming in should abide with local community regulations and must not cause problems the village.

- Most villages develop internal regulations; that are supportive of fisher people across communities; indicative of deeper social identities. In 16 villages, across all categories, communities helped boat crews that landed in an emergency, irrespective of their caste and community. This help included repairing boats, diesel, money, food and hospitality so that they can go back.

The CRZ Notification

- A significant number of people know something about CRZ. While no one said that they were completely ignorant about CRZ, the knowledge that different villages held was graded on a continuum. 30 out of 51 villages know about the CRZ; 16 villages know a little; 5 villages said that they had heard about the CRZ but didn't know details.
- One hypothesis for this might be due the state tsunami house relocation policies, wherein new houses were built at least 200m away from the coastline.
- There is shift in the understanding about the purpose of CRZ. Communities are not aware of the purpose of conservation and protection of ecologically sensitive and productive habitats such as estuaries, mangroves, sand dunes, coral reefs, fish breeding areas. Instead CRZ's purpose is now understood as protecting lives of coastal peoples. 42 out 51 villages said the predominant purpose was that of safety of communities. Only two villages mentioned safety of lives and conservation of coastal resources.
- 7 villages articulated that while the government is relocating people beyond the 200m line for safety reasons, in reality, it is for aiding vested development interests down the coast.

CMZ and the Swaminathan Committee Report on CRZ

- When asked whether communities were aware of the proposed CMZ and Swaminathan Committee Report in the CRZ, 24 villages [all in the Gulf of Mannar region] said that they were not informed about this. 20 villages showed some knowledge, of which 11 villages are in Nagapattinam. 7 Villages had heard about the CMZ but didn't know much about it.
- One of the reasons of the greater awareness in the Nagapattinam region is the efforts of a local NGO working for the empowerment of fisher people. Further, the greater exposure of these people because of post-tsunami rehabilitation could be a reason for their greater awareness. (It must be noted here that the above study was done prior to the consultations on the CMZ conducted by CEE nationwide, on behalf of MoEF)
- 49 villages out of 51 villages wanted to be consulted in drawing up this policy. Only two villages felt that this was not necessary.

Beach Erosion

- 38 villages reported erosion in their villages. The average erosion is about 150m; and the median measure is 50m [one or two villages have reported beach erosion of 1km]. This is a significant factor to take into account given the average distance of the settlement from the coastline.
- Some critical reasons that communities gave for beach erosion is sand mining [10], harbours [5], and other anthropogenic reasons.
- 9 villages reported that the cause of erosion was global warming and corresponding sea level rise. This indicates that there is some awareness about the implications of global climate change in the habitat that they live in.
- Causes for beach erosion: 10 reported sand mining (poor implementation of coastal management laws); 9 attributed to global warming and sea level rise; 5 reported harbours

Community and Coastal Development

Sand Mining

- Sand mining causes beach erosion and health hazards in coastal villages. Sand mining is done in 14 out of 51 villages. 3 of these villages are in Nagai and 11 villages are in Gulf of Mannar.
- One of the four companies in the region mined sand for more than 20 years and others since four to five years. Sand mining that two companies undertake have exceeded the area that the government has given permission about.
- illegal sand mining is supported by caste panchayat, gram panchayat as well as local state officials
- Sand mining companies minerals internally divide communities by getting some leaders to support the activity. Hence, governance structures cannot address the issue of sand mining.
- Five villages protested against sand mining and four villages have internal regulations that prohibit sand mining in their villages. These villages have developed vigilance systems to prevent sand mining.

Harbours

- Two villages (Manapad and Punnakkayal) protested against having harbour in their village because it might affect their livelihood.
- There is a fishermen village (Rajakkamangalamthurai) where all members of the community is a partner in constructing a harbour and has invested significant amount of money in its planning.

Development Projects and Tourism

- 6 villages out of 51 villages have Nuclear/Thermal Power plants and other chemical industries in villages or in the neighbourhood village. 5 are on the coast of Gulf of Mannar and one in Kodiakkarai of Nagapattinam district.
- Crab and prawn processing companies and cottage industries are the next important development units in the districts. Most of these units are on the coast of Tuticorin district.
- The major industries located in and around Tuticorin district.
- 8 out 11 villages in Nagapattinam and 18 out of 40 villages in Gulf of Mannar have tourism near their village. These include pilgrimage centres, sandy beach stretches, and a bird sanctuary.

