Disaster, Disaster Management and Livelihood of Fishermen: A study on the selected areas of Kerala.

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List of Abbreviations

KILE :	Kerala Institute of Labour and Employment
KFWFB	Kerala Fishermen's Welfare Fund Board
CAD	Coastal Area Development
EEZ	Exclusive Economic Zone
MHHWL	Mean higher high water level
MLHWL	Mean lower high water level,
MLLW	Mean lower low water level
MHLWL	Mean higher low water level
FGD	Focus Group Discussion
LIFE-Mission	Livelihood Inclusion and Financial Empowerment-MISSION
NCESS	National Centre for Earth Science Studies
IIT	Indian Institute of Technology
NGO	Non Government Organisation
INGO	International Non Government Organisation
ADB	Asian Development Bank
WB	World Bank
GIFT	Gulati Institute of Finance and Taxation
NITI Ayog	The National Institution for Transforming India
TRP	Tsunami Rehabilitation Project
HTL	High Tide Line
SIFFS	South Indian Federation of Fishermen Societies
PTA	The Parent Teacher Association
KMML	Kerala Minerals and Metals Ltd

IRE	Indian Rare Earth
MMDRA	Mines and Minerals (Development & Regulation) Act
NIIST	National Institute for Interdisciplinary Science and Technology
PIL	Public Interest Litigation
TPS	Transaction Per Second
MSP	Mineral Separation Plant
CMDRF	Chief Minister's Disaster Relief Fund
KSDMA	Kerala State Disaster Management Authority
IMD	Indian Meteorological Department
SDRF	State Disaster Response Fund
NDRF	National Disaster Response Fund

Preface

This research report is about the fishermen community and their everyday struggle for survival in the context of mounting disaster risks in Kerala coast. Coastal area of Kerala is experiencing hitherto unknown environmental risks and which pushes the fishermen out from the coasts. Kerala State Disaster Management Plan document, 300 out of the 570 kms of the Kerala coast is prone to multiple hazards such as excessive rainfall, storm surges, sea-level rise etc.

This research report focuses on three disaster-affected areas and communities in coastal Kerala i.e Coastal Erosion, Tsunami and the Ockhi Cyclone. The fishermen communities affected by these disasters are share common cultural, social and economic backgrounds. The individual life world, community resilience and the local economic characteristics are the topic of this research. Disaster is having a recurring nature and also results secondary impacts in terms of displacement and social exclusion of affected communities. Fishermen community is losing their access to even coastal resources.

Government and the general public of Kerala should pay attention toward the vulnerability of the Kerala's coastal community and there must be strong action plan to protect the coast and community.

S.Mohammed Irshad

Executive summary

The present research began in March 2018, four months after the Ockhi Cyclone. While this report is being submitted, Kerala is experiencing the most massive flood disaster that the State has ever seen. This research study does not refer to the flood. As stated in the project proposal accepted by KILE, its purview is limited only to the coastal areas.

Environmental risk in the coastal area is highly demonstrated in the lives of coastal community. The coastal hazards experienced by the coastal community of Kerala, as listed by the State Disaster Management Plan, are: Indian Ocean Tsunami 2004, Cyclone 2017, and recurring coastal erosion across Kerala. All of these leave a strong imprint on the community life in the form of loss of life, livelihood practices, loss of land, and displacement to a great extent. The recurring nature of coastal hazards affects the daily life of the community. Every change caused by hazards directly hits the community. The dependency on institutions and policies plays a significant role in community mobility. The most critical impact of coastal hazards is the increasing uncertainty of livelihood. It is demonstrated in livelihood practices and institutions in a complex manner; however, the general community and government of Kerala are yet to recognize these as development challenges. The gap between the fishing community and the general public of Kerala is a reality.

Research concern of the study

The fishing sector and coastal areas across the country are subjected to multiple kinds of changes due to various levels of interventions, including heavy capital investments and large-scale displacement of fishermen from the coast. Fishermen community is more resilient towards livelihood struggle than any other community. Everyday struggle for earning and facing the tough sea empowers the community to sustain themselves. Unlike earlier times, the community is now subject to a new set of crises, which directly hit its collective existence. The working hours of the community have been increased considerably while the real income has not been increased by much. The livelihood of the community faces multiple challenges, including poor availability of fish and poor accessibility to the resources.

The core objectives of this study are to study:

a) How Coastal erosion, Tsunami and Cyclone Ockhi affected the livelihood practices of the fishermen community and what are the short term and long term impacts on livelihood
b) How government institutions and disaster management institutions manage the crisis
c) How development projects in the coastal area impact disaster management in the study areas
d) How Tsunami rehabilitation influenced Ockhi cyclone in Kerala
e) How did the community and agencies respond to Ockhi cyclone and what are its long term impacts

Method and conceptual framework

This study follows the resilient community framework, and data were collected through focus group discussions, field visit, meeting the officials, experts, and secondary sources.

Major Findings

The existing nature of coastal economy of Kerala is the cause for natural disasters; however, there is no public acceptance of these facts. Kerala's fisheries economy is stagnant over decades and it is not ensuring any increase in the real income of the fishermen. At the same time, huge investment is coming in the coastal areas targeting the non-fishing resources along with promoting deep sea fishing, which is further excluding the traditional community from livelihood practices.

Recurring coastal erosion is closely associated with coastal infrastructure developments. Coastal erosion was temporary phenomena in the study area till the breakwater and harbor project in Thangassery got completed. Thereafter, erosion has become permanent and acres of beach have been lost to the sea. Government has relocated families in rehabilitation colonies with bare minimum facilities. It is an ongoing project and every government has to spend money for relocation. Local fishermen have lost their livelihood practice and have become dependent on harbor. Income and man days of fishermen have decreased considerably over decades. Government proposes hard solutions such as groins and sea walls, which are again inviting further environmental risks. The existing solutions are inadequate to reduce the risk of erosion in the area. The local fishermen are alienated from the coasts and that prevents any thinking on soft solutions to the problem. Community has lost its resilience and hence, displacement has become a solution.

Tsunami rehabilitation was considered by the government as a successful project; however, a close examination of the rehabilitation process reveals violation of rights and legitimization of social exclusion. The survivors were given basic facilities, but their long term need to survive the recurring impact of disaster was not assessed. The survivors call it as *re-plantation* rather than rehabilitation. It is not a model for disaster rehabilitation as the community lost their access to non-fishing resources in the area. Tsunami affected areas are known for its mineral deposits and rehabilitation helped the local mining companies to expand their business in the Tsunami affected areas. It opened up new options for them.

The third case studied in this research was management of the Ockhi cyclone and its aftermath. One could not have avoided the cyclone; however, the impact could have been reduced, if there were proper early warning existed. There was complete ignorance about the potential threat of cyclone in the initial days, and the local fishermen had to pay for it. The local non-State agencies had to put pressure on the State to reconsider the usual administrative response to disaster in terms of accepting the number of deaths and active rescue operations. There were no consensus among agencies on early warning and accepting the disaster. Kerala government blames IMD for not releasing cyclone warning on time. Cyclone rehabilitation package proposed by Government of Kerala was rejected by the Central government and no additional central assistance was released to the State government to meet the expenditure. The survivors had huge loss including the low fish catch after four months of Ockhi cyclone, which is not compensated with any sources.

Chapter I

Introduction

The present research began in March 2018, after four months of Ockhi Cyclone. While this report is being submitted, Kerala is experiencing the most massive flood disaster that the State has ever seen. This research study does not refer to the flood. As stated in the project proposal accepted by Kerala Institute of Labour and Employment (KILE), its purview is limited only to the coastal areas. However, the State and academia would accept the concerns raised by the findings. The lesson that Kerala learnt from the 2018 flood is that disaster is not limited to certain geographic settings, and that human intervention (development) can make it pervasive. This research study would only be significant at the academic and policy level if the society and the State recognize the anthropogenic and natural causes of disaster together. Risk is an inevitable outcome of development, science, and human greed, but it can be predicted and governed. This study deems this as a critical observation and argument, while being limited to coastal disasters.

This report is about the fishermen community and their everyday struggle for survival in the context of disaster risks in selected areas of Kerala coast. Kerala coast is experiencing hitherto unknown environmental risks and fishermen are on the receiving end. Their dependency on agencies also increases along with mounting risks. Kerala is a coastal State; it has a coastline of 590 kms and the continental shelf area also has 40,000 sq.km and extensive lakes and estuaries. About 10 lakh workers are engaged in fish work. The density of population in coastal area is of 2168 persons/ Km^2, whereas the State average is 859 persons/ Km^2. Fishing and fisheries sector have been a subject of many academic researches and enquiries. This report also follows the pattern of an academic study with an applied research focus. It is conceptually impossible to delink the community from the coasts. Hence, an interface of the life world of the community with coastal environment is the critical focus of this research.

Kerala coasts have been subjected to multiple kinds of hazards, caused by anthropogenic as well as natural factors. As per the Kerala State Disaster Management Plan document, 300 out of the 570 kms of Kerala coast is prone to multiple hazards such as excessive rainfall, storm surges, sea-level rise etc.

The report further explains that Kerala has 223 coastal villages, which are spread across nine districts, namely Kasargod, Kannur, Kozhikode, Malappuram, Thrissur, Ernakulam, Alappuzha, Kollam and Thiruvananthapuram. These villages are prone to cyclones due to natural causes. It has already been demonstrated in the State that human actions such as construction of harbours, jetties and groins, mining and dredging etc contribute to coastal erosion.. It is estimated that 480-km length of the coast is facing the threat of erosion. The rocky coasts having pocket beaches are experiencing a minimum level of erosion. The disaster management plan report explains that *the coasts with laterite cliffs*

under cutting of the softer clay layers lead to slumping with a net landward migration of the shoreline[1]. Table 1.1 shows the details of coastal erosion in Kerala.

Table 1.1: Eroding sectors along the coast in each District, Taluka and whole State						
District	Length		Length		Length	
	km	%	km	%	km	%
	High (without sea wall)		High (with sea wall)		Low	
Thiruvananthapuram	11.9	15.86	15.66	20.88	30.84	41.11
Kollam	1.14	2.34	37.77	77.58	0.91	1.86
Alappuzha			29.98	37.84	3.7	4.67
Ernakulam			33.39	69.02		
Thrissure	2.58	3.43	17.37	23.16	0.98	1.3
Malappuram			15.4	31.63	6.44	13.23
Kozhikode			35.4	44.68	8.47	10.69
Kannur			9.33	14.27	17.38	26.58
Kasargod	1.3	1.47	4.34	4.93	28.31	32.15
Total	16.91	3.02	198.63	35.47	97.02	17.33
Source: KSDMA- Kerala Disaster Management Plan (CESS data)						

Environmental risk in the coastal area is highly demonstrated in the lives of coastal community. The coastal hazards experienced by the coastal community of Kerala, as listed by the State Disaster Management Plan, are: Indian Ocean Tsunami 2004, Cyclone 2017 and recurring coastal erosion across Kerala. All of these leave a strong imprint on the community life in the form of loss of life, livelihood practices, loss of land and displacement to a great extent. The recurring nature of coastal hazards affects the daily life of the community. Every change caused by hazards directly hits the community. The dependency on institutions and policies plays a significant role in community mobility. The most critical impact of coastal hazards is the increasing uncertainty of livelihood. It is demonstrated in livelihood practices and institutions in a complex manner; however, the general community and government of Kerala are yet to recognize these as development challenges. The gap between the fishing community and the general public of Kerala is a reality. Society often perceives the fishermen community's exposure to hazard as a mere livelihood struggle unrelated to environmental risks. Communities experience and manage the risk through individual and collective efforts, and never depend on the general society and institutions. Such community mechanisms are fully self/individual-centric and community collectives play a vital role in building capabilities of the communities. This has made the entry of non-state actors and community collectives inevitable in disaster risk management. Community collectives and the ability to manage risks are integral parts of their livelihood practices. Fishermen ignore every other aspect of life and focus only on

[1] KSDMA- Kerala Disaster Management Plan (CESS data)

the livelihood. A study by Salim et al (2014) undertook a vulnerability assessment of fishermen exposed to coastal hazards. The paper argues that the fishermen community is yet to experience any long-term effects of climate change, and that economic parameters are more important for them than climate change. The study argues that the fishermen community has a low level of awareness about the climate change. However, the fact is that the existing social and economic vulnerabilities push them to ignore environmental changes and focus on everyday income to survive. The Kerala State Action Plan on Climate report published in 2014 by the Department of Environment and Climate Change, Kerala has identified the climate vulnerability of Kerala. The report explains that the sea-level rose in Kerala by 3.5 to 34.6 inches between 1990 and 2100 and has resulted insalinity intrusion in coastal groundwater, endangering wetlands, inundating valuable land and harming coastal communities. The report also quotes a similar assessment and states that sea-level rise would affect the wetlands of the State. Also, it mentions that the shoreline change from 1972 to 2010 had put 63.02 percent of coasts in a vulnerable condition. Climate change is increasingly affecting the fisheries sector and coastal resources. It has been assessed that the sea-level rise due to climate change leads to destruction of small fishes and plant species. Ten freshwater species have been identified as the most threatened by climate change. Climate risk results in low resources, mounting risks and low income in coastal areas. On top of that, the coasts of the State have been subjected to multiple levels of external interventions caused by the up-scaling of existing infrastructure, including modernization and capital-intensive fishing. Non-fish resources of the coastal areas are getting priority in investment projects, which gradually displaces the fishermen from their immediate settlements and relocate them to centralised fishing with less income and more working hours. These structural and non-structural changes are putting the community into a crisis day-by-day. The most demonstrated crisis is poor occupational resilience and mounting coastal hazards.

1.1Research concern of the study

The fishing sector and coastal areas across the country are subjected to multiple kinds of changes due to various levels of interventions, including heavy capital investments and large-scale displacement of fishermen from the coast. Fishermen community is more resilient towards livelihood struggle than any other community. Everyday struggle for earning and facing the tough sea empowers the community to sustain themselves. Unlike earlier times, the community is now subject to a new set of crises which directly hit its collective existence. The working hours of the community have been increased considerably while the real income has not been increased by much. The livelihood of the community faces multiple challenges, including poor availability of fish and poor accessibility to the resources. The distance travelled for fishing has significantly increased, affecting the income of fishermen who use non-mechanized methods and those who use mechanized methods. The declining availability of fish has increased the risk to livelihood practices. The community is forced to acquire or build resilience to handle the risk. Everyday livelihood practices do not ensure resilience against the risk, which is beyond individual and collective capacity. Lack of ownership on coastal resources continues to be a challenge for the fishing community. They have to fight the government for permission

to stay on the coast and use local resources. The dependency on State institutions along with mounting risks made life difficult for fishermen community live in the coastal areas selected for this research.

