

SECURING OUR SHORES

People participation and environmental management



Cover Photo: Fisherman, Tamil Nadu, India by Sarika Gulati

More than 8000 people lost their life during the 2004 Indian Ocean Tsunami in coastal Tamil Nadu, mostly fishing community.

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Foreword

Coastal ecology is under great threat with visible effects of climate change. The impact and intensity of hydro-meteorological disasters too is increasing. The adverse impact of these on coastal communities is leading to increase in losses of lives and livelihood. The issue highlights some of the raging debates on how we manage our coasts, and some solutions therein on how the local communities can be made more resilient.

The 1076 kms long coastline of Tamil Nadu constitutes nearly 15% of the total coastal length of India. It is endowed with a rich biodiversity reserve now under great peril due to the exposure to human activities and settlements. Coastal vegetation has a significant potential to mitigate damage and save human lives by acting as buffer zones during extreme natural events. Nature has provided biological mechanisms for protecting coastal communities from the fury of cyclones, coastal storms, tidal waves and tsunamis. Bio-shields constitute one such mechanism for safeguarding the ecology of coastal areas and the livelihood of the fishing and farming communities.

Well designed and managed bio-shields have successfully demonstrated the benefits of mangroves and other coastal forests that have long been undervalued. After a careful evaluation SEEDS decided to promote a multi-layered and multi species bio-shield in the Light House Panchayat area in Thiruvallur District of Tamil Nadu as a mechanism to counter effects of the possible coastal disasters. This programme is designed to strengthen ecological security of the coastal ecosystems as well as livelihood security of coastal communities in a mutually reinforcing manner.

Community involvement was the principal factor in the successful completion of this programme. The community was taken into confidence for the entire programme. Even the selection of the species for bio-shield development was done in consultation with the local men and women. The overall approach of the project is science based, community centered, partnership and process oriented. The intervention has helped the villagers to understand how different species which has grown together could actually be of use when a disaster of a magnitude like the tsunami was to hit them.

On behalf of SEEDS, we would like to acknowledge the assistance extended by colleagues at the M.S. Swaminathan Research Foundation. We are grateful to the UN-ISDR Regional office for Asia Pacific office and the Delegation of European Union, for their support to the project. Our colleagues, Dr. P. Thamizoli and Dr. Ignatius Prabhakar have played a key role in the design and successful implementation of this project. They have been ably supported by the team at the SEEDS Headquarters and the Safer World Communications Team. Above all I would like to thank the people of Light House Panchayat, especially their children to whose safety and well being the project is dedicated.

Manu Gupta
Executive Director, SEEDS
2009

Introduction

Fact: The world is shrinking further into a blackhole of impending disasters which can have an overriding affect on the lives of the people across the world.

Fiction: We are prepared to rebuild, reconstruct and regenerate what is now lost or will be lost.

Building resilience isn't just an offshoot of an impending disaster; it's the result of a community trying to sustain itself against the worst possible scenario by taking account of possible alternatives so that they are able to atleast hold themselves together in a time of crises. It's a given on most counts that history has taught us bitter lessons in the past; however it's often a rarity that we take it seriously enough to prevail without making the same mistakes in the future.

One of the most widespread natural calamities of all times—Tsunami—which hit us in the new millennium in 2004, has infact been recorded twice in hundred years in the Eastern coast of India, in 1881 and 1941. Despite the familiarity with the disaster and the extent of damage it could inflict we were hardly prepared to recover immediately from it. The eastern coastal belt of India is prone to frequent cyclones. Tanjore and Naganipatnam, are potentially the worse affected of the 15 districts in Tamil Nadu. The disaster preparedness for the worst here? Still uncertain...

While it is important to re-evaluate how and where we stand in the big picture and whether we are equipped enough to deal with a disaster like Tsunami for instance, it's equally important to take into account whether a community can rebuild from scratch if they are hit by something as disastrous. It should be imperative to a community to know how to: a) safeguard it's boundaries, b) institute measures before a calamity strikes, and c) work towards eventually recovering from the 'minimal damage' caused by that disaster.

Usually a disaster of such magnitude brings not only the community together but the world at large—boundary walls between countries and continents soon melt away because of the magnanimity of such a crisis. We are no longer as fragmented as a world as we would like to believe—if melting ice caps in another part of our world, thousands of miles away can have fast rising climate change concerns and can take a toll for the worst on everyone, then we should all, irrespective of nationality or ethnicity think twice about whether we can afford to be cocooned in a bubble, far removed from the reality of what might be happening in perhaps a drought stricken—Afghanistan or the Middle East.

While many would claim that a particular model doesn't work as effectively in another setting, a different region or continent, however surely we are equipped enough to mould it according to the immediate needs of another disaster stricken state. While the main focus of the report will remain to see how one can build resilience in the coastal communities of Tamil Nadu through bio-shields, one cannot discount that set models of efficiency and efficacy can be used in another coastal region far removed from our own coastline, through implementation in a manner that it works for that particular region or coastal zone.

We will touch base with various measures that have led up to the importance of bio-shield as a part of resilience building for a community, such as the Light House Panchayat in Tamil Nadu, and in the process understand the various ways in

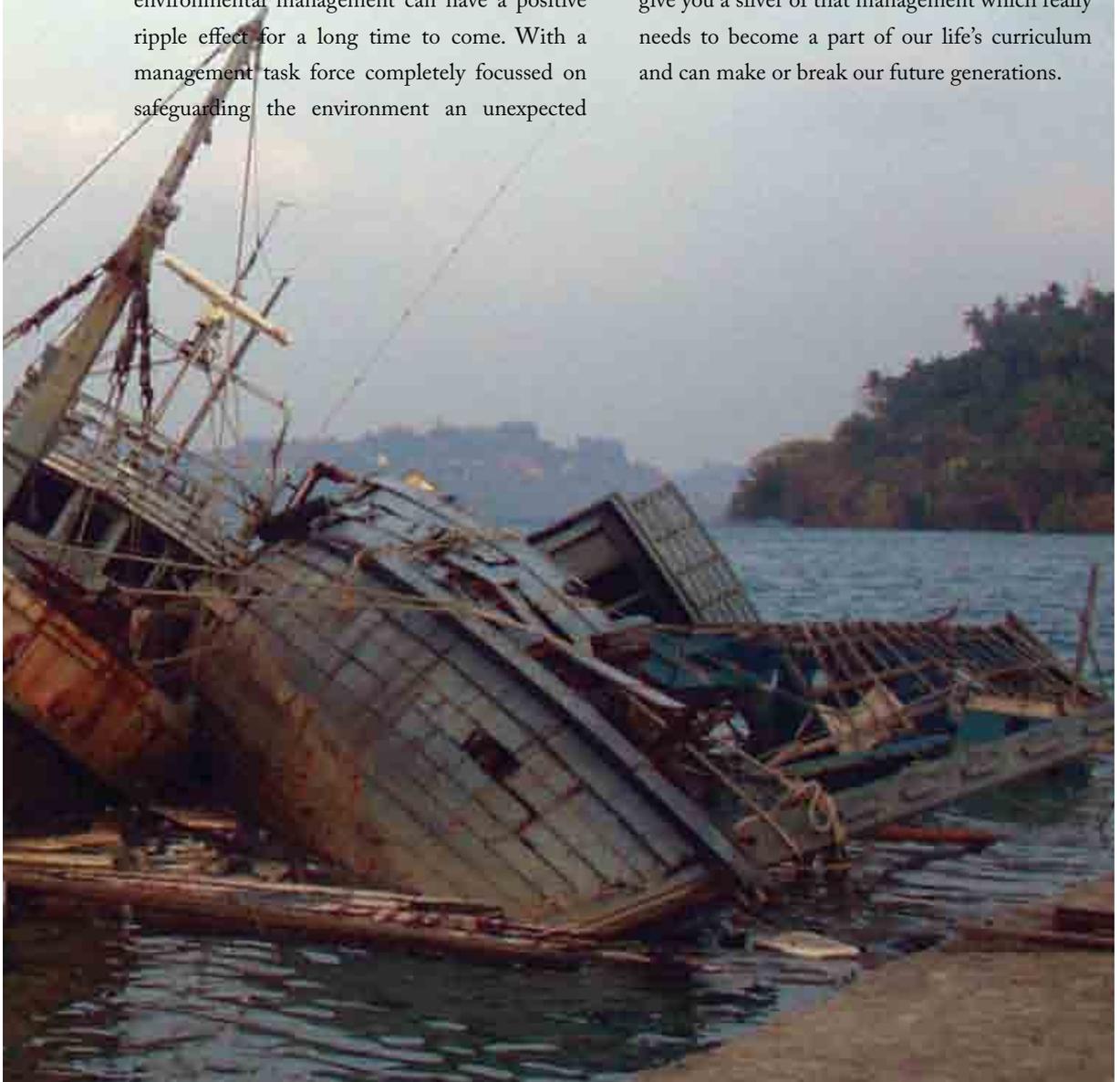
which a plan to sustain can be executed through concerted effects by a community and a team of specialists. In India, fractured ideas need to find a common thread where they can be exchanged after assessing the stakeholders role as well as that of the beneficiaries. It's imperative that the community is clued in to every small detail so that they feel like they are a part of the change and haven't been isolated or marginalised in their own familiar zone. The SEEDS initiative in Light House Panchayat, Minjur block, Thiruvallur district of Tamil Nadu, is an effort to work together with people who might be fragmented by caste but are bound together by hope.