Consequences of Development Project

- 31 villages showed that there is salinisation of water resources; 3 out of 11 villages in Nagapattinam reported salinisation; an overwhelming 70% [28 out of 40] villages in Gulf of Mannar reported salinisation of water. Three villages report salinisation of ground and sea water from release of effluents in the sea from shrimp farms and industries. 3 village water sources got salinised due to the tsunami. Water sources in three villages were salinised because of salt pans.
- A total of 18 villages claimed that health or natural resources were affected out of 26 villages that had development project. 16 villages out of the 22 villages in Gulf of Mannar claimed that health or resources were affected by the development projects. 2 out of 4 villages in Nagai claimed that health of resources were affected.

- Health hazards are there in 7 villages because of development projects. 13 villages have pollution and salinisation of ground water and sea water. In three villages no plants are growing because of ground water salinisation (pollution). Two villages reported dead fish and crab floating the areas where the effluent water mixes in the sea; five villages reported that there were less fish

Aquaculture Farms

- 13 villages have reported presence of aquafarms currently or in the past in the village and 14 in the neighbouring village. Aquafarms are currently present in 6 villages [2 in Nagai and 4 in Gulf of Mannar]. 7 villages had aquafarms in the past.

Community Consultation

- 25 villages were not consulted out of 32 villages have development project initiatives. 22 of 28 villages in Gulf of Mannar that had development projects were not consulted; of 4 villages in Nagai, one was consulted and 3 were not.
- Only 7 villages were consulted before implementing the projects. Out of seven villages, most of the consultation done was with the gram panchayat and caste and not all the members of the villages.

Community Institutions

- There are community institutions that bind the community into collective fora down the coast. These include traditional village governance [village committee, kadal committee, caste panchayat], church based community groups; and livelihoods based groups. They vary down the coast. While the Nagai coast is homogenous in caste and religion, Gulf of Mannar has additional layers of heterogeneous caste communities and a strong Church influence.
- They play three kinds of roles in governance: socio-cultural, conflict resolution and justice and economic
- All of them have transformed themselves over time to meet modern demands and work with modern institutions, including the state and church where applicable.
- Most community institutions have internal, commonly agreed upon regulations for governance of land and sea resources. These usually are based on membership, consensus and democracy.
- There is an evolving, shared framework of perspectives about livelihoods and settlements that come from active dialogue between these institutions.
- There is an inter-village network between clusters of village that comes together across caste and religious boundaries
- The network across villages have been weakened because of several reasons: mechanization, state structures, heterogeneity in caste and coastal development activity.
- Where it exists, it is reactive - that is, it comes together and into action when confronted with crises.

7. Recommendations

Based on the data, analysis, findings and conclusions, a list of recommendations is presented here:

7.1 Policy Recommendations

CRZ Notification

- Communities have to made aware of the conservation purposes and provisions of the CRZ, and the benefits of these for their livelihoods.
- State officials must be educated on what regulations will alleviate disasters, and what will conserve fragile, coastal ecologies.
- Measures for coastal regulations have to be stringently followed. This is particularly true for coastal development projects [particularly illegal infringements such as sand mining]
- Impact of global warming on the coast and coastal communities have to be understood. Fishing communities must be made aware of these consequences. Their participation must be actively sought to understand changes in coastal contours as well as suggest local mitigations measures and solutions.

Fisheries Laws
Fishing Holiday

- Monsoon ban / fishing holiday is a useful intervention. However, there has to be more scientific information on breeding patterns of fish in different coastal sites, climatic condition and species specificity.
- There has to be an active effort to understand community knowledge about local eco-systems and fish breeding patterns. This dialogue between modern science and traditional wisdom must be the basis of fixing the monsoon bans.

Fisheries Regulations

- It has to be recognised that the number of fishers in the coast across communities have been increasing. Efforts must be made to estimate what is growth rate of fisher communities. These estimates must be accounted for both fisher community settlement planning and management of fisheries resources.
- Stringent regulations against the use of harmful fisheries practices [banned nets, dynamite fishing], indiscriminate mechanised fishing, and destruction of natural habitats such as coral reefs [important for fish breeding and availability] should be enforced. Communities down the coast already indicate that they recognise these as the major factors are responsible for the reduction in fish catch and species. It is important to strengthen this awareness with community management measures that use internal community regulations and external regulation.