Disasters in coastal areas have left the community with permanent risk and vulnerability. This research study has taken three cases from Kerala to demonstrate how the fishermen community survives recurring and non-recurring disasters. It also examines the implications of these disasters for livelihood practices in general and attempts to show how the State governs such disasters with a view to narrowing down the risks. The cases taken for this research can be classified as recurring and non-recurring in nature. The coastal erosion in Kollam district is a recurring disaster. The Kollam coast, which has been taken by this study as a case, has been experiencing this phenomenon since the early 1990s. It has taken away the traditional practices of the fishermen community and displaced them from the coasts. It is primarily an anthropogenic reason that pushed the community from the coasts. Scientific studies also corroborate that extensive construction of harbors and mining are the causes of erosion. It has been proved that coasts are eroding at a faster rate in Kerala. The community living closer to the Kollam coast for livelihood security has been displaced since 1992 and ad hoc support systems are followed by the Government. Both the Government and the community together have failed to find a concrete solution to the problem. Basically, neither the community nor the State could stop the extensive economic use of resources which caused erosion. This study focuses on the impact of erosion on the community and the issues pertaining to its governance.

The Indian Ocean Tsunami of 2004 is another disaster considered in this study. It was a trans-boundary disaster that affected India, Sri Lanka, Indonesia, Maldives, Myanmar, Bangladesh and Thailand. It was one of the major natural calamities in the country, claiming 12,405 lives and causing an approximate loss of Rs.11,544.91 Crores at the national level[2]. This research has taken the impact of the 2004 Tsunami on Kerala as a case study and is specifically focused on two coastal villages Alappad and Azheekal situated in Kollam and Alappuzha districts. Extensive coastal erosion due to mining had already submerged some parts of these two villages before Tsunami. Post-Tsunami, the community there had to relocate to non-coastal 'created colonies' as part of rehabilitation. Administratively, it could be read as a project of disaster risk reduction and safe relocation. However, in principle, it is exclusion from the coastal ecosystem and gradual alienation of a large chunk of coastal community from local resource ownership. Post-disaster rehabilitation for Tsunami was one of the longest administrative intervention programmes in Kerala. Rehabilitation started one year after Tsnami and continued till 2012 as the State government's development programme. This study is being conducted 14 years after Tsunami and the survivors' life experience in these long years has been taken as its second case. The community is yet to recover from the social, economic and individual impact of Tsunami. It took more than a decade for the community to realize that a natural disaster can impede the very personal and social life of a victim. The survivors' quality of life has not improved and access to better facilities is still a distant option for them. It is also the reality that once the victims are rehabilitated after a natural calamity, they do not have an option to ask for more support from the agencies. The colonies that are created lack

[2] TSUNAMI - A Report to the Nation, June 3, 2005

necessary facilities, and the survivors are often forced to restrict themselves within the colonies due to the social stigma attached to them. Tsunami rehabilitation was largely an effort to ensure the bare minimum facilities to survivors. Thereafter, rehabilitation efforts became a burden on the people. No government department involved in the Tsunami rehabilitation accepts that it led survivors into vulnerable conditions. Recurring coastal erosion and Tsunami taught many lessons to the community, such as dependency on State institutions for support, living with bare minimum support as maximum possible rehabilitation, and the new identity of 'disaster victims'. For the government, it was a successful project of maximum State intervention. What was missing in these articulation were the early warnings, risk forecasting and risk governance. In the 14 years after Tsunami, disaster management has become an institution in the country. Kerala has also set up its own institutions, the importance of which is recognized by the government.

The present study has also taken Cyclone Ockhi, 2017 as a case to examine how the risk is being governed and what society can learn from the institutional governance of disaster risks. Ockhi was another shock to the coastal community which exposed the weakness of both Central and State governments in predicting and governing risks. Cyclone Ockhi was an incident where the collective and individual resilience of the community proved to be ineffective in bouncing back from the disaster. There were many allegations of poor institutional responsesby the agencies that were supposed to ensure early warning and early action. The Indian Meteorological Department (IMD) and other government agencies were subjected to unparalleled criticisms for the delay in delivering information. The community showed the courage to question the very scientific method of database management and dissemination of information followed by these agencies. Natural disaster desperately demands active support of government agencies, since such agencies can bring investment and ensure protection from capital loss. Therefore, the community inevitably approached government agencies for long-term needs and resilience. This is a natural course of events in countries such as India, and no bureaucracy can deny support in such cases. According to media reports, it took weeks for the agencies to complete the rescue work and the government agencies had to involve local fishermen for search operations. Many families lost their breadwinners and deteriorated to extreme poverty thereafter. There was cash relief from the State government. However, such financial relief never ensures a sustainable income to the community.

The government declared support packages for the survivors. However, the 2004 Tsunami and subsequent rehabilitation packages including cash relief proved that such support is ineffective for a long-term economic recovery. It is the responsibility of the government and similar agencies to draw lessons from previous risk rehabilitation. Unlike other professions, there is hardly any possibility for livelihood replacement and diversification of fishermen. The community has to return to the profession with all the risks and uncertainties left behind by the disaster. Thus, they have to internalize the disaster as a natural risk and trust their own knowledge and skills to overcome it. In this manner, the onus of survival and post-disaster crisis management is back on to the community.

Cyclone Ockhi of 2017 and its impacts have disappeared from the public memory of Kerala. It took only a couple of months for the government and the citizens to begin

ignoring the community. Even the media did not find it newsworthy after a couple of days of disaster. The community slowly returned to the sea for fishing. Apart from labour, the risk management capability is also a capital for the community. The quality mandays available for the community have been declining over a period of time, also affecting the income. This serious issue is the critical focus of this research. The fish workers have to return to their profession without much resilience, which extends the struggle for livelihood. Every disaster challenges the capacity and reduces the resource base. Hence, it is imperative to study how the fish workers in coastal Kerala manage to survive the crises. The survivability of the labour force and their engagement with the institutions of risk management and development is the focus of enquiry for this research study.

1.2The core objectives of this study are:

a) To study how Coastal erosion, Tsunami and Cyclone Ockhi affected the livelihood practices of the fishermen community and what are the short term and long term impacts on livelihood
b) To study how government institutions and disaster management institutions manage the crisis
c) To study how development projects in the coastal area impact disaster management in the study areas
d) To study how Tsunami rehabilitation influenced s Ockhi cyclone in Kerala
e) To study how the of community and agencies respond to of Ockhi cyclone and what are its long term impacts

1.3.Hypothesis of the study

This study hypothesizes that structural risks such as low fish availability, increasing coastal hazards and low wage rates lead to cumulative risks and uncertainties for the community. Cumulative risk was exposed in the coastal disasters that occurred in Kerala; however, the government and institutions have not recognized the vulnerability in the region and the poor resilience of the community. The institutional risk perception and capability did not match with the collective needs of the community. Hence, the employment resilience of the community is in a poor condition.

1.4.Universe of the study

This study is centered on three regions in the coastal area of Kerala: a) Ockhi cyclone-affected Vizhinjan and Poonthura coastal villages of Thiruvananthapuram, b) Eight kilometers of coastal area of Kollam district from Mukkam Maynad to Kakkathop to study the coastal erosion problem, and c) Tsunami-affected Azheekal and Alappadu Panchayat of Kollam and Alappuzha districts. Coastal disaster has affected/ is affecting these areas in different time periods; however, the scheme and support systems remain the same.

1.5.Unit of the study

The villages of coastal area (Alappad, Azheekal, Eraviuram, Thanni, Fort Kollam, Vizhinjam and Poovar) , community collectives, ongoing development projects, number of man-days, income from fishing and access to support systems.

Chapter Scheme of this study report:

Following this introduction chapter, the second chapter contains a review of literature and research gap.

Chapter three discusses the Conceptual Framework and Method of the Study.

Chapter four discusses the coastal economy of Kerala .

Chapter five r discusses the issues pertain to coastal erosion in Eravipuram.

Chapter six discusses Tsunami rehabilitation and secondary impact of disaster .

Chapter seven carries detailed discussions on Ockhi Cylone management.

Chapter eight carries summary and findings

Chapter nine carries conclusion and suggestions

Chapter II

Review of Literatures and Research Gap

Introduction

This chapter is divided into three sections. The first part discusses the disaster rehabilitation and adaptation. The second part discusses the coastal erosions and third part discusses the cyclone risk management and governance. This chapter meant to see how disaster risk is being governed and its implications to Costal Erosion, Tsunami rehabilitation and Cyclones discussed and debated in the academic discourses. The critical focus of this review is to see how the risk results by these disasters are governed and impacted?

Disaster risk management and governance are posing more and more challenges to the State and the institutions formed for such governance. Disaster often exposes institutional weakness and incapability of dealing with the risk. Picou, Marshall and Gill (2004) state that people affected by disasters, by definition, require "immediate assistance during a period of emergency i.e. requiring basic survival needs such as food, water, shelter, sanitation and immediate medical assistance" (IFRC/RCS 2002:181). Such assistance is necessary in the short term. However, long-term social and psychological consequences of disasters on individuals and communities are outside the purview of emergency response efforts and are typically overlooked. Their study focuses on the importance of rehabilitation in a sustainable development mode. Buchanan and Tullock (1962) argue that the failure to ensure joint surplus-enhancing rule change the in heterogeneous voting organisations ability to creation wealth. A critical analysis by de Silva (2009) showed that poor and ethnically-marginalized communities are the worst sufferers of disaster. He supported his argument by citing the vulnerability of the Muslim community in Ampara. The study established that ethno-political relationships that existed in the pre-tsunami condition further ethnicized and intensified afterwards. According to him, ethnicity has become the organising principle in the post-tsunami humanitarian aid distribution. The study was more focused on ethnic marginalisation and its impact on rehabilitation. It critically assessed the role of ethnicity in the distribution of humanitarian aid and concluded that communities were further fragmented and marginalized due to incorrect policies. Lack of bargaining power of the affected communities normally affects the aid distribution policy.

Community coping capacity is also a matter of concern. For instance, Paton et al (2008) discuss, in their paper, the importance of having coping capacity to face and adapt to the losses and disruption that a disaster leaves behind. Cardona, Ordaz, Marulanda, Carreño and Barbat (2010) pointed out that if the risk is not presented and explained in a way that attracts the attention of stakeholders, it would not be possible to make progress in reducing the impacts. Thus, disaster governance needs large-scale institutional interventions and mechanisms.

2.1 Disaster, Adaptation and Rehabilitation

The efficiency of disaster rehabilitation depends on how it ensures resilience and adaptation to the survivors. Kilby (2007) observed that along with fishermen communities, many Dalit and tribal communities living along the East coast were seriously affected by the Tsunami, and were either overlooked or faced severe discrimination in the rehabilitation process. The paper discusses donors' initiatives, such as the Oxfam support, that identified people left out of initial relief. Castle (1978) argues that the global economy is directly involved in establishing the demand and supply relationships for many materials. Short-term shifts in the pattern of use and in demand or supply lead to severe adjustments in resource use within an economy. According to him, public policy has the capacity to influence the environment within which property rights are mentioned and need to be considered simultaneously with rule changes. Schlager and Ostram (1992) explain this critical issue with reference to common property resource management, for them common property resources mean: 1) property owned by a government, 2) property owned by no one, and 3) property owned and defended by a community of resource users. It also refers to any common-pool resource used by multiple individuals regardless of the type of property rights involved; de facto and de jure ownership affects the incentives that the individuals receive, the type of actions they take, and the outcomes they achieve. They further argue that the significance of such difference of ownerships is that there exists a clear point of departure between owners who hold a complete set of rights, and all other users who do not hold complete rights. Often, the right to alienation is believed to be crucial for efficient use of resources. The right to alienation coupled with rights of exclusion generates incentives for owners to undertake long-term investments in a resource.

Agrawal (2003) argues that failure of market-oriented policies to manage commons has initiated the enquiry of alternative governing mechanisms for forests, pastures, water and fisheries. The study states that institutions usually come into being as a result of human actions, and allow specific individuals and groups to reap advantages from altered social circumstances rather than allowing societies as a whole to capture efficiency gains. The paper further elaborates that the processes of development and modernisation, and attempts to raise the efficiency of use and management of commons can end up increasing State capacities to control and intervene in local affairs. Buck (1989) argues that property rights are either transferable or not transferable and individual rights are saleable for goods or money, or are subject to bestowal and removal for services rendered. His study shows that non-transferable rights have often been removed from individual control and rest with the government or with the community of users. These rights may be assigned to individuals, but the individual may not transfer the right to another.

The 2006 paper by Kurian et al discussed the geomorphic changes in the coastal area due to Tsunami. The paper observed that the December 2004 Tsunami had made a devastating impact on some parts of the coast of Kerala. It brought about changes in the geomorphic settings of the coast. Sheth et al (2006) observed that the major reason for this impact was the narrow strip of land bound on the West by the Arabian Sea and on the East coast by a network of backwaters.

Hettiarachchia and Kushani De Silva (2014) tried to study the role of comprehensive disaster management programmes of Sri Lanka in reducing the direct and indirect risks and thereby, reducing the impact on community. The paper argues that such special projects and programmes would borrow best practices from across the world and proposes that disaster risk reduction measures should be linked with national development projects. Larson et al (2013) brought out some of the crucial factors in disaster rehabilitation and development in India. The paper is focused on the role of self-help groups in women empowerment after Tsunami. It explained that self-help programmes provide women with new income sources, training, access to micro-credit and savings. Such programmes have offered opportunities to women to take part in the decision making process and social action. Pittaway et al (2007) discuss that women and children are the most marginalised by disasters and least supported by agencies.

The study by Oxfam International (2005) came up with data showing that in Cuddalore, Tamil Nadu, almost three times as many women as men were killed by the Tsunami. Also in Pachaankuppam, another village in Tamil Nadu, only women lost their lives in Tsunami. The study by Irshad (2014) assessed the post-Tsunami rehabilitation in Alappad and Azheekal villages of Kerala. The paper observed that Tsunami rehabilitation was limited to ensuring the bare minimum support to the affected community and the ongoing sand mining from the coast further excluded the fishermen from the area. The displacement of the community from the land as part of disaster risk reduction eventually helped the mining companies to mine the evacuated area. The rights of the local community to resources were ignored and no benefit sharing practices were followed. The paper also discusses that unsustainable mining led to massive erosion and total submergence of two fishing villages in the area. Another study by Irshad in 2016 observed that the rehabilitation of Tsunami-affected people in multiple settlements had generated a sense of resilience towards the Tsunami risk. However, the long-term impact is critically negative in nature, since the post-Tsunami rehabilitation investments in the area did not bring about any substantial changes in the quality of life of survivors. The above mentioned studies have discussed Tsunami and risk governance in particular contexts and not discuss on the secondary impact of disaster.