While there are innumerable managerial task forces at work trying to put together a plan that bears financial results in every country looking at an upward economic growth or any sort of growth for that matter, we often conveniently forget that there would be no place to 'work from' without enough hands or places to support these robust financial streams of thought. It's not just about management that bears immediate financial results which determines how well you are doing as a country, people, or community, it's how well you are able to find a balance and institute regularity. To gain in perspective on one while completely losing base with another is just downright foolhardy.



Environmental Management needs to gain precedence over most financially lucrative projects and assignments, not just by a community but by the government as well. The thing is while environmental management can only accrue benefits over a period of time or sometimes in no time at all—It can only grow from strength to strength to become so resolute that it's difficult to even attempt to shake its foundation. The result eventually being that unlike most government approved financially and industrially viable initiatives that won't bear fruits forever environmental management can have a positive ripple effect for a long time to come. With a management task force completely focussed on safeguarding the environment an unexpected

disaster will perhaps be not as damaging for the 'people' most affected by it. Environmental management is crucial. It's important for us to be able to sustain ourselves against unexpected environmental calamities that can have continuously plummeting consequences even post the disaster has ravaged us. It's not just a fad to talk about growing environmental concerns; worldwide support is not being garnered through concerted efforts by people from all walks of life, just like that. The driving force behind these initiatives is to—Make room for a future. Here, we give you a sliver of that management which really needs to become a part of our life's curriculum and can make or break our future generations.



Environmental Management

A taskforce of committed people who are part of the community along with partners and intervention from the government can really elevate the management of a disaster stricken region. Preparedness is imperative, neglect however of our own environment is criminal. Such is the importance of environmental management.

Environmental Management can be defined as: “The management of interaction by the modern human societies and its impact upon the environment.” The three main issues that affect managers are those involving—politics (networking), programs (projects), and resources (money, facilities, etc.). While this makes perfect sense on paper, fact is that environmental management can be viewed from a variety of perspectives and in turn be interpreted effectively from region to region or in this case coast to coast.

While one can argue that the management of any sort of resource requires partnership, fact remains that where environmental management is concerned we are talking about the indirect involvement of people and communities and the long-standing repercussions of the same. It needs to be progressive in ideation assimilation with enough foresight injected in the management scheme so that it may bear fruits for the future and help in strengthening sustainability.

A report published by the secretariat of the International Strategy for Disaster Risk Reduction (ISDR), claims that the last ten years have seen 478,100 people killed, more than 2.5 billion people affected and about US\$ 690 billion in economic losses. There are innumerable instances of how with careful management practices in place one could have averted if not completely safeguarded oneself against such disasters. Take the Tsunami for instance which took more than 1,50,000 lives. In this case though the loss could

have been minimal with sincere efforts taken long before we were hit in the face with it. Logging, both legal and illegal, contributed to the incidence of flooding and landslides. A fact which remains well known however also one which doesn't result in appropriate action since it doesn't seem so disastrous unless we are tested by its consequences and the ripple effect nature of the disaster.

Around the globe, land use and land cover changes are eroding the natural buffers that protect communities from hazard risk. These same changes often erode people's capacity to recover from disaster. Other environmental changes, such as Anthropogenic Global Warming (AGW) promise to create new challenges to the security and sustainability of communities around the world. There are however ways intact to reduce disaster risk and enhance community resilience.

According to Dr. P. Thamizoli (social anthropologist) and Dr. Ignatius Prabhakar (SEEDS, India), environmental management will reduce the risk, improve the resilience and build capacity of the local communities. When tragedy strikes ideally the state should come forth to help with relief supplies, however in a real life situation the state alone cannot ward off the affects of a disaster unless the community is not involved in the reconstruction efforts. There is no way that the community can completely isolate itself from the groundwork. There needs to be a multi stakeholder approach that should be looked right from the start.



Post the damage... The importance of a Plan in Place

The high volume of wastes from disasters, from households and debris from forests and rivers, constitute a major concern for proper disposal. A study conducted by Japan's Ministry of Environment also showed that air pollution from urban and industrial sources has led to increased acid rain by hurricanes and typhoons.

Emphasising and reinforcing the centrality of environmental concerns in disaster management has become a critical need of the hour which further requires the sound management of natural resources as a tool to prevent disasters or lessen their impacts on people, their homes and livelihoods.

Post-disaster assessment of hurricanes and typhoons have clearly illustrated that, along with disaster preparedness, proper management of the environment—air, land, water, forests and

wastes, go a long way in reducing the risks and vulnerabilities which are inevitable as a result of typhoons.

Comprehensive understanding of natural systems coupled with the application of management tools such as environmental evaluation and risk assessment can make a major contribution to reduction of risks and mitigation of any impacts. An important aspect is the involvement of a broader range of partners in such a process, and to fully engage the resources and interests of the private sector in prevention and mitigation. Business leadership of 'prevention' actions in civil society and industry needs to occur so as to complement government policies and institutional arrangements. Such an approach relies on industry codes and standards as a supplement to regulations, thus achieving enhanced reduction of civil society's vulnerability to potential disasters.



The UN on Environmental Management

The basic premise of bringing the United Nations in the picture here is that at most times we seek validity and reaffirmation in a cause from world organisations to further demonstrate how critical it is to support a cause. In the same breath it then becomes imperative to elucidate on the stand the UN takes on environmental management. It stresses on partnership by the people as well as the government—both suffer when disaster strikes—and it affects both parties equally with far reaching effects on the environment. Whether you are rich or poor, you can't just buy a patch of land and expect that you will remain isolated and untouched in your comfort zone of oblivion when disaster strikes.

International Environmental Governance, UNEP

The Environmental Management Group (EMG) is a United Nations (UN) System-wide coordination body. Its membership consists of the specialised agencies, programmes and organs of the United Nations including the secretariats of the Multilateral Environmental Agreements. It is chaired by the Executive Director of United Nations Environment Programme (UNEP) and supported by a secretariat provided by UNEP.

The EMG furthers inter-agency cooperation in support of the implementation of the international environmental and human settlement agenda. It identifies issues on the agenda that warrant joint efforts, and finds ways of engaging its collective capacity in coherent management as responses to those issues. The current issues under consideration by the group includes cooperation

towards a climate neutral UN and sustainable procurement, sustainable land use and support to the implementation of the 2010 biodiversity targets and beyond.

A recent ruling by the Central Information Commission will allow greater transparency in environmental regulation.

The first order passed by Ms. Annapurna Dixit, one of the three recently appointed Information Commissioners, pushes the National Biodiversity Authority towards disclosing documents related to the approvals it has granted, while the second order pushes the Ministry of Environment and Forests to provide information related to discussions within the ministry related to proposed amendments to the Environment Impact Assessment Notification.

The significance of this development, which in itself is noteworthy is that it emphasises on the fact that there need to be checks and balances in place to allow greater transparency in matters of national importance. Whichever way you look at it, it's the attitude of the government and the people that eventually helps decide how far they are willing to go to safeguard the environment and actively do something to contain the disasters that might strike it. Needless to say that brings us to the question—Is environmental management essential to national security?

While most may think of this as a rather far fetched deduction of the overall current world scenario, it's importance to comprehend the overriding significance of it all and the need to act upon this fictionalised threat right now before it is truly out of anyone's control. A natural disaster doesn't see caste, colour or creed when it impacts



us and it becomes even more challenging to deal with since the extent of damage it is capable of can only be clear once the damage is done. An overwhelming amount of destruction and damage makes the whole experience even more detrimental to the growth and sustainability of an area and it then ceases to become a closet case and becomes an over-riding problem and a threat to the national security of a country. The turmoil, tragedy and loss post a disaster can be immense and the repercussions extremely damaging.

While terrorism seems overbearing at the moment, environment, climate change and the extent of damage we have already inflicted upon it hasn't gone unnoticed. It's slow degeneration

which will see countries and cultures being affected. It's imperative then that environmental management be a top priority during government policy formulation. We need to bear in mind, that tsunami was just a preview of how tragic things can become and how difficult it can be to cope with such natural disasters.

We do have laws in place, and along with that we also have the RTI (Right To Information) Act which reinstates another power in our hands—of asking questions and being handed over the right to know how a policy is being implemented and whether things are being channelised to bear maximum results or not.



Narrowing down South India, with Tamil Nadu under the magnifying glass...

According to C.K. Sreedharan, Principal Chief Conservator of Forest, State Forest Department, Tamil Nadu, perhaps it was the industrial revolution that actually challenged the very quality of life. However when a case in point like Chennai is taken he adds, “Disasters are mostly manageable, and Chennai over the years has a history of being subjected to very severe cyclones. Heavy salt water and the sudden changes in the wind direction don’t help matters either. In such a situation it’s obvious to worry about depleting fishing resources, and especially the fisherman for whom it’s directly linked to survival and livelihood management.”

Sreedharan further says, “The same gives rise to serious problems within the fishing communities.

Moreover the situation if not resolved soon, may also lead to epidemics of magnanimous proportion if a cyclone affects the entire length and breadth of a certain area and is of a high magnitude. In a place like Tamil Nadu, which is already reeling under the threat of Naxalism, the current scenario might just get worse.”

The vulnerability to natural disasters unfortunately continues to increase, and therefore a more effective approach should be taken to integrate eco system management, development planning as well as disaster risk reduction in the long term. The stakeholders and the beneficiaries need to comprehend the extent of the damage a disaster might cause and act upon the need of the hour. Adapting is imperative.

Coastal Ecosystems

About 40% of the world population lives within 100 kms of the coastline, and this proportion is increasing. In addition, the coastal ocean exchanges large amounts of matter and energy with the open ocean. As a consequence of these external influences the coastal ocean constitutes one of the most geochemically and biologically active areas of the biosphere. Owing to its relevance to us, across the board, active management of it is a priority now...

