

## **PART III: NEIDHAL OR LITTORAL: COASTAL TAMIL NADU**

### **CHAPTER 5**

#### ***FISHING AND INDIGENOUS KNOWLEDGE SYSTEMS***

This chapter discusses the use of IK for fishing in the coastal villages of Tamil Nadu. The focus is on the hardships experienced by fisher folk, who must constantly work against the vagaries of the winds and the sea. Traditional knowledge is particularly important in navigation, finding the best fishing shoals, and fishing practices.

#### **Introduction**

Deep and rich knowledge systems underlie many community-based renewable natural resources use and management systems. Traditional or local knowledge about the environment and natural resources is an important asset in coastal marine communities. Its acquisition, use and transmission are relevant to livelihoods in coastal marine zones and fishing. It is the purpose of this chapter to show how traditional or local knowledge of the communities in the coastal marine zone of the Coromandel in Tamil Nadu has great potential for effectively utilising and managing the fishing resources of the sea.

The studies of local knowledge in fishing communities of the Asia-Pacific region and eastern India have demonstrated that, in fishing, local knowledge is an important cultural resource. Traditional knowledge guides and sustains the operation of traditional community-based fishing management systems (Ruddle, 1994: 28; Neitschmann, 1989; Hooper, 1990; Raychaudhuri, 1980). The knowledge or knowing where, when and how to fish governs great many of the fishing decisions of the poor, small-scale fishermen. The rules and principles that comprise a fisheries management system in the Coromandel coast are directly from the traditional or local knowledge.

Everywhere, the traditional knowledge is empirically based and practically oriented. It is also complex and highly organised. The traditional knowledge of the Coromandel region has empirical information on fish behaviour, marine physical environments and fish habitats. There are also evidently explicit conservationist objectives. Traditional knowledge of fishing, marine environments and resources is of great potential practical value in the modern world. And so it is used and transmitted, from generation to generation, because it provides an important information base for local resources management. Our immediate concern in the chapter is therefore the indigenous or local knowledge in the fishing activities of the coastal Tamil Nadu, although we are equally interested in Indian coastal marine zone. Very severe interference, through various human activities, with the coastal marine zone in recent years has resulted in discernible and dire consequences. Specifically, the Pulicat

Lake, north of Chennai, which was once a thriving ecosystem, for example, has been modified. The upper regions of the lake have silted up and the exchange of seawater has been considerably reduced. Areas, which were submerged and fisheries before are now used for agriculture. But due to salinity, agricultural production continues to be very poor. The ecology of mangroves and backwaters is severely affected in Pichavaram and Vedaranyam (the Cauvery Delta). Aquaculture, indiscriminately sited in the coastal marine zones and unmindfully exploited for economic gains, is throwing the environmental (land-water interface) system out of gear. Tourism is putting pressures on the coast as well, even while the infrastructure for tourism - hospitality, travel and visitor services - is perceived as woefully inadequate and the environment and sanitation are not something we could be proud of. What is more important however is that we are not aware of the exact implications of the events and consequences, conflicts and disputes emerging from the coastal marine zone (Kumaran, 1998).

The primary motivation underlying this chapter, in fact the whole book, is a '*care for knowledge*' and a '*commitment to use that knowledge*' which may be gained here in our daily actions. We may commit ourselves to use the knowledge in all the major spheres of human activity along the coast. While some of these are complementary, others are conflicting as the coastal zone always support multiple activities.

## **Human experience in coastal zone**

Human experience is a timeless fascination for all of us. It is very much so when it is shared, in terms of insights, questions and solutions, with respect to a context. The context here is *Sustainable Coastal Marine Management*. Experiences relate to fresh nuances on the interplay of human and coastal personality, social milieus and the on-going challenges of history, humanity and the coast.

We all agree that *experience* is part of every human's personal life. We have the need to place it and appreciate it in contextual terms: we prefer to do it in a '*place context*'. Places have meanings for humans. They offer experiences, unique in themselves. Cultures are different inasmuch as experiences are different, in terms of places, events and ideas. Torsten Hagerstrand, a Swedish geographer of great repute, has once said:

In order to put ideas in place more seriously and develop them, certain conditions are helpful. If one wishes, one can say that such conditions are offered by places (in Anne Buttimer, 1983:85).