2.2 Coastal Erosion and Community Vulnerability

Coastal erosion has been the topic of multiple academic researches. A paper by Correa and Gonzalez (2005) analysed how coastal erosion leads to relocation of community and severely affects their livelihood and income. Purkait (2009) studied the coastal erosion on Sagar Island in Sunderban delta in India. The author observed that shoreline retreat has affected the coastal geomorphology and its inhabitants. It affected the crops that were planted there by replacing the natural vegetation and massively reduced fish catches. Saengsupavanich et al (2009) discusses the management of erosion prevention in Nakorn Si Thammarat province, Thailand. The paper argues that successful erosion management needs community participation with the help of indigenous information and practices. Seawall construction was suggested there as a measure without proper assessment and it prevented the local fishermen's access to sea. Santha (2015) discusses the conflict between formal and local knowledge on early warnings. The study observed that scientific knowledge needs to engage with the local system and contextualise it. The scientific

community needs to understand social discontinuities while engaging with the local methods of acquiring knowledge. Another paper by Santha et al (2014) studies the role of myths and beliefs in constructing risk perception among fishermen in Kerala. They argue that such discourse provides a space for resistance to fish workers to protect their customary practices and resources. Feagin et al (2005) observed that seawall and groins lead to greater down-drift erosion by disrupting the natural sediment transport system. They also stated that massive erosion necessitates other natural protection measures such as geo-textile tubes, and recognized the need for planning to protect the shore.

A paper by Cai et al (2009) stated that anticipated climate change would intensify the risks to coastal populations, and the global sea-level rise would inundate the low-lying coastal regions by the end of this century. Chattopadhyay (2010) argues that there is a need to develop geomorphic indicators for coastal hazard management. The paper proposes that one has to deal with geomorphologic processes by identifying the system boundaries and other activities including human-induced process. Van Rijin's (2011) study found that coastal erosion is dependent on the type of coast and its exposure to wave climate, surge levels, sediment composition and beach slope. The author argued that groins and breakwater are not the remedy for dune erosion. The paper also observed that groin often led to local down-draft erosion and is not an ideal solution if alternative methods are available. Correa and Gonzalez (2000) discuss how barrier erosion affects the local food security and disrupts the economy on the pacific coast of Colombia. Resource depletion due to erosion eliminated the possibility of a self-sufficient economy on the island. Absence of proper mitigation aggravated the challenges and deteriorated the local economy. Bird (1985) observed that coastal erosion is an issue across the shorelines in the world and that about seventy percent of the Earth's sandy beaches were under threat. The proportion may have increased since then. The observations by McKenna et al (2009) are largely confined to the costal management based on European principles. They argue that if local coastal protection measures are proved uneconomic and environmentally unsustainable, one has to allow the natural process to operate without any interruption. The paper underlined the importance of natural processes that can prevent erosion rather than proposing any external intervention.

Anderies et al (2004) argue that resilience building is the capacity to absorb a shock and retain the same function and structure of the community. Noujas and Thomas (2015) conducted a field survey in the coastal area of Kerala. They found that erosion occurred on the down-drift side of harbours and groins, and that inappropriate protection mechanisms also cause coastal erosion. The paper mentions around four kms of erosion in Eravipuram area. Hgde (2010) observed that rates of accretion and erosion are dependent on the nature of the beach. Coastal erosion leads to a landward movement of the coast and results in depletion of dunes and beaches. Mitra (2013) assessed that about 2519.31 hectares of coastal area eroded in the last 55 years in Mandarmani-Shankarpur, West Bengal, India. Such empirical assessment is important for framing policies and programmes to address coastal erosion. Another paper by Silva (2014) discusses a similar level of erosion on the Candeias Beach of Brazil. The significance of the paper is that it critically indicates that breakwater construction is the reason for sediment transportation on the Candeias coast. Kudale (2010) observed that construction of breakwater, jetties and other structures on the coast results in up-drift side and of the long shore drift and erosion of the down-drift side.

Such massive construction is important for the up-drift side; however, it leads to heavy erosion as the sediments are transferred from the adjacent shore. Hence, the paper suggests that the harbour engineering department should ensure that such construction does not affect the adjacent coasts and beaches. Rao et al (2008) studied beach erosion in Visakhapatnam. The coastal areas there are highly resource-rich and in low-lying areas. They are densely populated and beaches are open for multiple recreational activities. The authors observed that the construction of a breakwater 35 years ago resulted in heavy sea erosion in the area. The critical conclusion of the paper is that human intervention is the leading cause of coastal erosion in the area. The paper states that groins are not the solution for this, since the groins constructed in a perpendicular angle with the beach have become a new headland, causing further beach erosion. Gracia et al (2017) discuss the existing condition of coastal zones in terms of erosion and its impact on people, infrastructure, tourism and trade. They propose that any coastal erosion management project should undertake the necessary steps to minimise or eliminate erosion-related impacts. They propose ecosystem-based coastal protection rather than an economic cost-benefit analysis.

Jones and Phillips (2011) and Shi and Kasperson (2015) have researched coastal erosion in two different time periods and have arrived at a conclusion that the current pattern of climate risk would erode the coast to an extent unmanageable for human population. Barragan and Andreis (2015) argue that coastal erosion is a major environmental problem since human interventions on the coast are on the rise and development projects causing erosion.

Biggs and Smith (2002) indicate the importance of preserving the ecosystem on the coast to prevent erosion. They believe that such an approach is crucial for building resilience in the coastal area. Narayan et al (2016) conducted a cost-benefit analysis, exhibiting the benefits of prevention of coastal erosion across the world. They found that mangroves and salt marshes are much cheaper than groins for protecting coasts. The paper by Prasad et al (2016) proved that mining carried out by 'Kerala Minerals and Metals' and 'Indian Rare Earths Limited' from 1968 to 2015 led to a loss of shore in Vellanathuruthu, Ponmana north and Ponmana south villages of Kollam district, of 260, 388 and 367, respectively. The paper also proved that the 2004 Tsunami caused geomorphologic changes in the coast due to a run-up level as high as 5m in the northern sector of Alappad and Azheekal villages. The existing literatures discuses the nature and cause of severe erosion on the coastal areas, however what is more important is the displacement, livelihood loss and mounting environmental risks in the coastal areas. These reviews give a critical tool to assess the livelihood loss and displacements and it help develop the tool of this study as well.

2.3 Cyclone Risk Prediction and Management

Cyclones have also been subjected to several academic researches. A paper by Frank and Husain from 1971 talked about how poor dissemination of early warning put the lives of people of East Pakistan (Bangladesh) at risk. Murty (1988) states that up to 97 per cent of deaths caused by tropical cyclones are due to drowning in the storm surge. Haque and Blair (1992) argued that poverty and lack of trust in the evacuation process had increased the loss of lives and livelihoods in a tropical cyclone in Bangladesh in 1991. Furthermore, the paper highlights the need for reliable and responsible long-term plans for proper

evacuation of victims, and asks for involvement from non- governmental and civil society organisations. Houghton et al (1996: 334) observed that rising sea-levels have increased the potential impact of storm surges associated with tropical cyclones. It could be due to global warning or any other reasons. Keys (1997) opines that the research on early warnings of disasters is largely restricted to technical aspects only.

Chowdhury et al (1993) discuss the severe cyclone in Bangladesh in 1991. The estimated life loss was about 130,000 while the economic loss recorded was worth US$ 2.4 billion. The authors argue that there was a chain of events behind this massive death rate rather than a single causal factor. The timing and effectiveness of the early warning system are among the factors. In this case, the community did not have trust in the early warning system, leading them to believe that it was false. Social and economic vulnerability also pushes the death rate higher. This paper also emphasizes the importance of integrating cyclone warning in education programmes.Esteban and Longarte-Galnares (2010) developed a simulation model to assess the projected economic loss due to cyclones between from the present time up to the year 2085. They used the climate change model to assess the differential impact of tropical cyclones. The paper also assumes that these factors are highly unpredictable.Karaca et al (2000) analysed the importance of inventories in cyclone forecasting that serve as a yardstick in the evaluation of the regional macro-climate.

Pal and Ghosh (2018) conducted a study based on Cyclone Aila of 2009 in West Bengal. They observed that Sunderbans Island, which is the one of the world's largest delta lands, is sinking due to the rise in sea-levels. The paper predicts that the mangroves and the embankments would be safer since mangroves slow down the intensity of storms and winds to a great extent. Increasing economic activities, population density and human-induced vulnerabilities, in combination with other coastal hazards, could increase the risks in the region. The agencies for disaster management could not perform at the time of the cyclone to prevent the loss. Better coordination among various departments and agencies could have reduced the risks.

Li (2009) discusses the tropical cyclone in Darwin, Australia, focusing on differing risk perceptions among people belonging to different social and administrative categories. The paper found that as people get more experience, the difference of perception between laypersons and experts gradually vanishes. However, the difference remains the same when laypersons have short-term experiences with the risk. The study explains that the ‘lived experience’ of the people changes their approaches to risk perception. Hong and Möller (2012) studied the tropical cyclone in China and found that tropical cyclones lead to economic loss in wind power generation. Winchester (1992) built an argument that the community possessing resources are able to protect themselves from the economic and physical impact of cyclones whereas people possessing fewer resources are subject to loss of life and income. Winchester (2000) studied the cyclone mitigation in Andhra Pradesh and found that Government of India faced the same problem as the British government would have faced while dealing with disasters in India: striking a balance between safety and economic growth. The author observed that successive government policies have been able to reduce the number of deaths due to cyclones in the coastal area, but not the structural poverty, which again pushes the community into vulnerability. Samanta (1997)

observed that cyclones tend to create a crisis in the society in which the traditional institutions and structures are altered significantly. The paper also stated that cyclones in the coastal regions of West Bengal caused increased soil salinity, which affected the long-term economic stability of the region. Nicholls et al (1995) estimate that 42 per cent of the nearly 1.9 million cyclone-related deaths in the past two centuries had occurred in Bangladesh and about 27 per cent in India.

The study by Dash (2002) dealt with the micro-level impact of poor response to early warning systems. The author observed that all the survivors of cyclone received the warning; however, none of them thought that the disaster would have such a massive impact. They were under the impression that it would be a natural storm and not a cyclone.

Alam and Collins (2010) pointed out that the cyclone in Bangladesh severely harmed people living near the coast and in isolated settlements. The community coped with the isolation and the severity of the cyclone through adaptations based on local knowledge. It operated through individual initiatives, kinship ties and obligations, and social networking. Thomase (2003) argued that disaster management administration is often caught in the trap of insufficient time to collect and analyse the data for the purpose of proper mitigation. Tatham et al (2012) discussed the importance of applying an appropriate technology in early warning and mitigation of disasters. The Bhola cyclone in East Pakistan (present Bangladesh) in 1979 was one of the deadliest tropical cyclones ever occurred in the world. It was estimated that about 250,000 people died in the cyclone. Hossain (2018) says that the cyclone created a strong connection between disaster management and national politics, and caused people to think that the State should intervene to protect them from disaster risks. Panigrahi (2003) studied how relief support operated after the 1999 cyclone in Orissa (present Odisha). The author observed that there was a lack of coordination among the relief agencies, non-governmental agencies and government institutions, which resulted in discriminatory release of essential provisions among survivors. The paper argues that there must be sincere efforts to de-bureaucratize and de-politicize disaster management practices. Thomalla and Schmuck (2004) observed that the 1999 cyclone created awareness among communities, NGOs and government agencies about the importance of disaster preparedness and response to early warning. The paper also stated that the reasons for such a massive impact were weak response, absence of State-level political leadership to take up the cause, and poor contingency plans.

Akter and Mallick (2013) investigated the impact of cyclones in Bangladesh and showed that the average household income and per capita income significantly declined after the cyclone. The paper observed that the poor are more likely to experience the shock of a lower average income than the non-poor. Thus, the poor are more susceptible to the impact of tropical cyclones owing to poor living conditions and geographical settings. Pooley et al (2006) attempted to understand the community resilience in the cyclone-affected areas of North-West Australia. The paper observed that the sense of a community is the core factor that links individuals to the community. Suar et al (2002) assessed the post-disaster trauma of a community affected by the 1999 super cyclone. The study was conducted three months after the disaster and found that people who were close to the epicenter of the cyclone and lost their relatives experienced more post-traumatic stress than those living away from the epicenter.

Chhotray and Few (2012) pointed out the poor economic recovery of the people affected by the super cyclone. The paper found that there were social and political constraints on evolution of proper adaptation and resilience by the communities. No alternative livelihoods were offered to the survivors, leading to migration of the people from the affected areas. Irshad (2017) also discussed the slow economic recovery after the Orissa super cyclone and the 2013 Uttarakhand flood. The paper argues that the survivors of the Orissa Cyclone have not fully recovered from the economic loss even after 17 years. The asset bases of the survivors were very extremely low for the government to replace; hence, many such primary livelihood assets were not replaced and led to a clear income inequality between the people affected and people not affected by the cyclone. Thara (2018) emphasized the importance of timely intervention by agencies and the need for effective systems to disseminate the information acquired by responsible agencies information with the responsible agencies.

Cyclone and risk management has been studied by various scholars; large numbers of papers are from Bangladesh. The focus of review of this research proposal is to see how cyclones have been governed and how different agencies responded towards it. The review gives a broader perspective of cyclone risks and approaches to manage it.

Conclusion

Literatures reviewed in this chapter are critically related to disaster governance and impacts. Three sets of literatures have reviewed in this chapter to get a clear perspective on academic discussions on disaster referred in this study. The review also indicates that macro-micro (structured and non-structured) assessment of natural calamities are needed to arrive at a specific analytical conclusion of natural disasters vis a via community impacts. The coming chapter discuss the method and conceptual framework to study this critical issue.

Chapter III

Conceptual Framework and Method of the Study

Introduction

The present research thesis evolved from three critical problems pertaining to the Kerala coast: The massive Indian Ocean Tsunami in 2004, persisting coastal erosion and the Ockhi Cyclone in 2017. The study locates these three cases within the context of an environmental risk perspective to build an argument to further explore disaster risk assessment and responses. Environmental risk assessment is a process of tracing the hazard potential of the natural resource stock and the area where it is located. Whyte and Burton (2010) in their paper stated that environmental risk assessment compares environmental indicators as they change over time. This method examines a range of historic conditions by monitoring undisturbed areas and by analyzing natural disturbances over a period of time. Furthermore, the probable effect of the risks is monitored and estimated on the basis of long–term implications of the present risk management. Risk perception evolved from human interface with natural resources and is related to the type of value system attached to it.