According to Dr. S.M. Ramasamy, Professor & Director, Centre for Remote Sensing Bharathidasan University, Tiruchirappalli, the coastal ecosystem of south India is very complex and fragile because of the multivariate dynamically active and pulsatory tectonic as well as geomorphic processes. Basically, in laymen's term, the coastal ecosystem of Tamil Nadu is extremely diverse and flexible enough to keep rejuvenating for a long time to come.

If one attempts to trace the etymology of the word—Coromandel, you will find that it comes from the Chola dynasty which was called Cholamandalam in Tamil Nadu, and can be almost literally translated as 'the land of the Cholas'. The Coromandel Coast includes the Kaveri delta, Penner delta, Palar and Krishna. While the coastline can accommodate a lot, it's important to bear in mind that the coastline was affected by the tsunami, due to an inundation on the coastline of upto three kilometres.

For any ecosystem to survive, most ecologists argue, biodiversity and ecosystem management is crucial. According to Ravi Bhella, Director—Foundation of Ecological Research, Advocacy and Learning, Pondicherry, biodiversity is indeed important and relevant to our ecosystem. It is first important to identify the global change drivers, namely: climate, biogeochemical cycles, land use and eventually species introduction and eventually

once we have done that try and restore damaged ecosystems, while on the other hand perhaps help in encouraging another one to grow and breed, with a new set of species.

The greatest threat to coastal ecosystem is the increase in human activity near the coast. The Coromandel Coast has three basic habitat types that it caters to

- a) Coastal sand dunes
- b) Coastal wetlands
- c) Tropical dry evergreen rainforest

To understand the significance of biodiversity it's important to first comprehend what it is all about—Biodiversity is the variety and differences among living organisms from all sources, including terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are a part. This includes genetic diversity within and between species and of ecosystems. Thus, in essence, biodiversity represents all life. India is one of the mega biodiversity centres in the world and has two of the world's 18 'biodiversity hotspots' located in the Western Ghats and in the Eastern Himalayas (Myers 1999). The forest cover in these areas is very dense and diverse and of pristine beauty, and incredible biodiversity. According to an MoEF Report (1996), the country is estimated to have over 45,000 plant species and 81,000 animal species representing 7% of the world's flora and 6.5% of its fauna. The 1999 figures are



49,219 plant species representing 12.5% and 81,251 animal species representing 6.6%.

With such widespread biodiversity clearly contained within the country it's important to acknowledge then that biodiversity is essential and after all, beneficial to us. Especially in coastal ecosystems one needs to bear in mind the environmental flows, quintessential to its sustainability.

These flows are the natural flows that help sustain the environment, lead to the manifestation of ecological processes and ecosystems and therefore

have a domino effect in pushing biodiversity and helping the environment see a sustainable future. The ecosystem is forever evolving with new species and sifting changes. Energy waves cause littoral drift (movement of sand and debris along the coastline as well as stream/river flows carrying silt, nutrients, and fresh water to coastal wetlands). Many coastal ecosystems depend on continuous supply of freshwater, sediments and nutrients, the drift in this case then acts as a deterrent. However, this supply can often originate from other regions and is usually an export of other ecosystems.

Coastal Sand Dunes

The dunes cover large stretches of the Coromandel Coast and are composed of a) the frontal zone, b) Backdune zone and c) forest zone. Although there isn't an extensive study that has been carried out on the composition of the dunes, work by Arun et al. 1999 shows that arbuscular mycorrhizal fungi significantly contribute to the survival of plants in the harsh conditions. They found 14 leguminous species associated with coastal dunes, the dominant families being Asteraceae, Convolvulaceae, Poaceae and Leguminosae.

Sridhar and Bhagya (2007) compiled a list of 154 species belonging to 108 genera and 41 families. The biological complexity that the dunes allow is highly specialised in extreme conditions such as mobile substratum in the frontal dune, high levels of salinity, salt spray and high winds and dessication.



Challenges: The rampant encroachment and the misuse of the same due to privatisation has produced many challenges in identifying such areas and bailing them out through concerted efforts. The tourism lobby, inability of the government and our own policies have posed as big deterrents. Coastal zones can no longer be looked at by the Ministry as mere wastelands.

Coastal Wetlands

Mangrove forests along the East coast of India comprise nearly 57% of all mangrove wetlands in the country and the Sundarbans comprise over 75% of these. Pichavaram and Muttupet contribute the bulk of the area under mangroves along the Coromandel coast, which is dimally only about 2.5% of the mangrove forest cover along the Coromandel Coast. The back waters are moreover highly stressed due to the lack of flow and movement due to upstream modification with the construction of dams. This has further led to trapped sediments, reduced flow and trapped nutrients which has further led to reduction in species diversity. Aqua culture and tourism haven't

helped matters either. The coastal wetlands are a source of livelihood for the people of the coastal belts. The local communities depend on it for fishing, minor forest produce, grazing and reeds.

Challenges: The natural environmental flows, for instance, the cauvery tribunal needs to be diversified so as to include these coastal wetlands which are being completely ignored right now. Intervention in this case thus becomes paramount. Illegal industries that have sprouted should be regulated and a coastal regulation zone should be earmarked for 'ecologically sensitive areas'.

Tropical Dry Evergreen Forests

These constitute small tree, 9 to 12m in height that form a complete canopy of small and coriaceous-leaved evergreen with short boles and spreading crowns with some deciduous emergent. While historically it's believed that the tropical dry evergreen forests covered 30 to 50 kms of the entire coast, in the present day scenario it is limited to just 20 patches on the Coromandel coast. Point Calimere (2,400 hectares) is known to be the largest patch of tropical dry evergreen forest while some patches are smaller than even ten hectares. When Dr. Bhella and his team surveyed these patches they found that species richness across 75 sites ranged between 10 and 69 species. It must be understood that tropical dry evergreen forests are actually a huge repository of medical plants and support local health traditions and practices. *(Foundation for Local

revitalisation of local health traditions, gives a great insight into the benefits of what one finds at the tropical dry evergreen forests.

Challenges:

- a) Encroachment, urbanisation and associated pressure.
 - b) Conversions to other land use.
 - c) Fragmentation and isolation between patches.
 - d) Biomass removal beyond regeneration through trampling, lopping, logging and grazing.
- Ultimately, restoring these patches is actually an option, and that in itself is a big push towards change. These patches should be brought under some sort of government preview to stop their conversion into degenerated patches of land and subject to encroachment.

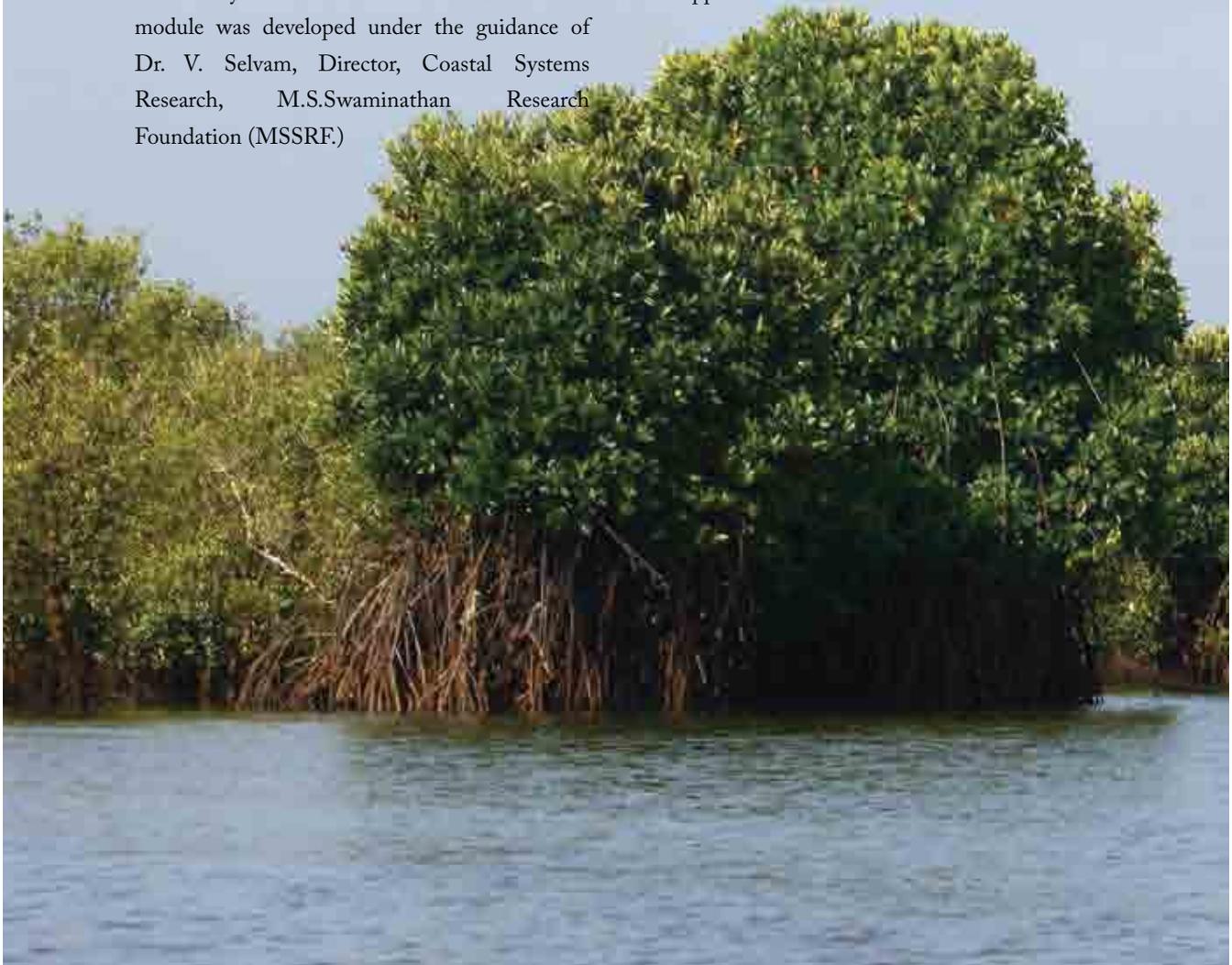
Mangrove and Non mangrove Bio-shields

The word 'Mangrove' is considered to be a combination of the Portuguese word 'Mangue' and the English word 'grove'. Mangroves are salt-tolerant plants of tropical and subtropical intertidal regions of the world. The specific regions where these plants grow are termed as 'mangrove ecosystems'. Mangrove forests are a group of shrubs and trees that are adapted to live in everchanging saline conditions and accumulated deposits of mud, while shelter belts are strips of vegetation composed of trees and shrubs that are grown along the coast.