## **Pressures, Land-Water Interface, and Impacts**

Coastal marine zones, all over the world, are such places and they offer not only conducive conditions for human experiences but also actions and development. The significance of place at any moment depends on past and present experiences. Not least among these are interactions with environment. It is in fact the experiences the coastal

marine zone as an environment offers that we are concerned with here. The human experiences of the coastal marine zone may be discussed within a framework of:



The pressures may be differentiated under socio-economic and environmental pressures while Land-Water Interface System may be discussed under social, economic, political and all other interactions, including positive and negative aspects of the system and the impacts can be discussed broadly again under socio-economic and environmental impacts. The socio-economic and environmental aspects that concern us relate to fishing and coastal marine resources management.

### **Care for knowledge in fishing**

Traditional or local knowledge in coastal societies is empirically based and practically oriented. The traditional or local knowledge of the Coromandel coast, as we shall see later in the chapter and also the next, is complex and very highly organised. According to Ruddle (1994:28), most such knowledge systems combine empirical information on *fish behaviour, marine physical environments and fish habitats into comprehensive and frequently complex fish taxonomies, directed towards ensuring regularly successful catches and often long term sustainment of aquatic resources. In some instances, explicitly conservationist objectives are evident.*

Most important of all information from the fisher people of the region is that the poor and the small-scale fishermen do care for the knowledge passed on to them by their parents and ancestors in regard to fishing and all that relate to it. They are aware that the traditional knowledge, although changing, sometimes rapidly as in fishing villages along the coast but in the vicinity of the urban areas, has crystallised routine or habitual ways of doing things in fishing just as it has helped define social roles in their communities. They are also aware that its possession and transmission has helped shape fisher folk society and culture. In reverse, however, society and culture shape knowledge as well. With the advent of the modern means of telecommunications, especially television, fisher folk culture is fast disappearing and with it the traditional knowledge the communities hold dear. It has become hybridised with the arrival of new technologies, especially in fishing and transport crafts. But the local and community organisations have called for, and ushered in, a resurgence of ethnic pride and indigenous rights movements. There has been a welcome burgeoning of interest in the subject of traditional knowledge. The fishermen are turning themselves into good Samaritans with an interest in constructions of knowledge and processes of its transmission.

### **Traditional Knowledge in Managing Fishing**

Traditional ecological knowledge of coastal marine environments and resources is of great potential, practical value in today's world. It provides an important information base

for local fish resources management. It must be systematically collected and organised, evaluated and scientifically verified, before being blended with complementary information drawn from sciences, so as to be useful for resources management (Pauly, Palomares, and Froese, 1993). Traditional ecological knowledge has fundamental socio-cultural importance to the fishing community, besides its practical value, because during knowledge transmission to, and socialisation of children over several generations, there crystallised several social institutions: routine or habitual ways of doing things gradually became the customary way that the things were done. Yet, throughout the country, traditional knowledge is either disappearing and, at worse, becoming hybridised with extra-local elements. Box 5.1 outlines the common characteristics of traditional coastal marine knowledge.

***Box 5.1: Common characteristics of traditional coastal marine knowledge***

Traditional or local knowledge of coastal marine environments has certain important features, common to several cultures. The most significant are:

- ❖ Based on long-term, empirical, and local observation, traditional or local knowledge is adapted to local conditions, embraces local variations and is extremely detailed;
- ❖ It is practical and behaviour-oriented, focussing on important resource types and species;
- ❖ It is structured, in fact compatible with western biological and ecological concepts through a clear awareness of ecological links and notions of resources conservation;
- ❖ Indigenous logic is however inductive, with conclusions based on prior observations and hypotheses neither verified nor refuted by systematic observations; and
- ❖ It is a dynamic system, capable of incorporating an awareness of ecological perturbations and of merging this awareness with an indigenous core of knowledge.