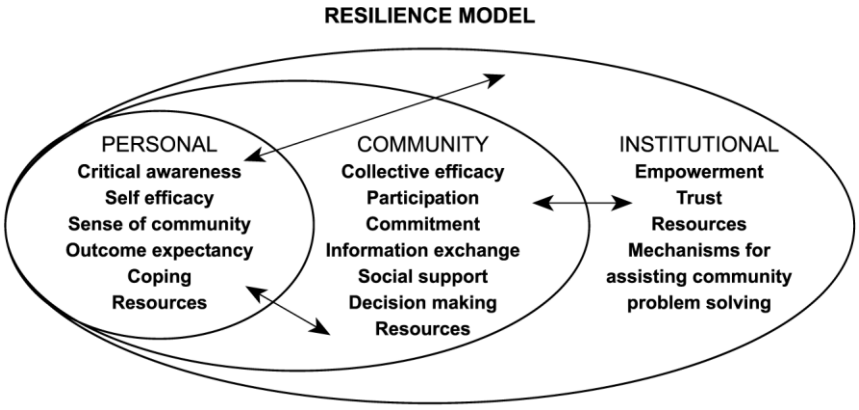
Covello and Merkhofer (1993:3) have argued that risk estimation is a procedure for generating a probability distribution of uncertainties about the timing and magnitudes of possible environmental impacts associated with specific events or actions. Any self–contained procedure can be applied to assess the probability distribution of an environmental consequence. Statistical probability can be derived with the help of statistical applications. However, the most critical aspect of risk assessment and exposure is that it is based on the socio–economic conditions of the human habitation dependent on the environment. As Beck (1992:35) has argued, the history of risk distribution shows that, like wealth, risks adhere to the class pattern, only inversely: wealth accumulates at the top, risks at the bottom. To that extent, risks seem to strengthen, not to abolish, the class society. Poverty attracts an unfortunate abundance of risks. Beck's concept of risk as reflexive modernity is a contemporary manifestation of risk and uncertainty and holds true in case of disaster risk manifestations and impacts in a country such as India. It also explains that those who capitalize the environment are less likely to be exposed to risk in developing countries. Hazards and risks in an unequal society result in more inequality in terms of loss of life and property. Economic inequality and capitalization of natural resources have converted risk safety into a private good. The poor and the marginalized are unable to pay the increasing cost of safety and are pushed towards more risks. Environmental risk and safety have become a private choice, which has also increased the cost of risk reduction. As Beck (2007:25) observed '*the risks generated by industrial and large-scale technologies are the result of conscious decisions, decisions which, first, are taken in the context of private and/or state organizations for economic gain and to seize the corresponding opportunities and, second, are based on a calculation for which hazards represent the inevitable downside of progress'.* Beck's analysis of risk is located within the political economy of risk perception. Economic vulnerability plays a vital role in exposing people to risks. The degree of resilience and economic backwardness determine the extent of vulnerability. As Schwab et al (2007) explain, hazards are events triggered by natural forces, but they turn into disasters only if people are exposed to the hazard and are not sufficiently resilient to fully absorbing the impact without damage to life or property.

Human interface with risks is a deciding factor that puts people at risk. This study analyses this critical concern in the context of the Marxian ecological perspective. Foster (2000:72) analysed the approach to ecology from a Marxian perspective, which covers human relations with nature. According to this conception, the human ecology is intervening with nature not only through production, but also, more directly, by means of tools, themselves

a product of the human transformation of nature through production. This mediation allowed humanity to transform nature in universal ways. Marxian explanation of the use of natural resources has wider policy–level implications as its approach to nature inclines towards a materialistic interpretation of nature and capital, which is increasingly followed in the larger capitalist utilization of natural resources. Thus, Marxians theory often use and legitimize capital-centric approaches of production; also, the human existence has been used to legitimize the heavy exploitation of natural resources. Marxian view of nature as an extension of human body does mean that human habitats are formed by converting natural resources into commodities. It is the most popular concept from Marxian theory in developing countries of the third world, which rely on it as a reason for diverting forests, use resources extensively and subverting environmental conservation movements and activities. Foster (2000:74) further explained this critical concern with a clear ideological position. Foster observed that the domination of the Earth itself, for Marx, took on a complex, dialectical meaning derived from his concept of alienation. It meant both the domination of the Earth by those who monopolized land, and hence, the elemental powers of nature, and also the domination of the Earth and of dead matter (representing the power of landlord and capitalist) over the vast majority of human beings. Thus, the alienation of the Earth, and hence its domination over the greater part of humanity (by being alienated in favour of a very few), was an essential element of private property and had existed in feudal landed property - which was the root of private property - prior to the rise of capitalism. Marxian explanation of the use of land (environment) by the capitalist mode of production raises many concerns in the contemporary state of conservation of natural resources. The increasing conversion of nature into a transferable commodity puts human dependency on nature under crisis. Human dependency on nature is not only for livelihood, but primarily, for existence. Nature is the dominant deciding factor creating environmental risk and uncertainty. The higher the level of risk, the higher would be the exposure of those who are economically vulnerable. The present study also corroborates that individual and collective exposure to risk is a result of the local socio-economic structure.. Fisher folk are the focus of this research, and the three cases in this research also prove that they are at the receiving end of risk created by structural and environmental governance. Risk governance aimed at preventing massive demonstration has become a critical challenge in the context of changing economic interests.

Marchi (2003) argues that risk governance is a popular expression related to the precautionary principle, risk governance can be interpreted as a bridge combining the idea of ‘sound’ science with that of democratic participation. Risk governance is a combination of science and social rights in the specific context of democracy. Also, it is a project of governing the interface between society and risks, including environmental risks. It is, as Habermas (1987:131) articulated, the governing of the life world of individual and society. The life world is intuitively present, in this sense, familiar and transparent, and at the same time, a vast and incalculable web of presuppositions that have to be satisfied if an actual utterance is to be at all meaningful, that is, valid or invalid. The life world of the fisher folk affected by Tsunami, coastal erosion and Ockhi is completely governed by the science of prediction and the political power of the State. The fisher folk studied in this research are equally exposed to cumulative and structural risks associated with the area and governance. The concept of resilience is still alien to the community. A resilient community understands the risks of future disasters. It is financially, physically, socially and mentally well-prepared to minimize impacts, recover quickly and emerge stronger than its pre-disaster state. Resilience is influenced by the awareness of a community about its risks, but is also dependant on

the strength and diversity of the economy, the robustness of the built environment and the conditions of the local natural environment. Preparation, planning and well-practised emergency response arrangements, including a strong volunteer base through individuals and volunteer organizations, is central to building resilience. Figure 1 is a pictorial representation of a model of resilience.



Source: Based on Paton and Johnston (2001)

Cutter et al (2008) defined resilience as *"the ability of a social system to respond and recover from disasters and includes those inherent conditions that allow the system to absorb impacts and cope with an event, as well as post-event, adaptive processes that facilitate the ability of the social system to re-organize, change, and learn in response to a threat".* Magis (2010) observed that resilient communities cope with, adapt to and shape the change caused by risk and uncertainty. It is also about protecting community resources, engagement with community resources, active agents, collective action, strategic action, equity, and impact. This explains why resilience building is the most critical challenge in disaster-prone areas. It needs an interface between risk governance and development. Hence, the ideal governance in such a setting requires, as Rose and Miller (1992) argue, political power exercised through a profusion of shifting alliances between diverse authorities from projects governing a multitude of facets of economic activity, social life and individual conduct. However, the present day political administration is confined to routine administrative delivery, and hence, there is less scope for accommodating the risk experience of vulnerable sections. This results in an institutional crisis which has been manifest in multiple forms. The case studies undertaken in this research are meant to capture the challenges experienced by the fishing community that prevent resilience-building in these areas.

3.1 Method of Study

This study follows mixed methods. The study had taken three critical geographical areas and themes. The study focuses on the cumulative risk and vulnerability resulting from the Indian Ocean Tsunami of 2004, persisting coastal erosion in Kollam and the governance of Ockhi Cyclone of 2017.

a) Focus group discussions and semi-structured interviews with the help of an interview schedule were employed to collect data from the community, community organizations and government officials in Kollam on the impact of coastal erosion on livelihoods.

b) Focus group discussions with community members were used to assess the impact of development projects in the area on the disasters as well as their environmental impact.
c) Data were collected from Tsunami rehabilitation colonies with the help of a semi-structured interview schedule focusing on livelihood, social taboo and the idea of rehabilitation as disaster risk reduction.
d) In-depth data on the impact of the Ockhi cyclone on livelihood of the fishermen, the government's response, and the articulations of risks by concerned agencies was gathered from the community, community organizations, political actors, bureaucrats and the general public, using qualitative research tools.
e) The performance of disaster management institutions in Kerala from the 2004 Tsunami to 2017 Ockhi was assessed and their evolution was studied.
f) Consultations with experts were undertaken to gather suggestions to address coastal erosion, disaster rehabilitation and governance, in order to recommend potential remedial measures.
g) A detailed micro-level assessment of the fishing economy in the study area was conducted to understand the implications of coastal hazards for the fishermen's household economy and the overall region.

The aforesaid data were analysed on the basis of a political economy framework to achieve more clarity about the institutional engagement in the area, demonstrations of power relations and developmental changes.

Conclusion

Building resilience is considered as the best method of disaster rehabilitation and also for risk reduction. The idea of resilience is an encompassing concept, yet it is existence depends on various institutional interventions. There must be a specific framework to assess the resilience and hence one model would guide the process and the impact depends on social and economic changes among the community. Disasters displace the developmental support and push the affected community into vulnerable conditions. So, survivors demand for resilience is not limit to a single model or approach. The community look for an integrationist approach which particularly focuses on building economic and social resilience to prevent the secondary impact of disasters and risk reduction. The coming four chapters discuss how the idea of resilience is missing in the present day disaster risk governance and management in the context of Kerala.

Chapter IV

Fisheries Economy and Coastal Economy

Introduction

Fisheries sector in Kerala is one of the most dynamic primary sectors that accommodates a large section of working population living in the coastal area. The coast and coastal community co-exist to contribute to the economy and the society. The coastal communities make up the coast, and its social and economic existence. Fishing is the most significant activity in the coastal area and it has been the same for decades till the non-fishing economy entered the coasts. The Economic Survey 2016-17 of Kerala State Planning Board Kerala has listed that Kerala has 10,28,000 fishing population and interestingly, the number keep fluctuating; it was 11,52,000 in 2011 as per Economic Review; the number of active fishermen registered in the Kerala Fishermen Welfare Board[3] in 2015-16 was 2,33,126. The number of active fishermen in Kerala in 1959 was 10,00,00, in 1991 the number was 2,16,710, and in 2004 it was 2,20,000[4]. It shows that the rate of increase in the number of active fishermen is not very high. The number is not much high compared from 1959 to 2018; this is precisely because of the peculiar nature of skill set required for the profession. Refer to Table 4.1 for the details of district-wise fishermen population in Kerala.

[3] Economic Review 2016-17, Kerala Planning Board,
[4] Economic Review varies years, Kerala Planning Board,

Table 4.1 District-wise Distribution of Fishermen Population in Kerala 2016-17 (Estimated)										
Sr. No.	District	Marine				Inland				Marine & Inland (Total)
		Male	Female	Children	Total	Male	Female	Children	Total	
1	2	3	4	5	6	7	8	9	10	11
1	Thiruvananthapuram	63544	56116	49879	169539	449	523	448	1420	170959
2	Kollam	39988	33588	19909	93484	13579	12785	8186	34550	128034
3	Pathanamthitta	0	0	0	0	937	814	379	2130	2130
4	Alappuzha	51703	47237	30195	129135	25140	24080	13017	62237	191372
5	Kottayam	0	0	0	0	9880	9373	5807	25060	25060
6	Idukki	0	0	0	0	269	270	171	710	710
7	Ernakulam	28856	27030	17001	72886	23847	23339	16944	64130	137016
8	Thrissur	21424	21739	13086	56249	7969	7296	4614	19878	76127
9	Palakkad	0	0	0	0	868	857	877	2603	2603

10	Malappuram	35532	28676	26106	90315	1819	1585	856	4259	94574
11	Kozhikode	39074	33963	25993	99030	4195	4419	3431	12045	111075
12	Wayanad	0	0	0	0	77	82	78	237	237
13	Kannur	16021	11839	10167	38027	2435	2575	1379	6380	44407
14	Kasaragod	17478	16248	9848	43573	416	394	184	994	44567
	State	313620	276435	202183	792238	91880	88390	56372	236642	1028880
Source: Directorate of Fisheries										

Table 4.1 explains that 77 percent of the population belongs to marine sector, and hence, the fisheries policy of the State is predominantly dominated by the marine sector. Kerala coast is highly dense compared to other areas of the country. Kerala coast is 2,168 persons per Km2, whereas the State average of the country is 859[5] i.e., the physical space available for the fishermen is low; and hence, for other support systems as well. The latest data shows that Kerala has 220 fishing villages; the number of fishing villages remains the same since 1959; in 1959 the number of fishing villages was 236. Table 4.2 gives details of district-wise fishing population and fish landing in Kerala.

4.2 Fishing villages and Fish landing in Kerala

District	Villages	Population	Fish Landings
Alappuzha	27	113121	126466
Ernakulam	22	113651	23175
Kannur	11	60490	24546
Kasaragod	16	47523	17773
Kollam	27	100231	119516
Kozhikode	34	106275	87952
Malappuram	23	87270	28679
Thrissur	18	79494	68283
Thiruvananthapuram	42	183235	47299

Source: Kerala State Coastal Area Development Corporation

Fishing villages close to each other share similar characteristics and amenities. Not all coastal areas can be considered as fishing villages; it is an area where a set of people live and follow fishing and allied activities as the main source of income. The development indicators of fishing villages hardly match with the general development indicators of Kerala. The Kerala Human Development Report 2005 was the for the first time report the coastal communities in Kerala are facing high child mortality, low electrification of houses, poor access to drinking water and sanitation etc.