The restored mangroves in Pichavaram today stand as a precedent in evolving sustainable community centric bio-shield modules. This module was developed under the guidance of Dr. V. Selvam, Director, Coastal Systems Research, M.S.Swaminathan Research Foundation (MSSRF.)

Pichavaram has been a result of concerted efforts since 1993, when the first phase of the restoration was initiated by MSSRF. The objective was to develop and encourage science based methods for restoration of degraded mangrove wetlands.

The plantation of the mangroves and the entire joint management mangrove was divided into three phases. The first phase commenced in 1993, with the study of how mangrove plantation would eventually help the coastal communities in the long run. Once a survey was conducted and it was found that one could work on the restoration of mangroves, the focus immediately shifted to the second phase of the project—that of initiation and application.



1993-1998

Timeframe chalked out wherein it was demonstrated how science based methods for restoration of degraded mangrove wetlands could be started. The work was initiated by MSSRF after most of the mangroves in India remained degraded for a long time—for almost 50-70 years. The work started first at Pichavaram.

The project was supported by Canadian International Development Agency (CIDA) under small project environmental fund. One of the major challenges in the restoration areas was the formation of trough shape lands. With the government heavily seeking profit between 1930's and 1970's under coupe system for revenue generation of the government, and the

12 to 15 hectares of forest clearing (mangroves) undertaken by the government there was a lot of pressure to bear results and make sure that the project led to a justifiable result. Finally the restoration process started with first deducing that the trough shaped area can be easily restored if facilities are provided for free flow of tidal water in and out during the high tide and the low tide. The deduction was later tested in about 8 hectares of degraded area. A canal system was put in place for free tidal flushing. The canal system further led to a lot of other logistical questions being raised about maintenance of the canals, and eventual upscale restoration activities instituted to combat it.

1996-2004

It was decided to implement the second phase of the program whose objective was to: develop and demonstrate people centred and process oriented models of Joint Management system through participatory analysis and action. The second phase included a)building institutions at the grassroots level, b)restoration and conservation of mangroves c)looking for land and water based alternatives and d)poverty alleviation.

The beauty of a Joint management program in place was the participation of multi-stakeholders who had common interests. Moreover in the long run such a management program allowed broad participation in decision making, accountability to stakeholders, sustainability of the resources and

equitable distribution of the profits. The JMM was first started in 1996 in Tamil Nadu and was later extended to all major mangroves of the east coast in India from Tamil Nadu (2 sites); Andhra Pradesh (2 sites); Orissa (2 sites); West Bengal (1 site).

Besides a JMM in place, another alternative which would seem equally effective and would bear results was the Joint Micro Plan. Micro plans are plans prepared by the people, for the people and in places where it is going to benefit as many people as possible. A joint management program also helps in participation of the entire community and capacity building, which in turn leads to social empowerment.

2004

Once a thorough research had already been undertaken, it was eventually time for implementation with the commencement of the third phase of the program—which started in 2004. The objective of the program was to develop and demonstrate models of bio-shield that integrated ecological security of the coastal areas and livelihood security of coastal communities. The program was implemented in Tamil Nadu, Sri Lanka and Andhra Pradesh.

A scientific model was adopted to study the extent

of the damage. Through remote sensing, before and after effects were monitored. It was found that the loss of lives in the mangrove protected areas was zilch as compared to those sites where restoration hadn't started or was not undertaken.

In unprotected villages like that of Pazhyar the extent of the damage was felt severely. There was a total loss of about 58 lives and almost 700 houses were permanently damaged because they were uprooted during the tsunami.

Challenges

The challenges which were 'apparent' and regressive during implementation:

1) The issue of participation. In a situation where a completely alien model is being instituted the community would naturally feel that their participation is tokenistic. However according to Selvam and MSSRF a solution could be, allotment of unreserved land to elect panchayat making them responsible to bring bio-shields. Moreover NGOs should be involved to facilitate the process of participation of the community and elected Panchayat.

2) The misconception that the models being implemented would be ecologically unsustainable. Proper scientific study is needed to identify suitable areas and suitable technique for raising mangroves and bio-shields. Multispecies non-mangrove bio-shield can be easily established.

When focusing on multispecies plantation various MSSRF models can be studied. One such model would be that of Pazhyar and Madavamedu wherein three species were decided upon. The

break up from the sea would start with the beach, the restored sand dune and multispecies non-mangrove bio-shields. In another model at Sadraskuppam and Chandrabadi, the distribution would start with the beach and later the plantation of multispecies for non-mangrove bio-shields. As with the earlier model one can experiment with adding three different species as a bio-shield.

3) Another daunting challenge with the implementation of the non mangrove bio-shields program was that there was no linkage between the bio-shield and livelihood security. However it's important for a community to understand that the mangroves can easily add to the livelihood security of the community with the integration of mangroves and the culture of fish and crabs. This has been known to work wonderfully well for the fishing community of Pichavaram. Similarly in a non-mangrove bio-shield, multispecies non-mangrove bio-shields can be easily integrated with economically viable tree species.

(One can see examples of bunding where brackish water farming system is used to integrate

mangrove plantation and culture of fish and crabs). The thing is that it's easy to integrate the community into something that works for them in the long run especially if it can be made clear to the stakeholders and the community that implementation of a new concept or model can actually benefit them and ward off the disastrous effects of any impending disasters, for instance something as nerve wracking and destructive

as the Tsunami. It was with this objective, that SEEDS, India, initiated the Lighthouse Panchayat, bio-shield project in the northern most part of Tamil Nadu post the Tsunami. Implemented in September of 2006, the bio-shield project is a one year program where the beneficiaries are the 1,800 families covering five villages in the Lighthouse Panchayat, Pulicat, Paazhaverkadu, Thirullur district of Tamil Nadu



While the fishing communities are usually reluctant of anything that hinders their daily functioning it was noticed that post the tsunami after seeing the extent of damage caused by it, the fishing community was open to experimentation and restoration process for any impending disasters. One had to just look at Pichavaram to comprehend the functional resilience of such a model that could save one from impending disasters.

Focal Point

SEEDS in its efforts to strengthen resilience of the local coastal communities in the Lighthouse Panchayat in Tamil Nadu is establishing a multilayered and multispecies bio-shield as an appropriate mitigating mechanism to encounter the possible disasters and prevent/reduce the damage.

Tamil Nadu's coastline makes up for 1,076 kms of the 7000 kms of the Indian coastline. Tamil Nadu falls mostly in a region of low seismic hazard with the exception of the western border areas that lie in a low to moderate hazard zone. As per the 2002 Bureau of Indian Standards (BIS) map, Tamil Nadu falls in Zones II & III. Historically, parts of this region have experienced seismic activity in the M5.0 range. The coastal line of Tamil Nadu is constantly facing threat due to sea borne calamities. Between 1891 and 2000 nearly 26% of the cyclone that formed in Bay of Bengal struck the coast of Tamil Nadu. Natural disasters such as cyclone, heavy rain with flood have become more frequent and an annual feature along the coastal districts. Beach erosion, sea water intrusion, destruction of fragile eco system etc., along the coastal districts are the other risks which need to be tackled along the coast. These characteristics bring the coastal areas under pressure to plan and develop mechanisms to mitigate the possible disasters and strengthen the ecological security and resilience of the local communities residing along the coast.

SEEDS post careful evaluation of the tsunami affected communities narrowed down the Light House Panchayat (with an earmarked area covering 5 villages) for its intervention program to build bio-shields for disaster risk reduction. For any program to work, community involvement is one of the over-riding factors that eventually determines whether that program really works for them or not.

A number of ideas and programs have been implemented by various non governmental organisations in order to strengthen the communities worst affected by the tsunami and eventually implement various checks and measures so that they are not rendered helpless when another disaster of such magnitude strikes again.

Like any other organisation who's basic area of focus is to strengthen the communities capacity to ward off disasters, SEEDS, India was also driven to make the disaster affected communities in the coastal areas of Tamil Nadu more self resilient and sustainable in the long run.

For the very same Bio-shield activities have been underway since September '08 in five villages—*Koonan kuppam, Thirumalainagar kuppam, Nadu kuppam, Arangem kuppam and Vairavan kuppam*—The ecologically sensitive and disaster prone coastal villages of Minjur block in Thiruvallur district, northern part of Tamil Nadu. These villages are located on the edge of the Pulicat lake, the second largest brackish water lagoon which lies parallel to Bay of Bengal. The villages are vulnerable to risks at time of natural calamities that are sea borne. There is also a consistent and considerable erosion of the shore in this region; the local population describes this as 'the sea is coming nearer'. According to the villagers roughly around 50 mts could have been eroded within the last twenty years. The geographical position of the region in the coast also contributes for



the local bodies. It is expected the outcome could be a replicable model.