Source: Ruddle, 1993a, 1993b, 1994.

***Fish Behaviour.*** This is the main component of the traditional ecological knowledge of the coastal marine resources. This knowledge is particularly highly developed about species of fishes, which are economically as well as ritually important. Fish behaviour varies with different places and different times. Information such as this is combined often with similar systems of knowledge about astronomical cycles, general climatological processes, sea conditions and terrestrial resources as well. This is also a principal reason for successful fishing. The fishermen, and also fisher-women, of the eastcoast have knowledge of their habitual aggregations, especially of those of the food varieties. Just as details of other fishes are known, so are the details of the relationships among the different reef species. In most cases, the special behavioural characteristics are embodied in the names of fishes. Matching vernacular names with the scientific names has resulted in mutual verification of scientific knowledge. Fish behaviour is a temporal variant as well, according to fixed diel, monthly and longer cycles. This knowledge, as embodiment of the causes and characteristics of different types of fish aggregation behaviour by species, is fundamental to successful

fishing. It is important to note that the relative importance of the types of such behaviour varies according to the gear employed. Certain marine animals and several fishes form large aggregations for reproduction in known locations, during certain months and moon phases. Experienced fishermen know prime spots where predictable fish aggregations, especially food species, occur. In many communities along the coast, this knowledge of the timing and location of fish aggregations is very valuable that they very carefully guard them.

Certain species aggregations occur at specific times of the year, during a few or several days around new or full moon. Fishermen possess knowledge as to where and on what days of the lunar month that predictable fish aggregations occur. Some are even capable of pinpointing the hour and the diel change of location as might result from tidal movements. Fishing for specific target fishes becomes predictable and can be verified by field observations along the east coast.

***Marine Physical Environments.*** Knowledge of the physical environment of the coastal marine areas is important for both the fishing technologies employed and the targeting of fishes by species. Nietschmann's (1989: 69) writes that:

*(T)he sea is knowable, useable and predictable...; the timing, location and conditions of the occurrence of marine phenomena is regarded as entirely predictable.*

Raychaudhuri (1980) describes how the fishermen co-ordinate the complex variables of topography beneath the sea, sea water conditions and sequences of tide and ebb with fish behaviour, to ensure successful catches and their own safety at sea. For Indian fishermen, the soil of the seabed may be classified according to its capacity to support the net poles and its fertility regarding the types and quantity of fish in the waters above it. They have known that the undulations in the seabed affect patterns of water flow and the colour of surface waters. These two are used often as indicators of the nature of the seabed.

The colour of the water is an indicator of the presence or otherwise of fish: green coconut water (*dabjal*) indicates an area of little importance for fish; mangosteen juice (*gabjal*) indicates the general presence of fish; blue waters (*nila jal*) and waters that glow like fireflies (*juni-bhanga jal*) indicate an abundance of fish. According to Raychaudhuri (1980: 61), water smell and oily appearance of the surface waters are the additional diagnostic characteristics. Again, in their understanding, a shoal of fish emits a fishy smell that enables fishermen to guess its route and movement. Expert fishermen can differentiate between the types of oil released by different species of fish: the oil released into the water by *hilsa ilisha* is pinkish. Fishermen guess the size, and also the movement, of the shoal from the characteristics of disturbance in the waters.

The Coromandel fishermen differentiate between two different types of water, namely: *vantakarap tanni* (a kind of chill water) and *Kalvattu tanni* (brownish waters along the on-shore). This water is relatively cool/cold and it is essentially morbid and unclear. It contains algae, muddle and some residues of the seabed. This gives the water sort of an

odour. The colour of the water is neither bluish nor greenish, but looks more cocoa-ish. Predominant in July-August, it is known for abundant catch, as the fish move from the deepsea region to the on-shore region. The chill water, according to the Pattanavars of Pondicherry region, originates in the deep sea and reaches the on-shore by the soni (southern) or vanni (northern) currents, accompanied by southern (*kota*) and northern (*vata*) winds. *Vantakarap tanni* has great potential to yield good catches. *Kalvattu tanni* has its origin in the monsoon rains, the waters of which are carried into the sea through the river mouths. This water enriches the fish resources in the sea. These waters originate in different points on-shore and in the hinterland and thus carries *vandal* (silt), *alukku* (trash) and various other materials. These enrich the food resources of the fish and hence fish is found in abundance in the on-shore region.