[5] http://www.fisheries.kerala.gov.in/index.php?option=com_content&view=article&id=76&Itemid=44

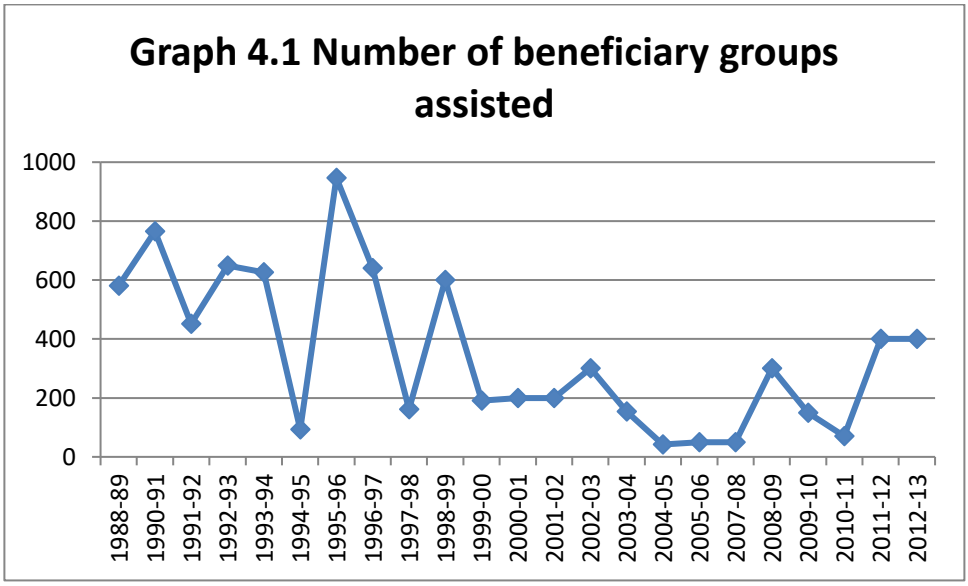
Also The Kerala Development Report 2008 has listed the socio economic progress among the fishermen community from 1956 to 1975; however, the report made it clear that such change is not happening after 1975. The changes in the priorities have shifted the focus from fisher folk development to fisheries sector development. The survey identified a set of reasons which push the fisher folk from mainstream development such as a) open access mode of resource use along with the lack of knowledge of community on exploitations, b) export oriented capital intensive fishing, c) low educational attainment, d) role of organized religion in denying a class identity to the fisher folks, and e) poor socio political movement with the community. There has been change in the government's approach to fisheries sector and the coasts; for instance, the increasing number of heavy investments and fishing vessels never match with any sustained increase in the living standards of the fishermen. The community keeps surviving with the fluctuating income and poor options for livelihood diversifications. The most visible change occurring in the fishing sector is the increasing use of mechanized and motorized crafts.

Table 4.3 Craft Under Operation

Year	Category of craft		
	Mechanized	Motorized	Non-motorized
1988-89	3548	9914	20545
1998-99	4040	27094	21598
1999-00	4194	28829	21751
2000-01	4150	29144	21854
2001-02	4150	29395	21956
2004-05	2355		25812
2005-06	5504	14151	9522
2006-07	5504	14151	9522
2007-08	5504	14151	9522
2015-16	5028	29345	2514

Source: Economic Survey, Kerala State Planning Board various years and Kerala State Fisheries Statistics 2017

Table 4.3 shows emerging trend in Kerala fishing sector. The number of non-mechanized crafts have reduced considerably from 1988-89 to 2015-16. About 78 percent reduction in the number of non-mechanized crafts has been reported in these 27 years. Such a massive increase in the number of mechanized and motorized crafts is due to the consistent support of various government agencies to improve the fishing activities of the community. Both Central and State government institutions offer financial support to modernize the fishing crafts. It is one of the successful projects in the coastal areas. This scheme is implemented with the help of 50% subsidy by Central Government sponsored schemes. It provides subsidy of Rs 30,000 per unit to fix motors below 10HP of already-motorized crafts. The scheme is implemented through Matsyafed. The graph shows the trend of motorization/modernization of country crafts in Kerala. Refer to Graph 4.1.



Source: Kerala Marine Fisheries Statistics 2015

It is evident from Graph 3.1 that the number of beneficiaries has increased over a period of time, but again goes down since no new crafts are put into motorization process. Mechanization is meant to reduce the work pressure of the fishermen and offer better income. However, the monthly average income of the fishermen is still not satisfactory in order to ensure reasonable quality of life of the fishermen. The average annual income of the fishermen was Rs 542 per annum[6] in 1959; of course, the money value changed over six decades. However, the change in income is not much compared to the cost of living and standard of living of Kerala. The study by Salim et al (2017) compared the fishermen's income from different sectors and arrived at a comparison. The study is based on field data and it is essentially proved that the income of the fishermen in Kerala is not improved much vis a vis the capitalization of the coastal resources. Refer to Table 4.4.

[6] Economic Survey, Kerala State Planning Board, 1959

Table 4.4 Average monthly income of respondent fishermen from different sectors

Sectors	Fishery	Labor	Agriculture	Business	Any other	Total
Marine capture	5719.7 (74)	1056.1 (14)	0.66	627.9 (8)	279.7 (4)	7684
Mari culture	3800.5 (58)	2620 (40)	-	93.4 (1)	88 (1)	6601.9
Inland capture	1284.4 (82)	206.5 (13)	9.9 (1)	17.5 (1)	44.4 (3)	1562.6
Brackish water aquaculture	752.1 (58.5)	92. 7 (7.21)	95.6 (7.44)	210 (16.35)	134.1 (10.44)	1284.5
Processing and marketing	3553.5 (62)	862.6 (15)	116.2 (2)	634.4 (11)	587.5 (10)	5754.2
Average	3022.0 (66)	967.6 (21)	55.6 (1)	316.6 (7)	226.7 (5)	4577.4

Source: Salim, Shyam S; R. Narayanakumar; R. Sathiadas; U. Manjusha and Bindu Antony .2017. Appraisal of the socio-economic status of fishers among the different sectors in Kerala, south-west coast of India. *Indian J. Fish., 64(1): 66-71, 2017*

4.1 Fishermen and Economy at the local level

The State level macro indicators reflect at the local level as well. The following part discusses the income and economic mobility of the fishermen based on the case studies from Azheekal, Eravipural and Vizhijnam area of Kerala coasts. What is common in these cases is that the local fishermen's income is not improving, in fact, it is stagnant for decades. The quality of life of fishermen is not subject to any major change along with the investment in the coastal areas. The number of fishermen who are practicing traditional methods and using non-motorized boats is decreasing, and the practice of mechanized fishing is catching up in these regions. The running cost of an inboard boat is Rs 5,00,000 per trip and expects at least double the investment as return to survive. Eighty workers are employed in such boats. It continues to operate for five days and every worker gets Rs 5,000 after deduction of all expenses. The selling or auction process primarily depends on earning better margin. The margin share between the owner of the boat and the workers works as the workers get forty percent of the margin whereas the owner receives sixty percent of the margin. A normal fiber boat needs Rs 10,000 per trip and about five people work on it. Earning depends on catch and the workers earn average Rs 500 to Rs 600 per day. Owner's net margin varies from Rs 1,500 to Rs 2,000. The price of diesel is the most determining factor; increasing price is indirectly proportional to the profit margins.

Fish auction at the harbor is an important process wherein the auctioneer directly engages with the fishermen and wholesale/retail purchaser. The fishermen, especially in boats, approach the auctioneer and the auctioneer acts between them and the purchaser; if the purchaser faces any financial issue, the auctioneer can arrange for it. The auctioneer gets five percent as commission. The auctioneer Mr Sreeram (47) is an experienced person and he was explained the difference between traditional and mechanized fishermen. Dealing with traditional fishermen is a time-bound process as the purchaser/auctioneer has to pay the cash on spot. Mechanized fishermen give time to arrange money. Mr Jayan is working as a fish worker on a boat for the last 22 years. He spends an average of 15 hours in the sea, and his average income is Rs 300 to Rs 400 per day. Mr Shiha is a traditional fisherman who uses his own *Kattamaram* and his earning depends on his work. He does not need to share his earnings with anyone, but the only problem he is facing is the price and proper access to market. He sells his fish in the local market and within his network. Mr Jaya and Mr Shiha spend about average 12 to 15 hours a day in the sea. It also depends on the fish catch and availability. They wait in the sea to get fish and never want to come back empty; hence, keep fishing till they get it. Therefore, working hours depend on the fish catch, and can never be counted in hours.

The coastal areas of Azheekal and Alappadu deserve special attention since Tsunami rehabilitation displaced the fishermen engaged in traditional non-mechanized fishing to harbor-based fishing. Those who could not replace the livelihood equipments and also had to give in to the restriction in the coastal area after Tsunami, became workers in the fishing boats. They moved from decentralized to centralized fishing which reduce the income of fishermen who had displaced from the Tsunami affected area. Similarly, the coastal erosion and displacement further impacted the household economy of fishermen in Kollam as well. The women fish vending workers interviewed for this research also explain that they earn Rs 300 to Rs 400 per day. They need to invest Rs 1,500 for fish, Rs 300 for auto rickshaw as normal auto rickshaws do not transport fishes. Average investment is Rs 1,800 and to maintain the margin they have to sell it at more than Rs 2,500 per day. Some days they face losses as the customers change their preference and they are forced to sell at low price as it is a perishable commodity.

4.2 Assessing the market and fixing the price

The fishermen follow very local centric and dynamic method to assess the market and price of the fishes. Once the fish reach to the shore, the fishermen do an assessment of prices in different harbors. In Azheekal and Alappad area fishermen can choose either Neendakara Harbor or Chereazheekal Harbor. This plays an important role in selling the fishes; once the harbor is fixed, they sell it either directly or through middlemen. Most of the times, they depend on middlemen since they know the buyer and local market conditions. Apart from direct income, there are many other factors that influence the income of the fishermen such as subsidy, price, and access to market. Infrastructure facilities in the coastal area are critical for enhancing the income of the fishermen. They look for support system from the government in terms of good quality equipments and direct financial support to buy it.

The fishermen from the Ockhi cyclone-affected Vizhinjan area of Thiruvanathapuram were also interviewed for this research. Church is active in the auction centres in Thiruvanathpuram. Auction is conducted by Matsyafed members and small fishes including Mackerel, Sardine and Squid are sold basket-wise, where a basket contains 30 kg. Big fishes including Tuna and Seer Fish are sold on the basis of number. The auctioneer charges Rs 50 if the selling price is above Rs 1,000, Rs 30 if the price is below Rs 1,000. Price depends on the availability of fishes and time. Refer to Table 4.5.

Table 4.5 The local realty of fishing

Overall boat cost per day	Rs 3,000 to Rs 6,000
Distance travelled	15 Km to 50 Km
Year of use of the boat	2 to 4 years
Fuels	90 percent Kerosene and 10 percent petrol (Kerosene Rs 35/1 litre)
Price of fishing net	Rs 75,000
Cost of full-fledged fishing boat	Rs 2 to Rs 3 lakh
Engine price	Rs 2.5 lakhs as the capacity
Working hours	12 hours
Source: Field Work	

The society charges 5% as commission and Church charges 2% as commission. The church collects 2 percent of the selling price as contribution from the auction place itself. Church has an agent in the auction centre itself. The agent assesses the value and charge Rs 2 per every Rs 100 worth sale. Church leaders says that they use the money for their welfare activities for the fishermen only and not for any other purposes. Refer to Table 4.6.

Table 4.6 The distribution of money is as follows:

Sr. No.	Agencies	Percentage of contribution (%)
1	Fishermen welfare	2
2	Loan and subsidy	1
3	Matsyafed	1
4	Welfare to the workers society	1
5	Contribution to Church	2
Total		7
Source: Field work		

June-September is the best season for fishing and about 2 to 6 workers engage in a normal fishing boat. Average profit per day varies between Rs 3,000 to Rs 7,000 depending on the catch and distribution among the workers. It is not daily income and it keeps changing; on an average, they get four days in a week, and daily income changes during off seasons. This is the common trend in the coastal villages of Vizhinjam. Refer to Table 4.7.

Table 4.7 Average income

Average number of working days per week	4 days in a week
Average income per day	Rs 500 to Rs 1,100
Loading charges from boat to auction centres	Rs 30 per bag

Source: Field work

The income of the fishermen is still at the subsistence level only and one cannot expect a higher economic mobility of the community with this limited and restricted income. Fishing as such is not able to ensure any substantial income to the community to overcome. Household income diversification is the option to achieve higher economic mobility. The case studies also present the fact that the community needs the support of supplementary income sources.

4.3 Fisheries Department and Fishermen

The two acts such as The Kerala Marine Fishing Regulation Act, 1980 and The Kerala Fishermen's and Allied Workers' Welfare Cess Act, 2007 are the guiding principles of Kerala's Fisheries sector. The Section 4 of The Kerala Marine Fishing Regulation Act, 1980 empowers the government to regulate the restrict or prohibit – (a) the fishing in any specified area by such class or classes of fishing vessels as may be prescribed, or (b) the number of fishing vessels which may be used for fishing in any specified area ; or (c) the catching in any specified area of such species of fish and for such period as may be specified in the notification, or (d) the use of such fishing gear in any specified area as may be prescribed. In making an order under sub–section (1), the Government shall have to consider the following matters, namely: (a) the need to protect the interests of different sections of persons engaged in fishing, particularly those engaged in fishing using traditional fishing craft such as Catamaran, Country craft of canoe, (b) the need to conserve fish and to regulate fishing on a scientific basis, (c) the need to maintain law and order in the sea, (d) any other matter that may be prescribed. This Act made government agency an indispensable part of fishermen in the State. The Section 3 of The Kerala Fishermen's and Allied Workers' Welfare Cess Act, 2007 is equally important as far as the economic existence of Kerala's fishermen is concerned. The Section 3 mentions that for Levy and Collection of Cess –

(1) Cess shall be levied and collected for the purpose of the Kerala Fishermen Welfare Fund Act, 1985 and the scheme there under, at one percent of the total sale proceeds of a dealer in a financial year.
(2) The cess levied under sub-section (1) shall be collected from every dealer in such a manner and at such a time, as may be prescribed.
(3) The cess levied under sub- section (1) shall be in addition to any cess, duty or tax levied on fish under any law for the time being in force.
(4) The proceeds of the cess collected under sub-section (2) shall be credited initially to the Consolidated Fund of the State in the manner, as may be prescribed. This enables the Fisheries Department to act, and community also gets a sense of ownership of the government institutions. This is the reason why there exists unparallel dependency on government welfare schemes offered by the Fisheries Department.