A thorough biophysical survey was conducted by an expert hired helped to design the plots for each of the village and to conduct consultation with the community for the identification of the species and suitability of the species. It was decided to have five species and casuarinas (ten lines) find the front line behind is *Tespecia* (three lines) followed by *Pungamia* (three lines) and *Neem* (three lines) the last layer being *Palmyra* (five layers). The list was finalised with species

which were economically important like coconut, casuarinas and ecologically suitable for bio-shields like *thespecia*, *pungamia* and *neem*.

The SEEDS project team could not ignore the all powerful traditional fishermen panchayat to involve the local community and implement the project activities in all five project villages. Periodical review almost on weekly basis takes place with the members of the traditional panchayat to address the issues and carry out the project activities as planned. The panchayat identified the care takers and fixed the labour

Steps Adopted

- 1 Organising the village meeting to explain the objective of the initiative and seeking their participation and consensus.
- 2 Identification of the areas suitable for raising plantations in the areas around the project villages through proper biophysical survey with the support of local men and women.
- 3 Identifying ownership of these lands and obtaining permission to undertake plantations from the concerned partners.
- 4 Assessing damage to sand dunes (sand dunes together with vegetation played a great part in mitigating the impact of the tsunami) that are located in the project villages and finding out ways and means to restore them.
- 5 Procuring the required saplings and also nurturing a small nursery as a source of planting material primarily to do gap filling.
- 6 Approach nurseries with the list of species selected to acquire planting species.
- 7 Preparation and implementation of micro plan for development and management of multi-layer, multi-species bio-shield and sand dune restoration.



wage. The panchayat ensured the community support in kind and also in cash from the common fund.

The initial phase of this project included the identification of plots for sapling plantation, cleaning the plots prior to planting, fencing the plots to protect saplings from the goats and cattle, and covering the fences facing the sea with palm

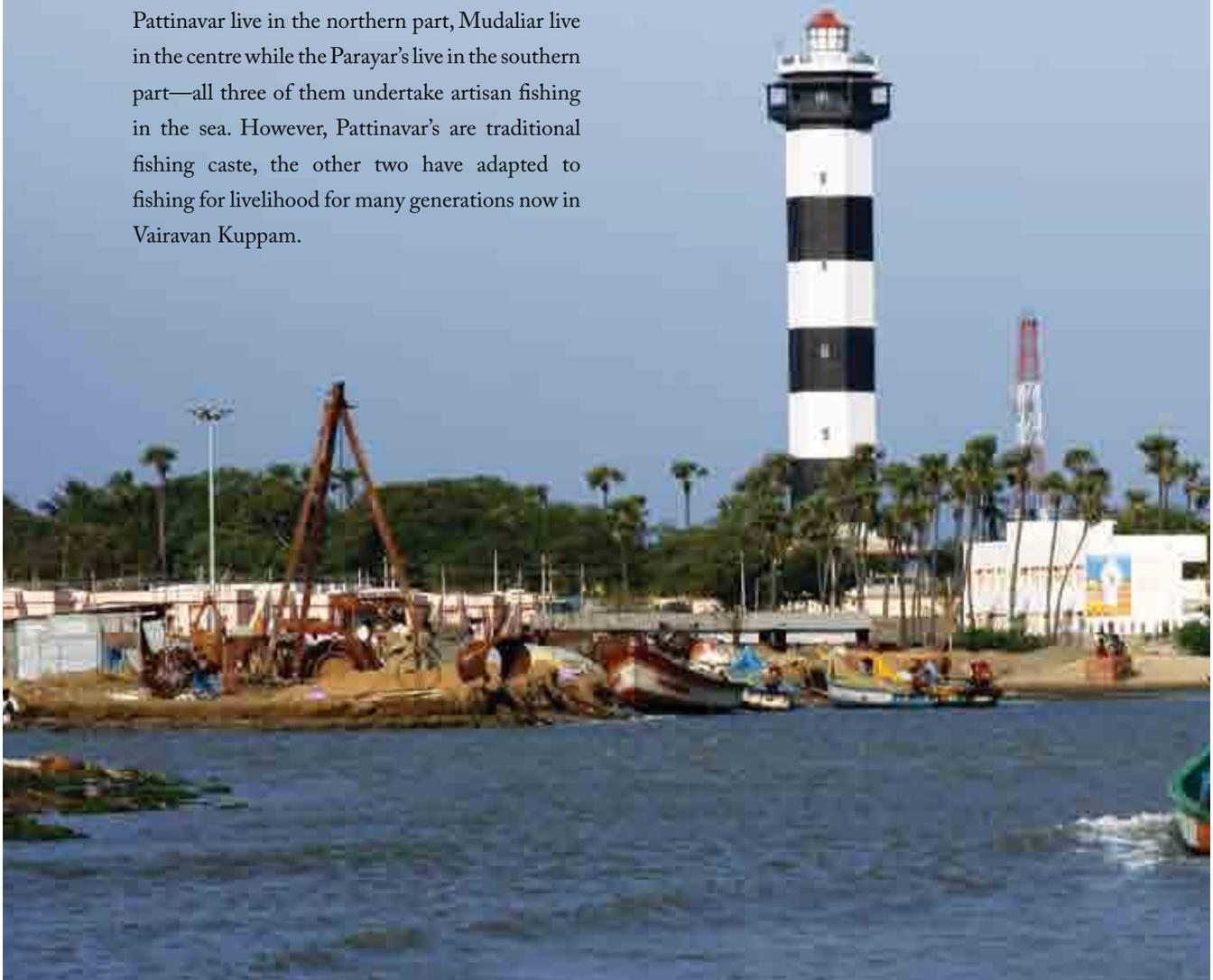
leaves in order to avoid salt spray on the saplings. Constant monitoring was also required to make sure the plants received enough water on a daily basis. All these considerations were initially a part of the implementation process, however now, with almost 4 months since the saplings were planted one can identify many challenges that have arisen and the ways in which they all have been tackled at the ground level itself.



An Overview

There are eleven hamlet villages situated contiguous in Light house village panchayat. Before 1984, there were only four villages—Kooanan Kuppam, Light house kuppam, Light house nadu kuppam and Vairavan Kuppam. Koonan Kuppam and Light house nadu kuppam are all artisan fishing villages inhabited by Pattinavar caste who fish in the sea. Light house kuppam is inhabited by the servicing caste of Parayar who do fishing in the lake and seldom undertake sea fishing or would work as wage labourers with the Pattinavar community in the sea. Vairavan kuppam is divided into three parts—the southern part, middle part and northern part. Pattinavar live in the northern part, Mudaliar live in the centre while the Parayar's live in the southern part—all three of them undertake artisan fishing in the sea. However, Pattinavar's are traditional fishing caste, the other two have adapted to fishing for livelihood for many generations now in Vairavan Kuppam.

In 1984, the Rocket launch station at Sri hari Kota was established, during which villages in and around the station were evicted and uprooted. The seven other hamlet villages—Sambaspalli kuppam, Tirumalai Nagar (TM Nagar), Nakathuravu, Karimnal, Pettai, Palli kuppam and Arangem Kuppam of Light house village panchayat were resettled here. Pattinavar's live in Sambaspalli kuppam, TM Nagar and Arangem Kuppam and fish in the sea. Nakathuravu is inhabited by Yadava and Vanniar reddy, whose traditional occupation is cattle rearing and agriculture respectively. Karimnal on the other hand is inhabited by the Parayar caste. Pettai is



inhabited by Yanadhi or irular tribes. Pallikuppam is inhabited by Parayar and Vanniar reddy. The other caste populations in the four villages of Nakathuravu, Karimanal, Pettai and Palli Kuppam also undertake fishing in the lake; few of them also own boats and do fishing in the sea. They are also the labour force for other kind of work like construction, etc in other hamlet villages of Light house village panchayat.

Light House is situated in the middle of the Light house village panchayat. The traditional panchayat called Oor Panchayat of the Pattinavar caste is very strong in all the fishing villages. The constituents of the Oor Panchayat are Panchayadhars and chettiers—the title given by the leaders. Traditionally there is one Chettiar and a group of Panchayadhars representing different lineages of Pattinavar caste in the fishing hamlet, assuming these offices were hereditary in nature. In recent times, the Panchayadhars and

chettiar were selected by the villagers on the basis of the number net based groups in the villages. The traditional term of Oor Panchayat is now also called as Oor Nirvagam (village management) and the panchayadhar and chettiar are also called as Nirvagi (Manager). The institution of Oor Panchayat/Oor Nirvagam is a strong controlling mechanism in all the villages, the other caste village hamlets in Light house panchayat also have similar institutions. Though informal in status, there are strict rules and regulations followed both at inter and intra village levels. However, there also exists a statutory village panchayat with a president and ward members in Light house village panchayat—decisions and control over inter and intra village affairs like household disputes, distribution of relief and welfare schemes, fishing disputes, infrastructure, NGO intervention, financial assistance at time of lean seasons are governed by the respective Oor panchayat/nirvagam.



The length of the sea shore stretch of Light house village panchayat from Koonan Kuppam to Vairavan Kuppam measures approximately 2000 meters (2 kms), and the width varies from 50 meters to 200 meters. The SEEDS project team held consultations with all the villages' of Oor panchayat. It was learnt that only five hamlet villages had the control over the sea shore and the respective Oor panchayat was willing to establish the bio-shield between the sea and their hamlet villages. The chief light house keeper was also consulted for the same, who expressed that a stretch of 700 meters between the light house and the sea should not have any vegetation as the radio wave transmission would then be disturbed.