The nature of seawater and its fish resources characterise three seasons, known locally as *kalakku* (mixed-up water, because fish varieties are found in a mix) when catches are bountiful; *telivu* (clear and transparent) when day fishing is an uphill task, for fish see/sense the nets and escape from being caught; and *ochchu* is neither bountiful nor lean, when moderate catches are ensured. Thus fish resources are never the same throughout the year. The seasonal availability of fish is shown in Table 5.1, by the months of the English as well as Tamil months.

Table 5.1: Seasonal Availability of Fish as known to Fishermen of the Coromandel Coast

Seasons	Fishes
January-March ( <i>Thai-Pankuni</i> ) <i>Telivu, ochchu</i>	Ribbon fish, horse mackerel, lizard fish, perches, pomfret, whiting or lady fish, seer, sole, lactarius, jew fish, prawns, mullets, white bait, sabre fish, and sardines.
April-June ( <i>Chithirai-Aani</i> ) <i>Ochchu</i>	Sardines, white bait, lizard fish, gar fish, flying fish, perches, otolithus, red mullet, thread fish, pomfret, whiting or lady fish, mackerel, seer, sole, mullets, and jew fish.
July-September ( <i>Aati-Purattasi</i> ) <i>Kalakku, telivu, ochchu</i>	Shark, anchovies, silver bellies, prawns, lizard fish, gar fish, flying fish, perches, otolithus, horse mackerel, pomfret, sole, sardines, ribbon fish, mullets, lactarius, jew fish, and sabre fish.
October-December ( <i>Aipasi-Markali</i> ) <i>Kalakku</i>	Shark, silver bellies, cat fish, mullets, ribbon fish, white bait, lactarius, jew fish, perches, lizard fish, pomfret, mackerel, sabre fish, and prawns.

Source: Bharathi, 1999: 42; Murugan, 2002: .

Looking at the table, we may say that there are several different fishes and in abundance that the fisher folk do not find it difficult to carry on a relaxed, tension-free life. But the fact that their traditional conservation ethics and management practices provide a

locally sanctioned code of behaviour that can be taken advantage of in furthering the objectives of modern resources management.

Societies everywhere, be it on the hills or in the plains, be it coasts or the interior places, demonstrate an understanding of the ecology. Fisher people's everywhere exhibit a conservation ethic (Box 5.2), revealing a perception of resources as being finite and exhaustible. In many small-scale fishing communities, general ecosystem awareness and ecosystem ideas are not common in local or traditional knowledge.

In the Coromandel coast, on the other hand, such awareness and ideas have always been common knowledge, in traditional as well as local, and small-scale as well as large-scale fishing. Resource depletion, manifest in increasing scarcity, is always thought of as being *bad* and also inevitable. A *rest period* for stock recovery is a widespread management practice. Some fishing methods are perceived as destructive to the marine environment. Commercial fishing operations of recent years, especially those involving motor-powered boats and/or trawlers, have elicited from the fisher folk environmentally aware responses: protests, rallies and agitation by the fisher people's organisations in the country.

**Box 5.2: Conservation Ethic**

Conservation ethic may be defined as *an awareness of people's ability to deplete or otherwise damage natural resources, coupled with a commitment to reduce or eliminate the consequences*. Traditional conservation ethics and management practices provide a locally sanctioned code of behaviour that can be harnessed to further the objectives of modern marine resource management. Several marine resources conservation measures have been consciously employed by traditional societies to conserve stocks and ensure sustained yields. In some societies, thinking may be less sophisticated that long term ecological implications of resources use are seldom perceived as being an integral part of marine ecosystem management.

Source: Ruddle, 1994: 36.