Welfare programmes of fishermen community are channelized through Matsyafed, a separate entity under the Fisheries Department. The following are the welfare schemes carried out by the Matsyafed and Fisheries Department of Kerala:

1. Group Insurance Scheme
2. Death while fishing or immediately thereafter, not due to accident
3. Financial assistance for the marriage of daughters of fishermen
4. Financial assistance for the death of dependants
5. Old age pension scheme
6. Financial assistance for temporary disability due to accident
7. Financial assistance to the dependents for the death of fishermen
8. S.S.L.C. Cash award and scholarship
9. Family welfare scheme
10. Financial assistance for treatment of fatal diseases

11. Chairman's relief fund
12. Special cases sanctioned by the board
13. Maternity benefit scheme
14. Cash award for higher education
15. Widow pension
16. Extension programme

ALLIED WORKERS WELFARE SCHEME

1. Group accident insurance scheme
2. Old age pension
3. Financial assistance to the dependants for the death of allied worker
4. Maternity benefit scheme for women allied worker
5. S.S.L.C. Cash award and scholarship
6. Cash award for higher education
7. Financial assistance for treatment of fatal diseases of allied workers
8. Family welfare scheme
9. Marriage assistance

The 24 schemes operated by Matsyafed are the great support systems for the community. Therefore, any changes in the approaches of Matsyafed and Fisheries Department do impact the life and livelihood of the community. These 24 schemes are not for any kind of infrastructure development or any area development. Each of these schemes is directed towards the household of fishermen community. No other community in Kerala is entitled to get such a household-based government support system. These could be otherwise considered as supplementary income supports to the community. Income from fishing and such support systems makes life move in the fishing areas of Kerala. It is a kind of inevitable dependency since the livelihood practices of fishermen are increasingly being subject to seasonal risks and uncertainties. For instance, the trawl ban during monsoon made most the fishermen experience unemployment and relative poverty, except a tiny fraction that used non-mechanized boats. However, the above mentioned schemes are not meant to offer any direct income benefits to the members. Still one could see a deep engagement of State in the life of fishermen community. Any such direct support of government could otherwise be considered as the presence of active welfare State. However, it does not mean that government spends huge amount for these schemes. A close examination of these schemes proves that these are not incurring any high cost to the government. Still, the agency is able to offer this support and give a sense of confidence to the community that certain entitlements are guaranteed. Every fishermen household is benefited by these schemes.

Micro credit is the most general and crucial support extended by the government agencies to the fishermen. Refer to Table 4.8.

Table 4.8 .National Minority Development Finance Corporation Supported Micro Finance

	No. of SHG	No. of Beneficiaries	Community		Gender		Area		Amount Disbursed	NMDFC Share
			Muslim	Christian	Male	Female	Rural	Urban		
2013-14	1469	14711	3340	11371	1142	13569	11264	3447	2222.2	1999.98
2014-15	2438	22063	4293	17770	1594	20480	13522	8541	3333.74	3000.366
2015-16	2037	20760	1946	18814	1683	19077	18029	4791	3333.25	2999.925
2016-17	1902	12900	1073	11827	584	12316	9939	2961	2222.7	2000.43
2017-18	1083	6368	273	6095	282	6086	4363	2005	1111.15	1000.035

Source: http://matsyafed.in/

NMDFC: National Minority Development Finance Corporation

Table 4.8 also reflects the crisis persisting among the micro initiatives. Along with reduction in the number of beneficiaries, the number of self help groups from 2014-15 to 2017-18 have also reduced. Still these schemes are the source of supplementary income for the community. The number of schemes and the members indicate the importance of State-led welfare in a country like India. The whole idea of Kerala Model of welfare expansion is dependent on institutionalization of State-led welfare schemes. More than the middle and upper class population, the poor and backward classes are more close to the government welfare schemes. It is evident in Kerala, since the depressed classes are more aware of the welfare schemes and even the method to access them. The fishermen community knows that these schemes are meant for them and how to access them.

It is quite surprising that though the fish production in Kerala is operating at its potential capacity, the quality of life of the fishermen is not subjected to any improvement. From 1992-92 to 2016-17, the fish production has varied between 5.95 lakh tonnes in 1992-93 to 6.76 lakh tonnes in 2016-17. Table 3.9 shows that the fish production in Kerala is not subject to any major change in terms of production. It not considered as a stagnation in production; it could be rather treated as the potential use of fisheries resources. Refer to Table 4.9.

Table 4.9 Fish production (Lakh tonnes)

Year	Marine	Inland	Total
1992-93	5.53	0.42	5.95
1993-94	5.59	0.45	6.04
1994-95	5.49	0.48	5.97
1995-96	5.33	0.5	5.83
1996-97	6.61	0.52	7.13
1997-98	5.11	0.58	5.69
1998-99	5.82	0.66	6.48
1999-00	5.94	0.74	6.68
2000-01	5.67	0.85	6.52
2001-02	5.94	0.78	6.72
2002-03	6.03	0.75	6.78
2003-04	6.08	0.79	6.87
2004-05	6.02	0.76	6.78
2005-06	5.59	0.78	6.37

2006-07	5.61	0.79	6.4
2007-08	5.86	0.81	6.67
2008-09	5.83	0.83	6.66
2009-10	5.7	1.17	6.87
2010-11	5.6	1.21	6.81
2011-12	5.53	1.4	6.93
2012-13	5.31	1.49	6.8
2013-14	5.22	1.86	7.08
2014-15	5.24	2.02	7.26
2015-16	5.17	2.1	7.27
2016-17	4.88	1.88	6.76
Source: Economic Review various years			

The export sector has shown an interesting trend. Kerala's share in fish quantity was 23 percent of the national export in 1992-93; this trend was maintained till 1999-2000. Kerala's share in total quantity of export started declining from 2002-03. Refer to Table 4.10.

Table 4.10. Export of marine products from Kerala vis a vis India

Q. Quantity in Metric Tonnes V: Value in Rs Crore				
Year		All India	Kerala	Share of Kerala in %
2006-07	Q	612641	108616	18
	V	8364	1524	18
2007-08	Q	541701	100318	19
	V	7621	1431	19

	Q	602835	101000	17
2008-09	V	8608	1569.82	18
	Q	678436	107183	15.79
2009-10	V	10048.53	1668.49	16.6
	Q	813091	124615	15.33
2010-11	V	12901.47	2002.1	15.52
	Q	862021	155714	18.06
2011-12	V	16597.23	2988.33	18
	Q	928215	166399	17.93
2012-13	V	18856.26	3435.85	18.22
	Q	983756	165698	16.84
2013-14	V	30213.26	4706.36	15.58
	Q	1051243	166754	15.86
2014-15	V	33441.61	5166.08	15.45
	Q	945892	149138	15.77
2015-16	V	30420.82	4644.42	15.27
	Q	1134948	159141	14.02
2016-17	V	37870.9	5008.54	13.23
Source: Economic Review various years				

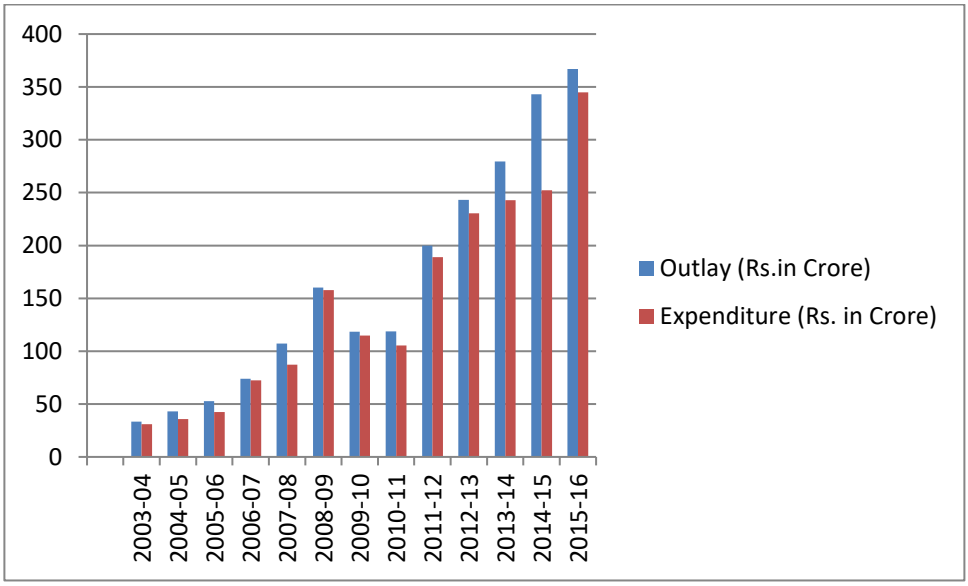
The export performances of Kerala's fisheries have come down to 14.02 percent in 2015-16 from 23 percent in 1992-93, despite of government investment in fishers sector. Fisheries Department and Matsyafed are the two entities operating exclusively for the fisheries sector under a ministry in the State. There have been many specific social security schemes for fishermen through Kerala Fishermen's Welfare Fund Board (KFWFB). Right from group insurance to widow pension, KFWFB finances and supports the fishermen. Matsyafed is also involved in livelihood promotion schemes and providing financial assistance to fishermen. Apart from that the government's 12th plan outlay of fisheries and coastal area development shows the emerging trend in the coastal areas. Table 4.11 proves that plan outlay for the year 2015 to 2017 for fisheries sector and coastal area move together.

Table 4.11. 12th Plan for Fisheries and Coastal Area Development – outlay and expenditure (Rs in lakh)					
Sr. No.	Year	Fisheries		Coastal Area Development (CAD)	
Plan Outlay		Plan Outlay	Expenditure	Plan Outlay	Expenditure
1	2012-13	14200	13792.11	6400	4869.27
2	2013-14	15780	13563.19	5835	4875.83
3	2014-15	17740	14679.32	8727	4772.3
4	2015-16	17840	14476.62	18937	20117.66
5	2016-17	16930	19039.1	19700	19083.7
	Total	82490	75550.34	59599	53718.76
Source: Economic Review 2017					

This is going to be a new trend in Kerala's fisheries sector and more emphasis is being given on coastal area development rather than fishermen. It is evident from the stagnant income of the fishermen on ground. There is considerable increase in the budget allocation for fisheries sector; however, as mentioned above, in the last two years, the coastal area development has received more funds than fisheries sector i.e., it is more than 50 percent of the total allocation to fisheries sector all together

Though the preference is shifted to area development, 2014 onwards it is indeed reflecting the changing policies of fisheries sector. Refer to Graph 4.2.

Graph 4.2 Coastal Investment pattern



Source: Economic Review, Government of Kerala, various issues

The fisheries still contribute substantial income to the Kerala economy. Table 4.12 reflects the contribution of fisheries to the Kerala economy. A close examination of the table also proves that the sector's contribution to the State economy has not improved much in the last five years. There is stagnation in the fishing sector; however, no assessment has been done on this approach in the sector.

Table 4.12. Contribution of Fisheries sector to Gross State Value Added (Base Year 2011-12) (in crore) Constant Price

Category	2012-13	2013-14	2014-15	2015-16 (Provisional)	2016-17 (Quick)
Gross State value added (at basic prices)	356354.7	371651.5	385869.6	402352.73	424588.9
Fishing and Aquaculture	3764.19	3978.45	4313.62	3979.49	4051.44
Share of fisheries sector in GSVA	1.06	1.07	1.12	0.99	0.95

Primary sector	51357.6	49409.05	51508.76	45486.87	47846.23
Percentage share of primary sector in GSVA	14.41	13.29	13.35	11.31	11.27

The stagnation in contribution does not restrict both the public and private investment in the sector. There is still demand for infrastructure development in the fisheries sector. Table 4.12 indicates new trend in Kerala's fisheries sector. The number of fishing harbors is on the rise in Kerala. Refer to Table 4.13 for details about the fishing harbors in Kerala.

4.13 Fishing Harbors in Kerala

Sr. No.	Completed	Sr. No.	Under construction	Sr. No.	Proposed to be constructed
1	Thankassery	1	Vizhinjam	1	Poonthura
2	Neendakara	2	Muthalappozhy	2	Valiyathura
3	Kayamkulam	3	Chethi	3	Varkala Chilakkoor
4	Thottappally	4	Arthunkal	4	South Paravoor
5	Munambam	5	Chellanam	5	Punnapra
6	Ponnani	6	Chettuva	6	Parappanangadi
7	Beypore	7	Koyilandi	7	Puthiyangadi
8	Puthiyappa	8	Thalai	8	Pathiyankara
9	Chombal	9	Kasargod	9	Ajanoor Kadappuram
10	Mopla Bay	10	Thanur	10	Kaipamangalam
11	Azheekal	11	Vellayil		
12	Cheruvathoor	12	Manjeswaram		

Source: Harbor Engineering Department

Table 4.13 indicates the changing nature of coastal area development and preferences of government in the coastal area. The Economic Survey 2017 mentioned the ongoing harbor construction cost to be Rs 56,365.67 lakhs. Harbor and ports are the priority list of Government of India's infrastructure development projects under public private partnership. Increase in number of harbors is seen along with decline in other traditional

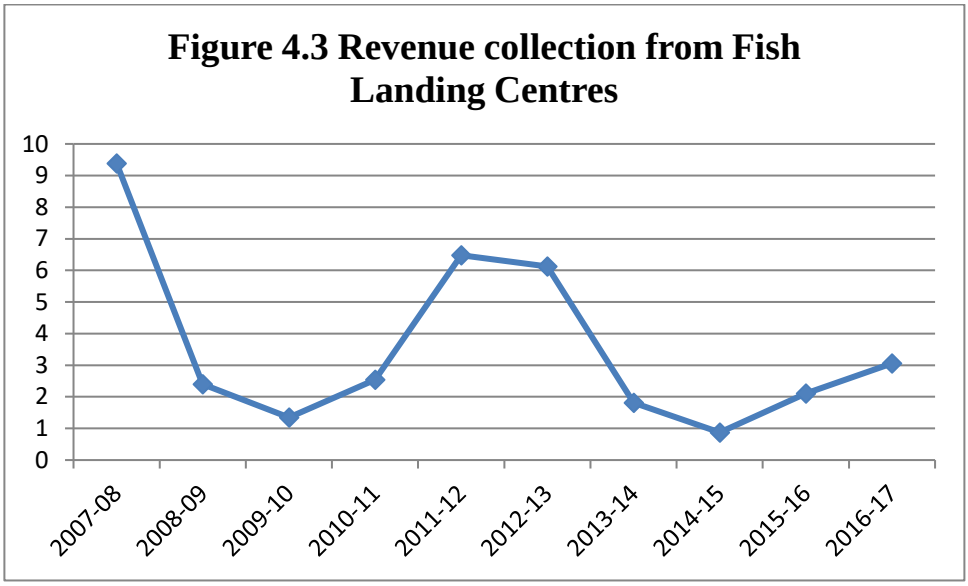
fishing practices. Decentralized fishing and non-mechanized fishing are not getting its due attention from the State and on the other hand, too much importance is being given to the centralized and highly capital-intensive fishing. It is evident from the difference in total revenue collected from harbor and fish landing centres in the State. Revenue collection from the fish landing centres is decreasing considerably in the last one decade. Table 4.14 shows the trend in revenue collection from fish land centres. The declining revenue has to be assessed with reference to the income of the fishermen who are working and selling fishes, and then too are getting less income. However, worth considering fact is that the revenue from fishing harbor also has not increased at a higher rate during this decade.