The SEEDS team conducted regular meetings and consultations regarding bio-shield with the village leaders of Koonan Kuppam, TM nagar, Light house Nadu Kuppam, Arangem kuppam and Vairavan Kuppam both in groups as well as individually. A micro plan was made in discussion with the Oor panchayat and the saplings first planted on October 24th 2008 at Koonan Kuppam. Similarly in all the other five villages micro plans were made and the last village to see plantation efforts was Vairavan kuppam in the south on December 30th 2008. The respective Oor panchayat decided on the modalities of

planting and watering the plants and there was a distinct variation in selection and the salary put aside for people to assigned watering of plants.

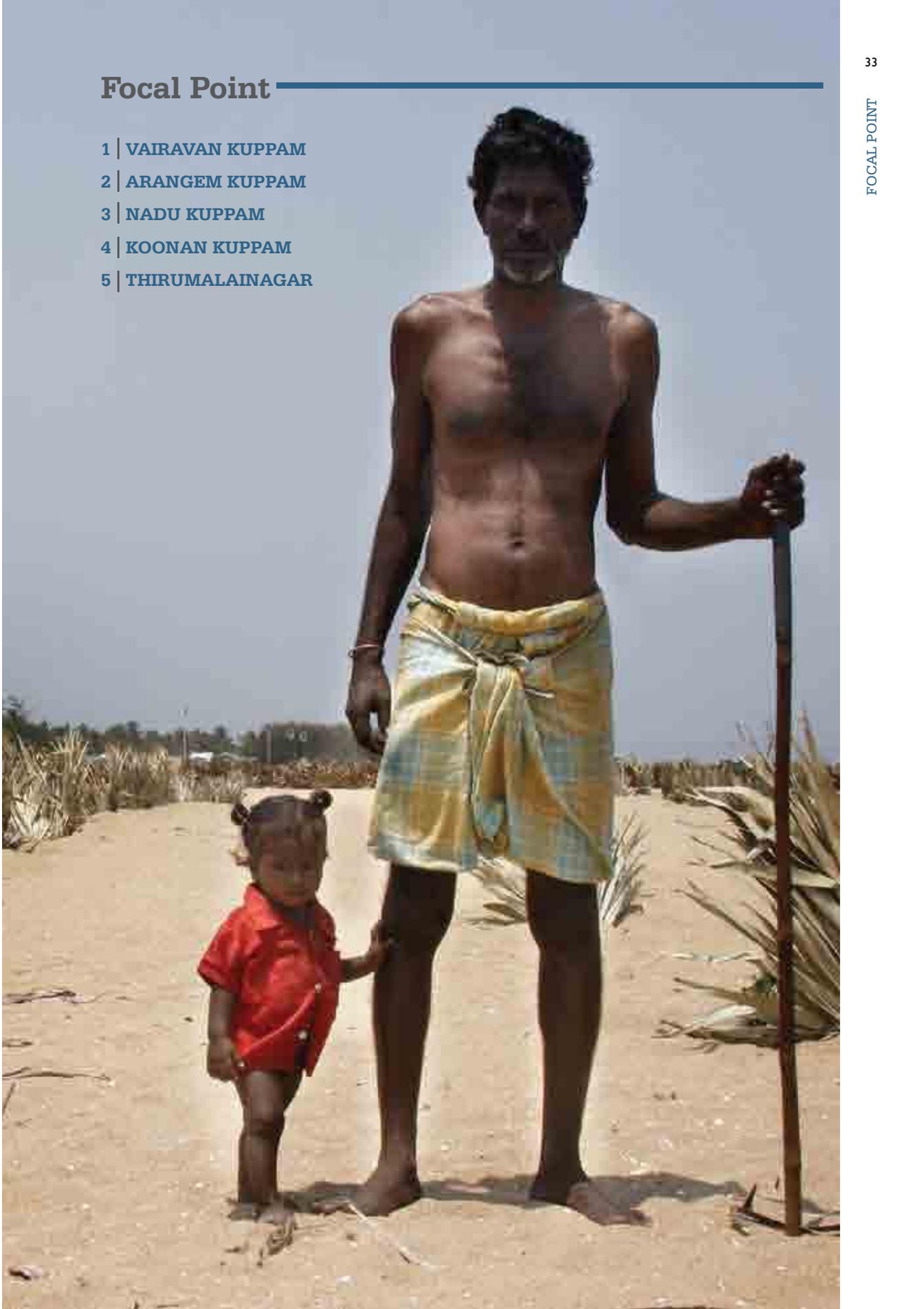
Case in point marking involvement: Koonan Kuppam, on the day planting was to take place declared it a no fishing day—about eighty men took part in digging pits for about 249 coconut saplings, 169 neem saplings and 2125 casuarina saplings. Oor panchayat decided on the number of women required to water the saplings. Two bore pumps were dug on the same day to draw water for watering the planted sapling. All these initiatives were decided by the Oor panchayat under consultation by the SEEDS team. The salary for the watering women was also decided by the village leaders. Initially though the Oor panchayat requested SEEDS to pay the salary, as their common fund was close to nill. The SEEDS team undertook continuous monitoring and with the continuous interaction with the Oor panchayat, many activities took places—fences were built, the two bore pumps were shifted to a place where water quality was good, pipes were laid to connect the water source to the plantation plots and water storage tanks were dug. Four Yanadhi tribal women were employed from the neighbouring hamlet village of pettai. Replanting of casuarinas took place twice after the first planting and for the months of April and May 2009, the Oor panchayat requested SEEDS to only pay half the share of salary amount for watering women.

At present the SEEDS Team is undertaking initiatives to involve youths and Women SHGs in the value addition to the bio-shield by holding discussion with the Oor panchayat. Women SHGs and youth are also involved in the vegetable cultivation inside the bio-shield plantation plots in all the five villages using Sand Bars.



Focal Point

- 1 | VAIRAVAN KUPPAM
- 2 | ARANGEM KUPPAM
- 3 | NADU KUPPAM
- 4 | KOONAN KUPPAM
- 5 | THIRUMALAINAGAR



1 | VAIRAVAN KUPPAM



The intervention has helped the villagers to understand how different species which were grown together could actually be of use when a disaster of a magnitude like the tsunami was to hit them again.

For any sort of orientation program by any organisation per se it's important to establish a 'connect'. One cannot assume that any non-governmental organisation can just walk into an area or a community and believe that they can completely overhaul a place in a matter of a few months or days just because they have the resources. Similarly, once SEEDS identified the 5 villages where the bio-shields were to be planted it brought in an anthropologist who could be the link between the organisation and the community and truly understood where the community was coming from and tried his best to integrate with the people, instead of working from the periphery. Dr. Ignatius Prabhakar's role was quintessential

in building that connect and truly involving the community so that they understood what the bio-shields were and how they would benefit from it in the long run. We'll start with Vairavan kuppam to assess the situation at the ground level now.

As one enters the lighthouse panchayat and the first of the five villages one can easily notice the enthusiasm with which the community welcomes you and wants to talk to you as you are trying to grasp the situation at the ground level. It's important in any model that is being implemented that regular appraisal of the area should be undertaken so that one can always work on the

area which needs most work. Upon talking to the representatives of the community surrounding me one can't help but notice that perhaps gender mainstreaming which is a bone of contention for most should have places like this as an example. It's not surprising that women are not involved in direct interaction during panchayat meetings. The structure is hierarchical and patriarchal in nature with the men being the decision makers.

The community when quizzed about what they thought of the bio-shields now that they were already planted said that they were well aware of how planting of different species could help them. There was always the issue of who would take care of them and inherent logistical problems. It was the sea borne calamities that they were ravaged by as a community that led them to the adoption of the same. They further add that the worst cyclone which they saw besides the tsunami was in 1984, where they had Cattamarine boats that ferried them from one place to the other. With regard to the traditional practices to predict any impending disasters, the villagers unanimously respond to it by saying that the moon would be a dead give away at times. The method to this calculation and

prediction—according to the lunar calendar, one would decide whether it was a full moon day or no-moon day, they would then through that gauge the extent of the calamity. Usually they would know eight hours before the calamity and to flee from the place they would take their Cattamarine boats out of the city.

It was the SEEDS intervention that helped them understand how different species which were grown together could actually be of use when a disaster of a magnitude like tsunami was to hit them again.

One of the biggest challenges which had to be dealt with was not trying to sell the idea of the bio-shields to the villagers, but actually trying to convince them to have a group in place that would water the saplings that were planted. The watering was to be done twice a day at fixed hours and intervals over the covered area and for that one would need to be consistent, since the weather conditions near the coast wouldn't let the saplings survive if the watering was not done on a regular basis.



“Even if the plants reached a mature harvesting period, no matter how profitable they would seem to be at that time, they wouldn't touch it for the next 50 years. All this has been done for our benefit, and now that we know how useful it's going to be for us in time of a tsunami, I see no reason to not take care of them.”

Durairaj, 55

While initially it were the women who volunteered to water the plants, they were also occupied in their domestic chores to actually make it a regular practice. SEEDS in consultation with the village leaders decided to pay for the initial months.

Rs. 1,000 was fixed but that didn't help matters too much since the women were anyway doing double the work trying to manage their household chores, selling the fishes in the market as well as coming back and watering the plants.