Ruddle (1994) speaks of the contemporary importance of local knowledge as being (a) inherent academic interest; (b) practical usefulness; and (c) an instrument of empowerment. Local knowledge is of great importance, for example, to subsistence fishing along the Coromandel coast. Hence, the fisher folk acquire, use and transmit such knowledge even now as it is extremely relevant to their livelihoods. The practical and behaviour-oriented traditional knowledge, with focus on the most important species and their habitats, are of immediate value for fisheries planning, monitoring and management, and the enforcement of community-based regulations. To be effective, and for survival, local fishermen know much about significant biological events. This is important in siting and managing community -protected areas.

**Importance of traditional knowledge, now and in the future.** The principal areas where traditional fishermen contribute knowledge to development and management

planners, and where modern science is deficient, are: (a) traditional management methods, (b) conservation, (c) stock assessments, (d) environmental impact assessment, (e) local hydrography, (f) mapping, and (g) fish systematics and biology.

There are traditional common property systems, which ensure equitable access and include management measures aimed at sustainable use of fisheries. *Kambi* method of fishing, which is discussed in detail in the next chapter, is one such management measure. It provides equitable access and is a management measure for sustainable use. The strategy includes the concept of community-based ownership of fishing areas besides seasonal, spatial, gear, and size or species restrictions. Entry limitation imposed by traditional methods is important for sustainable development.

The traditional management systems in operation along the coast include careful conservation measures. For example, there is a widespread use of certain seasons and areas, which relate to spawning and harvestable-size limitations. This could be of assistance in the planning of marine reserves and routine marine resources management.

The traditional knowledge of fishermen provides a useful basis for understanding local stocks and their population dynamics. For example, the fisher people of east coast have knowledge about the timing, location and behaviour of spawning aggregations. It is important to note that the traditional knowledge of the local fishermen is far more important than the scientific knowledge of the marine biologists. The marine biologists do use this knowledge of fishermen to their best advantage. With the knowledge of spawning migrations and spawning aggregations, the fishermen could offer valuable insights into the likely impact of coastal infrastructures, such as jetties, harbours, and other constructions being put in place in the course of coastal zone development. Most important, the fishermen of east coast understand local hydrography so well that even oceanographers and fisheries biologists are not aware of it as well as the fishermen do. Research is urgently needed on such matters as these so that the coastal marine resources could be better managed.

The fisher folk have a spatial familiarity of their physical environment, it must be possible to map local currents, seabed conditions, and fishing aggregations (see Chapter 6). It is also possible to develop a finely detailed mental mapping. The submarine cartographic knowledge of *karuppu* and *parai* discussed in the next chapter, for example, is of immediate practical importance (see Raj, 1990).

## **Replacing TEK and traditional values**

The contemporary importance of local knowledge cannot be doubted, for the reasons outlined above. What is worrying most is the march of the contemporary cultures, which have little or no respect for traditional knowledge. Traditional knowledge is a system of power and it can provide a basis for the empowerment of communities to undertake community-based resource management. This is particularly important in tropical, multi-species fisheries such as India's. There is no doubt that traditional knowledge is of



continuing importance to present-day subsistence fishing carried out along the coast. Unfortunately however its promotion and participatory development is seen as organising the rural poor and therefore subversive. The point is, those in the government do not understand the importance of organising the fishermen towards preserving a culture and knowledge system that is worthy of such effort. Kurien (1990, 1991) has detailed the example of local knowledge providing the basis for a *socio-ecological movement* in Kerala, which has later snowballed into a powerful political force.

The one problem that threatens to replace TEK and traditional values is the free entry of capital and outsiders into traditional fishing areas. Such entries were in the past prevented by social barriers as caste and possession of fishery-specific skills. But as a result of trawling boom in the 1980s in in-shore fisheries, which were once the exclusive preserve of traditional fishing communities, who also viewed the sea as their community asset, inroads were made into common property resources. Virtually, open access to the fishery resources to anyone who could afford to make investments in craft and gear and who has *political clout* by himself or ability to arrange for political patronage became possible, as the political parties took hold of such communities as their vote bank. Today, some of the very traditional fishing areas stand overtaken by the capitalist and political forces, the traditional values and TEK are being destroyed. It was precisely for the reason of reclaiming their historical rights the fishermen of Kerala started the socio-ecological movement. This they did by a programme of erecting artificial reefs, which was based on traditional practice and knowledge. Unfortunately, conditions for such a movement do not exist along the east coast, even as there are conflicts emerging from the entry of capital from outside, with or without political interference.