Table 4.14 Details of Revenue Collection in Various Fishing Harbors and Fish Landing Centres. (Rs in Lakh)

	Fishing Harbor	Fish Landing Centres
2007-08	225.117	23.319
2008-09	303.989	7.48
2009-10	355.02	4.856
2010-11	400.154	10.431
2011-12	389.08	26.96
2012-13	408.3	26.64
2013-14	501.3	9.28
2014-15	486.67	4.29
2015-16	413.33	8.9
2016-17	293.3	9.24

Source: Kerala Economic Survey various years

The revenue from fish landing centres is decreasing at a higher rate. Refer to Graph 4.3.



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Source: Source: Kerala Economic Survey various years

4.4 The new fisheries economy and disaster risks

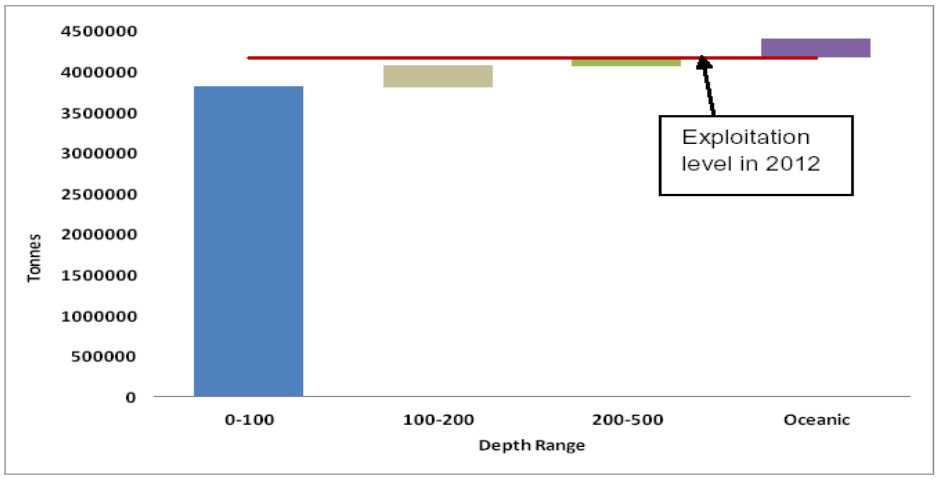
Fisheries Economy of Kerala is moving towards a highly capital-intensive sector; hence, the above-mentioned investments on coast and harbor are necessary. Deskilling and occupational displacement are the serious issues pertaining to the coast and the community. Coasts are changing and more non-fishing and export centric industrial establishments are concentrating on the coast. A new concept called 'Blue Economy' is stepping in. Smith-Godfrey (2016) defined blue economy as a process of extracting ocean resources by developing heavy industries. In 2015, the Economist's Intelligence Unit of 2015,5 in its report defined blue economy as "*A sustainable ocean economy emerges when economic activity is in balance with the long term capacity of ocean ecosystems to support this activity and remain resilient and healthy*". It refers to an efficient economic use of ocean resource and the areas. The World Bank in 2017 elaborated this concept in detail. As per the report, a blue economy is low-carbon efficient and clean economy. It is an economy, which is based on sharing, circularity, collaboration, solidarity, resilience, opportunity, and interdependence. The crucial part of the blue economy, which World Bank defined, is that it includes establishing ocean industries such as coastal development, shipping, and port infrastructures. Doyle (2018) argues that blue economy considers ocean as a share development space. Mr Nitin Gadkari, the Minister for Shipping, Road Transport & Highways, and Water Resources, River Development & Ganga Rejuvenation in 2017, also refers that blue economy is providing to be catalyst for India's progress and is helping establish ports[7]. It was an official acceptance of blue economy in the country;

[7] Press Information Bureau Government of India Ministry of Shipping. 09-November-2017 17:59 IST. http://pib.nic.in/newsite/PrintRelease.aspx?relid=173352 (Accessed on 28th September 2018)

however, the Meenakumari Commission report had, in fact, directly supported the importance of blue economy in 2014.

The report made an interesting statement that the economic liberalization in India was started in 1966 with Green Revolution. In 1985, Ms Indira Gandhi attempted to open up the reserved public sector to private sectors. The third attempt was in 1991. Liberalisation privatisation initiated in 1991 was set the tone of the commission report. The Committee observed that the 1992 New Deep Sea Fishing Policy demanded for joint venture and leasing for deep sea fishing. It further reports that exploitation of off-shore resources in Exclusive Economic Zone (EEZ) would have to be reconsidered in terms of the existing infrastructures available in the EEZs. Therefore, the Committee indicates the need for comprehensive and implementable Monitoring, Control and Surveillance on commercial fisheries resources. On page number 63, the Meenakumari Commission report made it clear the, G*overnment further realized that most of the deep sea fishery resources were available beyond the conventional fishing limits and fishing capability of the indigenous craft and such resources could be gainfully exploited only if upgraded and sophisticated vessels of adequate size and capabilities were inducted into the fishery. The Policy also underscored the need for a departure from the open access concept in the territorial waters, putting in place stringent management regimes and promoting exploitation in the deep sea and oceanic waters for reducing fishing pressure in the traditional fishing areas.* It is a very straight forward suggestion and it demands opening up the deep sea fishing sector to the high-tech vessels. To justify the argument, the Committee refers to Kerala's poor capability in exploiting the marine resources. The Committee reports that the Maximum Sustainable Yield (MSY) up to 200 meter of depth in 1989 was 7,95,300 tonnes and in 2012 it was 8,39,185 tonnes. The graph presented in the Meenakumari Commission report justifies its suggestions by referring the lack of resource exploration in the country. Refer to Graph 4.4.

Graph 4.4 Potential of Deep Sea fishing



Depth-wise potential and current level (2012) of catch in the Indian EEZ

Source: Meenakumari Commission report

The Committee is very clear about permitting foreign vessels for deep sea fishing and this recommendation of the Committee invited resistance from the fishermen. The Committee report and blue economy resulted in another mass coastal development project called the Sagarmala Programme.

The following are the components of the Sagarmala programme:

a) Modernization & New Port Development
b) Port Connectivity Enhancement
c) Port-linked Industrialization
d) Coastal Community Development

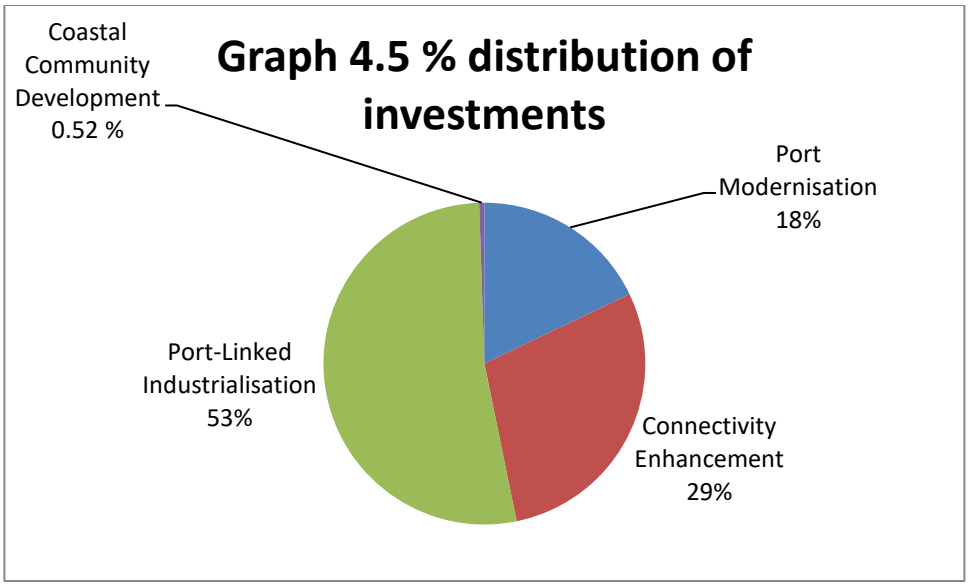
About 415 projects costing Rs 8 lakh are being calculated for it. It is going to be public private partnership project[8]. Table 4.15 gives the detailed account of the projects and the graph shows the percentage share of each sector.

Table 4.15. Project Details of the Sagarmala Programme

Sr. No.	Project Theme	No. of Projects	Project Cost (Rs in Crore)
1	Port Modernization	189	142,828
2	Connectivity Enhancement	170	230,576
3	Port-Linked Industrialization	33	420,881
4	Coastal Community Development	23	4,216
	Total	415	798,500

Source: http://pib.nic.in/newsite/PrintRelease.aspx?relid=159037 (accessed on 29th September 2018)

[8] http://pib.nic.in/newsite/PrintRelease.aspx?relid=159037 (accessed on 29th September 2018)



Source: Source: http://pib.nic.in/newsite/PrintRelease.aspx?relid=159037 (Accessed on 29th September 2018)

Community development gets only 0.52 percent of total investment and port-linked industrialization gets higher share of the investments. Refer to Graph 3.5.

4.5 Conclusion

This chapter explained the coastal economy of Kerala in the context of mounting disaster risks. It is quite evident from the data that there is no considerable reduction in the fishermen's social and economic vulnerability, and the new fisheries sector development projects are not meant to ensure the well being of the fishermen. Fisheries and fishermen's economy is in a stagnant stage for decades, and fisheries economy is now centered on coastal area resources and high capital intensive fishing, which are not all inclusive, and is also environmentally destructive. The coastal disasters in Kerala need to be studied in this critical context. The heavy capital investments and resource based developmental approach are piling up environmental risks. The following chapters discuss this issue in detail based on three disasters occurred (ing) on the Kerala coasts.

Chapter V

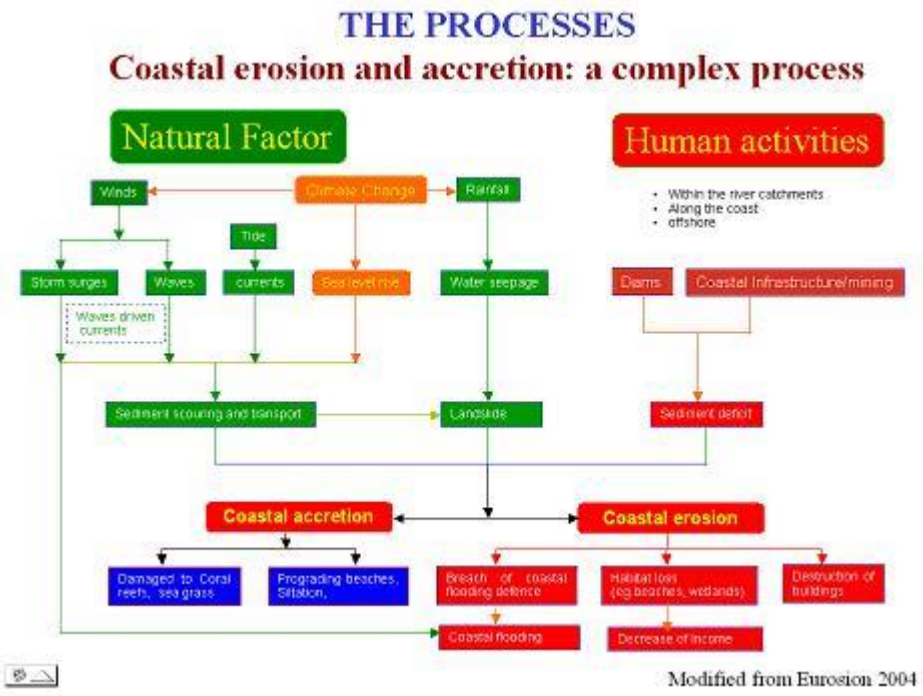
Coastal Erosion: The Recurring Disaster and Lack of Solutions

Introduction

Coastal erosion due to large scale commercial use of coastal areas is recognized as a country -wide problem in India. Every coastal State in the country has experienced this crisis and failed to prevent it as well. While there are both natural and manmade causes of coastal erosion, harbors and breakwater projects are the determining factors. Vaidya et al (2015) found that coastal erosion is largely caused by natural effects such as occurrence of storms or presence of headlands and also due to construction of artificial barriers such as breakwaters and groins etc. Central Ground Water Commission Report on coastal protection and development in India in 2016 came out with data that 45.5 percent of the coastline is affected by erosion in India. The report (2016:14) defines coastal erosion as follows: "*a coastline is a complex series of interlinked physical systems in which both offshore and onshore processes are involved. Coastal Erosion is one of these physical processes, wearing away and redistributing solid elements of the shoreline as well as sediment, normally by such natural forces as waves, tidal and littoral currents and deflation. Erosion occurs when material being removed, for deposition elsewhere, exceeds the rate of supply finally resulting in the landward shifting of the shoreline".* The report further explains, "*Waves are the main cause of coastal erosion. Wave takes birth in the mid ocean and moves towards the coast. Waves bring an enormous amount of energy to the coast that is dissipated through wave breaking, generation of currents, water level changes, and movement of sediment, turbulence and heat".* Science tells us how erosion is created across the coast, and the local community living on the coast experiences the same. The community perspective may not be the same as that of the scientific community, yet there is a mutual acceptance of the problem.

The commission report (2016:15) specifically stated that an assessment done in 1960s proved that Kerala State is worst affected by coastal erosion. This assessment found that about 57 percent of the Kerala coast is vulnerable to erosion. The report also argues that work for prevention of coastal erosion began during the nineteenth century. Another assessment, conducted in 1980s, indicated that about 85 percent of the Kerala coast was in the grips of erosion. The commission report gives a detailed account of the causes of coastal erosion. The natural causes are waves, winds, tides, near-shore currents, storms, and sea-level rise etc. Catastrophic events such as storms, tidal surges and cyclones cause the sea-level to rise and lead to severe erosion. Climate change is an important factor which erodes the Kerala coasts. The list of manmade reasons for coastal erosion is a long one, including coastal defense structures, river regulation works, dredging aggregate extraction/ sand mining, oil/gas exploration (in the form of long-term subsidence), and ports/harbors that impact sediment transport etc. The commission report also listed the following reasons for coastal erosion: a) Building houses via land reclamation or within sand dune area, b) Construction of Harbors, c) Sand removal above replenishable quantities from the coast, d) Groins and jetties and other structures on the coast/shoreline that interfere with long shore sand transport and can result in erosion when ill-designed, e) Structures such as seawalls, bulkheads and breakwaters with side effects in terms of erosion of adjacent areas, f) The mining of sand/gravel along the beaches and in the surf-

zone, and g) The maintenance dredging of harbors, navigational channels and tidal inlets that causes loss of sand from the littoral zone and the sand being dumped into the deep sea.