The Dr. Ambedkar youth group eventually came forward and asked village leaders if they could take the responsibility of watering the plants in the earmarked areas. The youth group like the social setup of the village has just men as its members. When one quizzes the villagers on how long they felt the bio-shields would take to act as shields to ward off any calamities, the unanimous response was that it would take a maximum of three to four years. However, along with that hope was also the belief that once the trees were grown and strong enough it would be easy to reap commercial profit by chopping them down. This point was made especially by one of the leaders who saw the financial viability of the casuarinas, (poor man's timber) and felt that there would perhaps be no need of the plant and it would serve its purpose till the time it had taken its full height. The people of the village are still clearly divided in opinion when it comes to how long they feel the plant should be allowed to grow.

There is a contradictory opinion which is voiced along other lines, by one of the seniors of the village...



“There could be a chance that we wouldn’t touch the trees for the next four to eight years, however what is the point of growing something like casuarinas when you can’t cut it and reap benefits. I don’t see any point of still letting it stand post a four year period.”

Gajendra, village leader, 40

The longevity and watering of plants is not posing to be the only problem in Vairavan kuppam. The youth group which is as of now taking care of the watering is also not sure of how long some of its members are physically going to be at the village. It’s the lure of working in the city that seems to be the overriding factor when you quiz them about the plantation. Some of them are quick to say that any job that lets them earn more than Rs. 4,000 a month would work for them and would justify their leaving the village. The reason for this shifting interest from being essentially a fishing community to being a part of the labour force in the city is because the price of their catch fluctuates much too often. The fluctuation in the price at market doesn’t help matters either, because after all they need to put food in their mouth.

In another part of the village, in Pattinavar a couple is taking care of another patch. While it was initially planned that five women working on the fields would be given a total of Rs. 6,000, after about five days of watering the plants they wanted more money. It was later decided by the villagers, that a couple which wasn’t part of the fishing community could actually water the plants. The couple was knee deep in debt and since they didn’t have any way of earning money this seemed the most plausible solution. It was



decided that Mari (the man of the house), would be given Rs 6,500 by the village for watering the plants. It's important to note here that this sum while fixed by the community is being given by SEEDS, and when the project implementation gets over it'll be the villages which will have to find ways to generate money so that they can pay the people watering the plants.

The various species growing on the seafront are—thespecia, pungamia and then casuarinas.

“One of the biggest challenges which had to be dealt with was not trying to sell the idea of the bio-shields to the villagers, but actually trying to convince them to have a group in place that would water the saplings that were planted.

The watering was to be done twice a day at fixed hours and intervals over the covered area and for that one would have to be consistent, since the weather conditions near the coast wouldn't let the saplings survive if the watering was not done on a regular basis.”



2 | ARANGEM KUPPAM



We are taking care of these plants here like they were our own children, however as long as the villagers pay us for watering the plants, we'll be able to continue with this. If they stop paying us, it'll be hard for most of us to continue watering the plants.

Govindavali, 45

In Arangem kuppam there are 8 people who in total take care of watering the plants. The eight include two men and six women. Although they haven't been watering for a long spell now, two months to be precise, this group of people is quite particular when it comes to watering the plants.

There is a makeshift shed that you find here in this plot of land where the man who guards it sits and wards off any animals that might graze on the saplings. He's stationed here from 5am to 7pm.

While earlier there were about 10 people who were watering the plants, it was later decided

that if eight people were given Rs 1,500 each, it would also work for them. The villagers here feel that these plants aren't only important when it comes to disasters that might strike them but in the recent past, seeing how the wind direction has affected the villages; the plants are a very good idea.

One of the villager laments that off late the wind has been carrying a lot of sand to their huts and water reserves, so the plants will eventually help in the long run. If there is a plot of land to act as a shield then the sand wouldn't be reaching their home. Some are beginning to see the sense in the forestation efforts.

3 | NADU KUPPAM



“While we don’t have anyone in place who acts as watchmen, whenever people go to the seaside to defecate, they act as watchmen on their way back. This has so far worked for us and we realise that the plants when they grow, will give us shelter and will protect us from the tsunami.”

Desappan, village leader, 56

The village has three women who are responsible for watering the plants. They are paid Rs 1,500 each. The major problem in this plot of land was the salinity of the water which was extremely high that resulted in more than three fourth of casuarinas and other species dying. The water source that was inside the plantation plot was later shifted and now the quality of water is under control. Pipes have been laid underground to connect the water source and the plantation plots. Owing to the dying of casuarinas plants, the Oor panchayat has decided to reduce the salary of the

people and has asked only two women to water the plants. The plot that has been converted into an area to grow bio-shields was earlier a dumping reserve. Now however, the place looks a little different with the plot fenced and the saplings which are trying to be grown here. The problem of livelihood security persists here as well; the village is Rs 7 lakhs in debt.

However, the debt will be equally distributed amongst the 84 families of the village reducing the blow a little.

4 | KOONAN KUPPAM AND 5 | THIRUMALAINAGAR KUPPAM



Community participation was pivotal to the project. The community pitched in for digging bore-wells for watering the plants. The villagers are very optimistic and they feel that the digging has all been worthwhile since the bio-shields will be a boon for them in the long run.

Koonan, the third village one crosses and Thirumalainagar the fourth of the five villages are both predominantly inhabited by the Pattinavar caste. While there were initial problems due to payments, all such issues have been resolved as of now. However, when one visits the actual plot area, the picture it displays is pretty dismal, especially so because the plants are either drying or have been grazed by animals.

In Koonan kuppam four women of Yandhi tribe from the neighbouring hamlet of Pettai look after the plots and are paid Rs 1,500 each as well as a

sack of rice by the village panchayat. Similarly, in Thirumalainagar, three women and one man also from Pettai, work on the plot.

In Thirumalainagar, the community was involved in the digging of bore wells and hosepipes were made use of for watering the plants. The villagers are very optimistic here, they feel that the digging has all been worthwhile since the bio-shields will be a boon for them in the long run. The water is being drawn from 10 to 12 feet and chances of the water becoming salty are pretty high according to the villagers, so they need to immediately start



looking for alternate channels of fresh water. The villagers themselves have instituted a ruling which makes sure that the plots remain clear and clean of any misuse. They have placed a Rs 500 fine for defecating and a Rs 200 as an award for anyone who tells the panchayat who they saw defecating near, or in the plot area.



The Thirumalainagar village is in a debt of about 15 lakhs and most of these villages owe money to the Chettiyar community. (Chettiyars have been historically known as money lenders) The villagers had demanded that there should be steel fencing for the plots, but the estimated cost was coming out to be Rs 8 lakhs, so SEEDS decided against it at the end.

Koonan kuppam on the other hand is 40 lakhs in debt; however it doesn't seem to perturb the villagers as much because they know that it'll be shared equally by the 470 families in the villages. In any case they are far better now, then the time when they were all in a debt of an astronomical figure of 1 crore. It is obvious when you see the plot site that yet again the conditions here are pretty bad and there should be greater involvement of the community if they really want to see a bio-shield which will safeguard them at a later date.



When one quizzes the villagers over the negligence that seems to have predominated the plot area they are quick to retort that the texture of the sand here is different from that of the other villages so it becomes difficult and far tougher for the saplings to grow. The villagers here are optimistic that even if the funding from SEEDS stops, they will be able to raise enough money to keep the plot in shape.

Challenges Ahead

The 5 villages at the lighthouse panchayat are visibly and logistically on a different page altogether. Of all the plots which have been reserved for bio-shields, you can perhaps spot two which seem like they are being looked after by the community with active involvement. The rest really do present a very scary picture and one is forced to question the sustainability of this initiation undertaken by SEEDS.

Before one goes on about the challenges that seem overwhelming, it goes without saying that initiation is the first step towards learning and acknowledging that there is a way out of a

problem. If it hadn't been for SEEDS perhaps the people of the lighthouse panchayat wouldn't have ever known of an alternate way of warding off an impending disaster. They have been kept in the loop from the very beginning and unlike non governmental organisations which feel that a month or two should be sufficient for bringing about change; SEEDS understands that a requisite and realistic time frame needs to be in place if one wants to see definite change and results.

The evaluation of the areas so far and the challenges that lie ahead are:

1 Financial Viability

Seeing the plot areas and the species grown as something that's long lasting and permanent instead of looking at the bio-shields as a quick way of making money: Most of the villagers one spoke to at the villages agreed that the species being grown were important when one thought of the larger picture and the tsunami. Majority felt that casuarinas would be extremely profitable in the long run. There is a natural tendency to see the financial viability of the plants being grown.

2 Common gain

People who have been left out of the watering of the plants may feel persecuted since anyway that means that they are missing out on an additional source of income. Although in some places you find the entire community involved, the current threat to livelihood security might force most of the youth to look elsewhere for work.

3 Watering of Plants

There still isn't too much clarity over how much really is needed for watering of the plants. While



watering wouldn't have seemed like a big issue, it's been one of the toughest to tackle because of yet again, monetary compensation being given. All the villages fully understand that while SEEDS has supported them so far, it will not be here forever to monitor the saplings or the plants which are being tended to. The villages now need to find ways to generate income for those involved in watering of the plants and take out funds from their respective panchayats.



4 Co-dependency

Ever since the tsunami, the villagers and the people in general have been led to believe that without any effort from their end NGOs will come and give them financial help, baling them out of their problems. Now however, it's been long enough for the community to collectively acknowledge that they cannot see every non government organisation as a bank of funds and available resources. They need to look at how they

can sustain themselves over a long period of time without any help from outside.

5 Ground water levels

The salinity levels are in any case pretty high near the coast. Moreover for fresh water reserve one needs to dig really deep (about 10 to 12 feet underground). With the temperatures soaring now and the advent of summer finding fresh water is going to pose as a huge problem When



that happens there really is no hope for the plants, because without water they won't grow.