Local or traditional knowledge has lost its legitimacy and disappeared in some areas primarily due to contacts with the larger society. A certain hybridising of local, traditional knowledge has also occurred, leading eventually to the loss of traditional knowledge over several years, as newer and newer knowledge became embedded into the native systems. Hybridising to varying degrees is seen all along the coast in Tamil Nadu, ushering in a fear that the traditional knowledge would one day disappear entirely and without a trace.

## **Issues and Initiatives in fishing**

The country's coasts and seas harbour rich biodiversity, on which about 22 million fisher folk depend. Nevertheless, in regard to the aquatic conservation policies and economic development for the global market, the livelihoods and priorities of these people are not taken into account. True, the National Fishworkers' Forum has mobilised the millions of fisherfolk to protest against destructive commercial trawling and intensive aquaculture along the coast. This protest has brought national attention to the neglected sector of fishing by the traditional fishermen (Raju and Sarin, 2001).

It is however sad that there are no hard data to demonstrate that any of the fisher folk is practising resource conservation. If they were, then there would not have been any problems as those faced by the fisher folk, these days. Contrarily, therefore, some societies

have less sophisticated thinking that they would not have perceived long-term ecological implications of marine resources use as an integral part of the general marine ecosystem. In small-scale fishing communities such as the ones along the eastcoast of Tamil Nadu, there is a great/high awareness marine ecological linkages, as we later show in the next chapter.

There is something that might have come straight out of a phrasebook of the Third World social realities, namely, the contrast one sees between the fisher colony and areas that abut it. In city and metropolitan contexts, Chennai and Tuticorin, for example, the huts and single story houses of the fisher folk are overshadowed by imposing tower blocks and high rise apartment complexes. According to Hoskote (2001: 32), it is in this space that the fisher people conduct their daily negotiation with the brooding ocean.

## **Applying Traditional Knowledge in Coastal Marine Management**

Our vision and goal is to establish the principle and practice that the natural resources belong to the local people who have cared for and sustained them, while harvesting their fruits for themselves and for others. There is however a struggle amidst the people of the coast themselves. The struggle is between two unequal sides; one side having all the power, all the knowledge and all the money, while the other side is devoid of all these. The process of struggle and the process of building up take place hand in hand. There is no blueprint or chronological order. The stages can be over-lapping and may differ from place to place according to each situation.

The fishing communities, totally dependent on fishing for their livelihood, should own the water bodies like the sea, lakes, rivers, lagoons and reservoirs. They should also own their fishing implements. They should manage the water bodies, fish resources, and the sale and distribution of fish. The fishing communities, particularly the fisher women, who distribute fish and small fishing implements, assume greater importance. The people have to be mobilised to take control over these resources.

Mobilisation of peoples towards sustainable marine resources development and management has four distinct elements:

### ***1. Togetherness***

All those who have a stake in fishing for livelihood (actual fishers and not those who only invest in fishing gears for profit) should come together. All those who are affected by factory trawlers, coastal industrial aquaculture and coastal industries should be brought together as well. A close relationship should be created between fish consumers and the bonafide fish-harvesters.

### ***2. Awareness***

Systematic education of the fisher people about the impacts of globalisation / liberalisation, which has paved the way for over-capacity, destructive fishing gears

and depletion of fish, and for making them aliens in their own sphere should be attempted through community and voluntary organisations. In fact, such institutions are at work in many of the villages of the coast. For example, *Nala Oli Iyakkam* of Father Edwin of Nagercoil, Kanyakumari in the south of Tamil Nadu is involved in several activities. Most important of these is the creation of what is called *anbiyangal*, which in the words of Father Edwin 'compassionate neighbourhoods' whose purpose is creating awareness amidst fisher folk and towards self-governance.