Shore Seine

- The continued prevalence of shore seine indicates the need for beach integrity to be preserved for community beach space use. Since shore seines are also indicative of kinship and traditional governance patterns, it is important to understand the changes that community structures are undergoing

- It is important to understand near-shore resources; and the factors that influence them [such as near shore trawling].
- Encourage practices of community management of fisheries resource.

7.2 Resource Use Recommendations

Sand Dunes

- There is a need to document the settlement patterns of villages on sand dunes over time space.
- Given that traditionally fisher villages were built on sand dunes, enquiry has to be made into traditional and modern forms of architecture and settlement planning, and their effect on sand dunes and dune formation
- Research and documentation on traditional knowledge of sand dune restoration techniques and applicability in current context has to be conducted.
- State officials and communities need to be made aware of why sand dunes are important so that they can actively participate in their protection and restoration.
- State policy must focus on developing mechanisms for the restoration and protection of remaining sand dunes. The CRZ regulation of no-development zone on sand dunes has to be stringently enforced.

Plantations

Species

- Plantations must prioritise cultivating indigenous species that are appropriate for the coastal habitats, and to specific site requirement [water, soil conditions]
- Forest department officials must be educated about locally preferred species by the community.

Micro-planning

- Forest department officials have to be trained in understanding common land usage, so that they are enabled to respect and recognise traditional boundaries and spaces held across fishing villages.
- Village micro-planning has to be reinforced and communities must be aware of their legal rights over access and benefit sharing in plantation various species.
- While defining communities affected by plantations, even those plantations proximal to the villages and not just those within village boundaries should be considered.
- Plans for plantations including the species planted, location of the plantations and the benefit sharing principles should be jointly drawn with the community.
- Benefit sharing of plantations has to be clearly understood both by the state and the community.
- Communities must also be consulted on access regulations to these plantations.
- Efforts must be applied to understand internal community regulations about plantations. Plantations planning must take into account these internal regulations. Forest department officials must be made aware of these changes.

Other

- Research has to be conducted on why the palm trees and economy based on palm jaggery declined rapidly in the last century.

- There should be no plantations on sandy beaches and sand dunes; these are unique ecological habitats that should be retained.

Beach Spaces

- A detailed enquiry has to be made into how fishing communities traditionally use sandy beaches.
- A detailed enquiry has to be made on how fishing communities regulate their sandy beaches internally.
- State policy must recognise traditional regulation of beach space use and strengthen these internal regulations.
- Given that the sea shore is an integral part of fishing communities, the state has to recognise the rights of fishing community to access and use beach space, as well regulate the entry of external actors.
- Ensure rights of community commons as defined by socio-cultural traditional boundaries is recognized by the state
- All relocation efforts must ensure that communities have near access to the sea shore, for not just storing their boats and gear but also for other purposes that they use it for.
- Village expansion because increase in housing has to be taken into account in coastal planning;
- All coastal development plans must assess impact on beach spaces and community usage of these spaces.
- Scientific enquiry into causes of beach erosion and long-term monitoring of beach erosion patterns has to be conducted.

7.3 Communities and Coastal Development

- Mechanisms for recharge of ground water need to explored and implemented. Enquiry into traditional methods of ground water recharge and water harvesting methods must be undertaken.
- All coastal development interventions must require the environmental clearance, but also should include public hearing clause in the CRZ notification.
- Mega-projects on the coast such Koodamkulam power plant and Sethusamudram will severely damage ecological and livelihood security, and therefore not recommended in highly populated and ecological sensitive zones.
- Ensure rights of community commons as defined by socio-cultural traditional boundaries is recognized by the state
- Ensure mechanisms of grievance redressal about pollution and consequences on human health and coastal ecologies.
- Strengthen CBOs to be vigilant of their coastal environment and illegal violations.
- Build capacities of community based institutions to understand legal rights and processes; as well as development plans, programmes and policies.

Community Institutions

- Sensitize policy makers, planners and development practioners to the existences of CBOs
- Strengthen open access platforms where dialogue on pressing issues of the coastal villages can be addressed by community based organizations.

- Engender reflection amongst CBOs to move to a proactive rather than a reactive framework.
- Engender CBOs to become more inclusive.
- Study the changes in institutional growth of CBOs, with a view to understand mechanisms that allow democratic structures.

Village Formation

- State planning has to take into account the need for expansion as new populations migrate to the coast. It has to take into caste and cultural variations down the coast.

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