6 Community Involvement

Active community involvement is necessary for any project to survive, while some plots are showing signs of hope, the same is not true for others. One should share their best practices with each other and in spite of the caste divide should at least share the challenges they face and work

out how they will eventually overcome them. This way while they don't have to necessarily work with another caste, they can still borrow a few ideas. It needn't be a solitary fight but a collaborative effort to improve their immediate.

How can DRR (Disaster Risk Reduction) work?

DRR is not a phenomenon in isolation, its efficacy depends on its incorporation into the various development projects undertaken by both the public and private entities. With multistakeholder involvement and interlinkages risk management can be effectively carried out thus fulfilling its ultimate agenda.

With the focal point as Lighthouse panchayat and the five villages SEEDS has undertaken work in, to talk about how exactly a model like DRR can work is imperative.

Although less deadly than earthquakes, hydro-meteorological hazards directly affect large numbers of people and their livelihoods: an estimated 157 million people in 2005, up by 7 million compared to 2004. Natural disasters affect human health and biodiversity as well as agriculture, water resources and coastal and marine resources. There is a pressing need to integrate ecosystem based management into disaster risk reduction and development planning according to Dr. R. Rengalakshmi, MSSRF because it can:

1. It can decrease vulnerability to natural disasters.
2. Natural disasters have a high cost.
3. It costs less to prevent disasters than it does to fix the damage they cause.
4. At-risk populations depend on ecosystems for their livelihoods.
5. Natural disasters and the responses to them have a negative impact on biodiversity.

While it's easy to talk about disaster risk reduction, one cannot forget that the most vulnerable are those who have the least. One needs to realize the vulnerability context of the poor within the development framework. The figures in the east coast speak for themselves:

a) 1891-1990: 262 cyclones (92 severe) in a 50 km wide strip on the East Coast

b) Tsunami in the east coast was recorded twice with in the last hundred years -1881 and 1941

c) Frequency of depressions –higher in October 186, November 154, frequency of storms hitting the coast- October 34, November 51

d) Frequency of cyclones crossing the coast of the various districts of Tamil Nadu 1891-1989, the two districts which worst prone to cyclonic disturbances are Tanjore—Nagapattinam 13 which is next to Chenglepet—15

One of the overbearing problems seen in the five villages has been about livelihood security. For that Investment on strengthening and diversifying the livelihoods and sources of livelihoods of the people of disaster prone areas can be an effective strategy for disaster risk reduction in the long run. While providing an early warning helps the community to plan coping strategies to reduce risks – This just doesn't end here, it also means that effort should be taken by the agencies at work to educate the community while structuring the program on diversifying crops, promoting and production of disaster resistant and other indigenous crops. In this case if one crop fails the other will at least survive. Strengthening social and organizational support structures, improved post harvest facilities such as grain bank and community based storage methods. This will result in increased reserves of food at household/community level; therefore number



of food shortage months is decreased.

According to P. Thamizoli and Ignatius Prabhakar, it is important to do Stakeholder analysis and ensure Community Participation in the Coastal bio-shield development as and Disaster Risk Reduction method.

The 2004 UNDP global report on reducing disaster risks states that the goal should be a strong civil society and a strong State working in partnership with a socially committed private sector.

Risk reduction management is beyond the capacity of the government, multistakeholder participation is essential. It is important to determining the main stakeholders and developing the relationship between them. Stakeholder analysis helps to understand the attitude of each of the stakeholder, from supportive to opposed such as strongly in

favorable, weakly in favorable, indifferent or undecided, weakly opposed and strongly opposed. In such a multi-stakeholder spectrum, the involvement of local communities remains an important factor in enabling people to cope with risks and prevent them from becoming part of the disasters themselves.

There are different levels of community participation in any collaborative project such as

Participation of local communities is crucial to understanding both local needs and empowering people to address those needs as well as to send a message to local communities that their voice is valued. Taking into account the vulnerabilities and capacities of local communities is an essential ingredient for effective risk reduction planning.



- Sharing information with the community
- Consultation with the community
- Contribution by the community
- Community taking informed decision
- Empowered control of the community

Capacity building of the community is crucial to achieve the expected community participation. It is defined as 'Interactive learning-scientist learning from villager, villager learning from scientist and together defining the path of development, learning by doing-actual experience and Learning by evaluation'

Some of the conclusions arrived at are:

- Participating needs sensitivity to the specific socio cultural and political conditions and ecosystem
- Proper methods and tools to promote community processes is essential
- Should include gender equality and the most vulnerable categories in the plan

One cannot talk about disaster risk reduction without even touching gender issues. Gender mainstreaming into environmental management is crucial for disaster risk reduction. It's important to understand that men and women are affected differently by disasters and environmental hazards. Again, none of the five villages had any women who were actively involved in the decision making when the SEEDS intervention program was underway. They were only involved when they

were asked by the panchayat members. Even during the tsunami it were the women and children who were affected more than the men, the reasons varying from practical issues like that of wearing their traditional costumes, to that of authority within the household.

Remote Sensing and application of GIS tools for Coastal and Ocean Resources Mapping, Monitoring and Management:

According to Dr.R.R.Krishnamurthy, Reader, University of Madras, Tamil Nadu, Marine resources cannot be assessed directly using remote sensing. However, there is potential for assessing some stocks indirectly using a combination of field survey and remote sensing. Although, Remote Sensing does not replace traditional methods of stock assessment, it only augments existing methods.

E.g.: Mangrove wetlands are extremely important for the maintenance of the quality of coastal environments.

Remote sensing investigations are useful in identification, classification and understanding functions of mangrove wetlands. Remote sensing imagery has been used extensively to map affected areas post the tsunami, the coral reefs and even the entire Great Barrier Reef in Australia. They allow us a deeper understanding of an area and the changes that have taken place over the years. While one might not be able to exactly predict the future, one can surely determine what it might seem like and study the affects of a calamity extensively.

Note by the Author

‘On unfamiliar terrains...

There are some experiences that instill more awe and passion in us than anything else ever did. The journey I undertook for putting together *‘Securing our Shores’* was inspiring and invigorating at the same time. Having lived most of my life in the capital, slightly secure in the cushioning effect it provides, going down south was an experience I was looking forward to when the mention of the bio-shield report came about. The south is known for being meticulous, organised and structured, quite unlike North India which is mostly synonymous with chaos. Tsunami might have ravaged most shores in South but the rebuilding efforts swiftly undertaken post the disaster struck were commendable and acknowledged worldwide. The thing with natural calamities is that they strike us when least expected and even if you know when it will strike, the disaster preparedness to cope with such mass destruction is dismal. Post 2004 and the Tsunami, there have been a sea of changes and studies that have been undertaken by leading universities and organisation down south. The light house village panchayat now is a model that can be easily replicated in other coastal areas across the world.

The energy and enthusiasm of the people was most infectious when I reached the Light House Panchayat villages. I might have been apprehensive sitting on a boat at the periphery of Andhra and Chennai waters, bobbing my head up and down to catch a glimpse of the village; however, I was excited about the ongoing bio-shield project and couldn't wait to familiarise myself with what was going on. I wanted to see for myself how far the villages had come in sorting out socio-economic hiccups and realising the potential of the program

as we foresaw it back home. The one thing that strikes you about the people of the light house village panchayat is the honesty and simplicity with which they have welcomed the changes the Bio-shield project has proposed in their lives. Although there are no doubt enough social mobility problems that seem to be overburdening them, but the coping mechanisms are truly worth a pat on their back.

The community feels collectively responsible if a huge debt seems to weigh them down. While the bio shield project has managed to sow the seeds of strengthening the community through collectively coming together, it's truly amazing how they have also internalised that despite the fact that Casuarinas might be commercially viable in the future, for safeguarding themselves from



any future disasters they should be working in sync with each other and not looking at the cash incentive.

While I walk the almost 5 km stretch of villages divided by the caste system, I am taken aback by the concerted effort everyone from stakeholders, the organisations and the people have put in to truly make this paradise a model of excellence in project execution. Before the visit to the Light House Village Panchayat site, sitting in an air conditioned room with thinkers and project implementers of other South Asian regions I felt pride in the fact that we were somewhere close to being a centre and a hub of ideas. While brainstorming with different minds from across the world we were able to let go of our nation sized egos and think of ways in which we could possibly reduce the damage and destruction that wreaked havoc on a community post a disaster.

The people involved in the project are committed and driven to make themselves more self sufficient in the future. Boys in their early 20s categorically say that they will work in making sure the bio shields are able to safeguard their rich community but it is no guarantee that it will give them the incentive to stay. Migrating to big cities with not so big money but confidence in their abilities is

natural, what becomes a matter of concern is that with organised efforts like the bio-shield project, mass migration can be avoided in the future and alternate, more lucrative means to earn livelihood can be created. Exploring un-chartered territories like tourism can make this place a cash cow for its people. Of course that doesn't come with its own set of problems; however successful models can be surely replicated.

It's wonderful to see the saplings at the shore on the earmarked areas taking a direction and life of their own thanks to the community pitching in to make it work, inspite of the innumerable problems and the lofty social segregation they have to battle with practically on a daily basis.

I might have gone to the model villages as a curious seeker however I have come back richer in experience and knowledge, soaking in the beauty of the place and the people. The journey for them is ongoing and it may take time to finally see concrete changes, however it remains wonderful the way everyone has truly come together.

I have finally familiarized and soaked myself in this strikingly beautiful unfamiliar terrain...

Pratishtha Dobhal



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SEEDS is a non profit organization working to make communities resilient to disasters. For this, SEEDS adopts a multi hazards locally based approach seeking to empower communities through awareness generation, training and action.

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