### 3. Campaign

This campaign has to begin in the local areas, leading to the national and international levels. At the local level, the campaign is for addressing local issues. The problems and analysis of the local places and their implications at the national and international levels should be drawn out.

### 4. Training

The fishing communities, which have been exploited by ruthless money lenders, middle-men and merchants and which have, as a result, lost control over their own harvesting and the fruit of the harvest, should be trained to manage the fish resources, sale and distribution. It is important that they use, rather revive, their traditional knowledge to the fullest extent possible as it has preserved their culture and their coastal marine resources in a better way than the modern, large-scale and destructive activities.

The four interest groups that we must bring together, in partnership, to discuss the insights, questions and solutions to coastal marine resources problems and conservation are:

1. Environmental NGOs and / or community organisations;
2. Government personnel in the agencies directly concerned with fishing and coastal marine resources systems;
3. Group of local, regional stakeholders; and
4. Scientists and researchers with an avid interest in fishing and coastal marine management.

### What can we do about it?

Coastal marine management issues are complex, involving social, economic, ecological and political arguments. Most issues have a spatial dimension, allowing rational decisions on siting, zoning, and timing to facilitate management. The coastal marine management in regard to fishing and related activities may be examined broadly under:

1. Organisational frameworks,
2. Coastal water management,
3. Coastal land management,

4. Coastal ecosystem management, and
5. Coastal hazards management.

Emphasis will however vary between the five areas above, according to the experiences the places along the coast offer to the fishermen. Most programmes related to them reflect concern for the future of the coastal environments. There has to be a ***Unified Approach*** to coastal marine management. The one approach we may consider coastal issues could be within a single major legislative and procedural system, administered by a monolithic agency. The other could follow a '**Positive within Negative**' approach. But the two have been criticised for the same reason that they have achieved little on the ground, in countries such as the US, the UK and France, despite well-covered in law. There is of course a '**Middle-of-the-Road**' approach which countries such as Australia, Canada and Israel, which work with Co-ordinating Councils, Lead Agencies and Broad National Policies have taken advantage of. The Councils and Agencies play a key role as '**think tanks**' with knowledge, technical skills and clearing house functions.

### ***What should then be our approach?***

The developing countries have adopted approaches, which are either American or the British, or whichever country that suppressed them first and supported them later, rather vigorously. Their experiences have proved that the approaches are not for import and that the countries in question should develop/design one of their own, based on their experiences rather than other milieus'. Do we already have an approach, in India and in Tamil Nadu? If not, what can we do to provide one? Currently, all coastal issues raise conflict between coastal users/stakeholders and interest groups.

Are we concerned here only with the '**negative**'? No. We are indeed concerned with the '**positive**' of what can be done to make human experience in the coastal marine zone satisfying and the coastal fishing activities sustainable. Biologically productive areas occur primarily in the coastal zones, land or sea: food production on land and in sea, providing a security for the world population.

Coastal ecosystems represent an extremely valuable resource and yet one that is increasingly threatened by human interests. Destruction of marine and land habitats (mangroves, for example) is most serious in coastal zones. Little do people realise that salt marshes, estuaries, mangroves and coral reefs and all areas of great beauty and vital to our welfare are especially vulnerable to human disruption and degradation. Coastal cities often dump their rubbish, from industrial refuse to household garbage, into nearby wetlands. Estuaries are 'crossroads' between land ocean ecosystems and hence locations of much human activity (Adyar estuary and innumerable others along the coast). They are productive in terms of fish life. Many of these prime habitats are destroyed at a rate that often eliminates entire communities of fish. Another prime cause of habitat loss lies with eutrophication brought on by sewage sludge and fertiliser run-off. Pressures such as these, especially using up of oxygen by sewage and algae decay, are destroying both mangroves

and coral reefs. Pressure on arable land has led to clearance of mangroves for agricultural land.

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