Source: http://www.fao.org/docrep/010/ag127e/AG127E09.htm#fg42

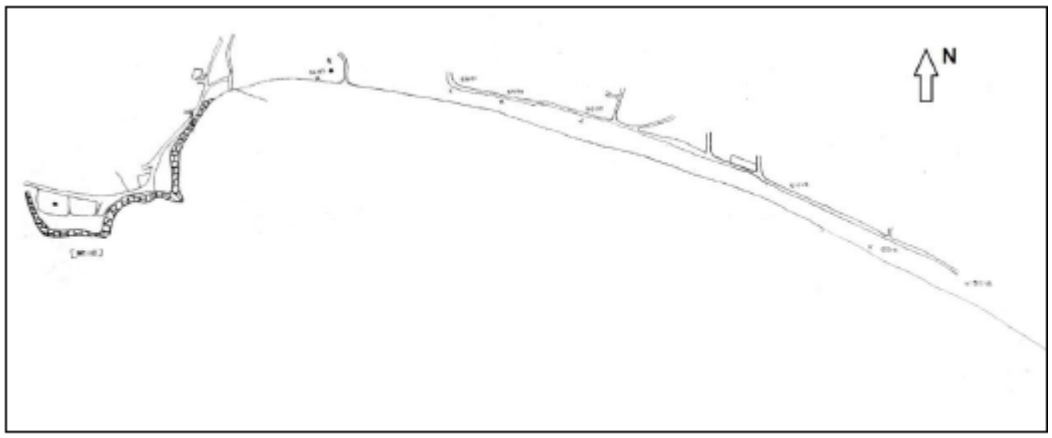
Coastal erosion is one of the most common disasters with anthropogenic causes across the world. Kerala is not an exception as the coastal erosion is a result of massive structural interventions on the coasts. Kerala had temporary coastal erosion, which gradually became permanent in nature. Coastal erosion had been an issue for the community since a long time; however, the severity was within the capability of the community to manage as it used to be temporary. Beaches used to erode during the monsoon and return to their normal states within a couple of weeks.

5.1 Coastal Erosion in Kollam and Eravipuram Areas

The community used to manage the erosion until 1985, when the Thangassery Harbour and Breakwater project initiated. A fishing harbor existed in Thangassery decades ago, but it did not pose any major environmental risks. The topography of the Thangassery harbor in 1957 is shown below[9].

[9] Baby Girija D.K. PhD Thesis. Hydrodynamic Investigations on Nearshore Morphological Changes due to Construction of Breakwaters through Case Studies. Amet University 2015

Graph 5.1: Shoreline change: Kollam coast

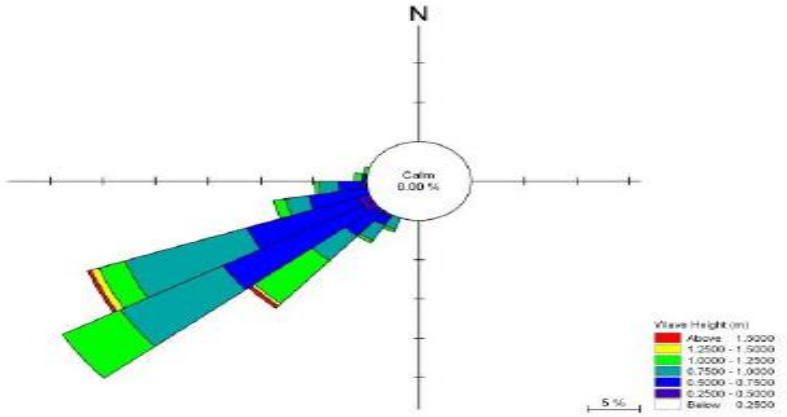


Topography of Thangassery Fishery Harbour (1957)

Source: Girija (2015)

Graph 5.1 shows the 1957 images. It is a known fact that the height of the waves changes along with harborharbor and breakwater projects. Girija (2015) assessed the wave height pattern in the Thangassery harborharbor area (see Graph 5.2).

Graph 5.2: Wave Height



Wave height Distribution for the month of January 2013

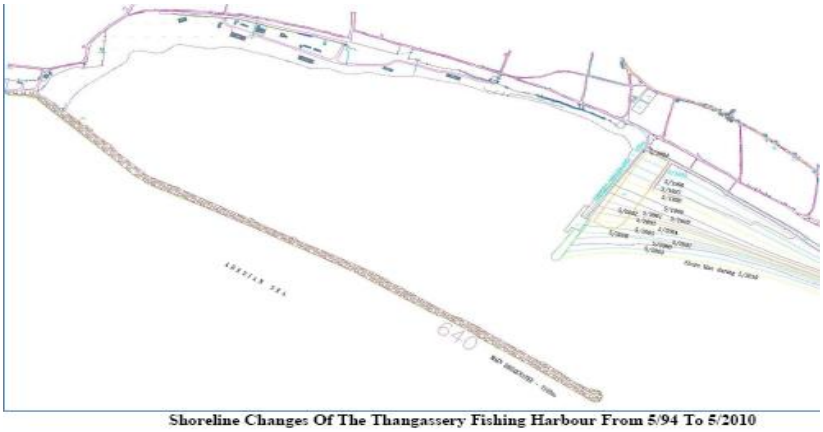
Source: Girija (2015)

Girija (2015) assessed the tidal range in the area and found that the maximum range observed was 110mm, during spring. The following tidal parameters were assessed: MHHWL[10] - 0.91M, MLHWL[11] -0.85M, MLLWL[12] - 0.30M and MHLWL[13] - 0.61M. The

[10] MHHWL-Mean higher high water level
[11] MLHWL-Mean lower high water level,
[12] MLLWL- Mean lower low water level
[13] MHLWL- Mean higher low water level

maximum tide height at the Thangassery fishing harbor was 1.10m and the minimum tide height was 0.20m. The accretion level is decides the level of coastal erosion (see Illustration 5.3).

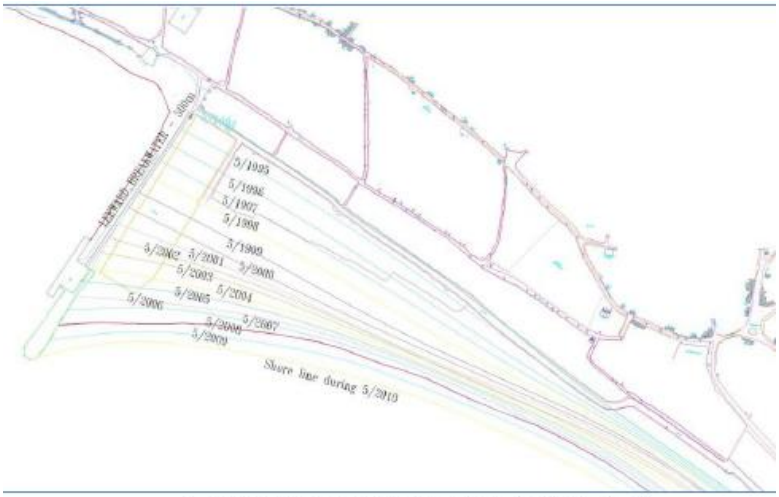
Illustration 5.3: Level of Erosion in Kollam Backwater Area



Shoreline Changes Of The Thangassery Fishing Harbour From 5/94 To 5/2010

Source: Girija (2015)

Illustration 5.4: Erosion and Beach Formation in Kollam Backwater Area



Enlarged View Of The Shoreline Changes From 5/94 To 5/2010

Source: Girija (2015)

Illustration 5.3 and 5.4 show the real impact of the harbor i.e., the shoreline changes. Girija (2015) also assessed that during the 2011-13 period, about 600 m of sediment accretion/ erosion occurred in the Thangassery breakwater project area. About 72,000 m^3 of materials eroded from the main breakwater side during 2013 and 2014. Apart from that, an accretion of 18000 m^3 has been noticed in this place. Girija (2015) also conducted an analysis on the leeward side of the Thangaseery harbor and breakwater, which indicated erosion of about 18,000 m^3 during 2011 and 2013, and accretion of about 1,92,000 m^3 during 2013-14, towards the northern direction of the coast. . This scientific assessment corroborates the

argument by the local communities that the harbor led to erosion and also to resource inequalities. The public account committee of Kerala Niyamasabha[14] in 2008 had conducted an assessment of harbor construction. According to them, the cost of the Thangaseery harbor part I in 1985 was Rs. 9 crore, and part II, the expansion, was sanctioned for Rs. 10.10 crore. The committee made an interesting and critical observation that considering the proximity, the Neendakara and Tangasseri are a criminal waste of public money. The committee mentioned in the report that if the Thangassery harbor had shifted to Ambalapuzha, the coastal erosion in the area could have been prevented. This official record should be considered as open acceptance by the government that the Thangassery harbor results in environmental risks and coastal erosion.

Eroded Coast Eravipuram

[14] Committee On Public Accounts (2006-2008) Kerala Legislative Assembly. Fourth report on Fisheries and Port Department

Eroded Coast Eravipuram

The community would frequently lose their housing due erosion and hence, preferred not to build any concrete or permanent structure on the coast. Lack of permanent housing and recurring displacement were impoverishing the affected coastal communities. They had to stay in relief camps or their relatives' houses during monsoon months. Mr. Peter, a 51-year-old fisherman narrates the experience:

My family used to stay at the nearby school during monsoons, which used to be away from the beach, and had no other income to sustain. We used to live with others' support. Once the school opened, we used to move to relatives' houses. I spent my childhood like this and it continued till we moved into a colony built by Quilon Social Service Society, a church-based NGO, with the support of the Government of Kerala. We used to settle down in the same place where we had our house once monsoon ended; however, we could not go back to the areas since the harbor construction in Thangassery started. The sea did not give our land back and the real struggle started then. Our relatives are also like us, they could not support us. We became refugees and moved from one place to another; we used to stay in church premises, schools and temporary sheds of neighbors etc.

Fishing is originally a hard occupation. Hence, life became a double burden for displaced people, making them dependent on government schemes for rehabilitation. Later, in 1998, Mr. Peter got into the beneficiary list along with 98 other families, who were eligible for

2.5 cents of the land and a free 350 Sq Ft house[15] in Thanni area of Kollam coast. Every family had to pay Rs. 15,000 to Quilon Social Service Society (QSS) as their share. QSS was responsible for implementation of this rehabilitation project with cost sharing method. Government wished to relocate the people; however, it deliberately involved church NGOs to negotiate with the community, perhaps, for the influence of the Church on the local community. This helped the government in avoiding the ownership of the project, since it had many limitations.

All those relocated to this rehabilitated colony are fishermen who used to stay on the shore before moving. A few families did have land rights. However, many participants were reluctant to disclose their previous status in the Focus Group Discussion (FGD). Those who did not have the legal rights said that they had been living there for decades. Nobody wanted to disclose their pre-displacement land ownership issue. It was an attempt to hide their social conditions and vulnerability. The researcher was not interested in their pre-displacement property ownership. In fact, the focus was their present social vulnerability caused by displacement. Poor quality of sanitation is the biggest challenge for the community, coupled with less working space in the area, restricting their social mobility. There is no authentic data available on the number of people displaced by coastal erosion at the State level or at the district level. The researcher also filed a couple of requests under 'Right to Information' to the fisheries department to obtain the exact numbers.

As per the information received from the Directorate of Fisheries dated 01/03/2018, government of Kerala had implemented a project called 'Special Rehabilitation Package' for the fisher folk who lost their lands and houses in the coastal districts, providing financial assistance of Rs. 10 lakh per beneficiary (Rs. 6 lakh for purchasing land and Rs. 4 lakh for house construction). In the year 2017-18, Department of Fisheries has proposed this project to rehabilitate 750 fishermen families residing within a 50-metre zone of High Tide Line (HTL), beyond 200 metres of HTL. Approximately Rs. 150 crore has been sanctioned for this project in the year 2018-19 of which, Rs. 90 crore is for purchasing land for 1500 fishermen, Rs. 20 crore for building houses for 500 families, Rs. 8 crore for acquiring land for fishermen beyond 200m, and Rs. 32 crore for constructing flats for fishermen. Recurring coastal erosion has become a permanent risk within the 50 HLT of coastal Kerala. The fisheries department of Kerala has assessed those 18685 fishermen families to be displaced from 50 HTL areas in the Kerala coasts. This number is going to increase along with coastal erosion i.e development induces coastal erosion and5 50 HTL will change according to it. The livelihoods of the fishermen in these disaster prone coasts are likely to displace along with erosion.

It is also about displacing them from the existing livelihood practices. This risk needs to be discussed in the context that the government and fisheries department have no plan to protect the livelihood of fishermen affected by coastal erosion. Poor livelihood support systems force the fishermen not to accept the government offer for relocation. The fisheries

[15] An area of 350 Sq Ft is common to all rehabilitation projects in Kerala. This is the maximum space provided to the families by a free housing project.

department is not proposing any project to ensure the livelihood to the fishermen who have to be displaced[16].

See Table 5.1. State Government has to spend huge amount for it and land availability within the coastal area is also a constraint. Land away from the coast would gradually displace the community from fishing. The hazard becomes a disaster and which gradually push the community to live with risk and uncertainty[17].

Table 5.1 Details of Fisher folk Family with in 50M from sea

Slno	District Name	No. of Houses	No. of Members	No. of Children
1	Kasargod	1153	7418	1483
2	Kannur	1512	9120	2049
3	Kozhikode	2609	15691	3827
4	Malappuram	1806	12600	3684
5	Thrissur	408	1855	366
6	Ernakulam	1618	7302	1449
7	Alappuzha	4660	20332	3680
8	Kollam	1580	6351	1343
9	Thiruvananthapuram	3339	18292	4468
Total		**18685**	**98961**	**22349**

Source: Fisheries Department Kerala

[16] I met a group of fishermen who still use single boat for fishing in the Thani area where they have access to beach between two groins. They said if they accept the project they cannot buy land build house with Rs 10 lakhs and also they have not got any assurance from fisheries department to protect the livelihood. They use beach for dry fishes and it has good local market which are dependent on their access to beach.

[17] One official of the State Planning Board who does not want to disclose her name said that fisheries department is unable to displace all affected families at once. Such huge displacement would disturb the public consciousness of the coastal community and would be difficult for the government to manage it. So the department wants to implement it as phase manner.

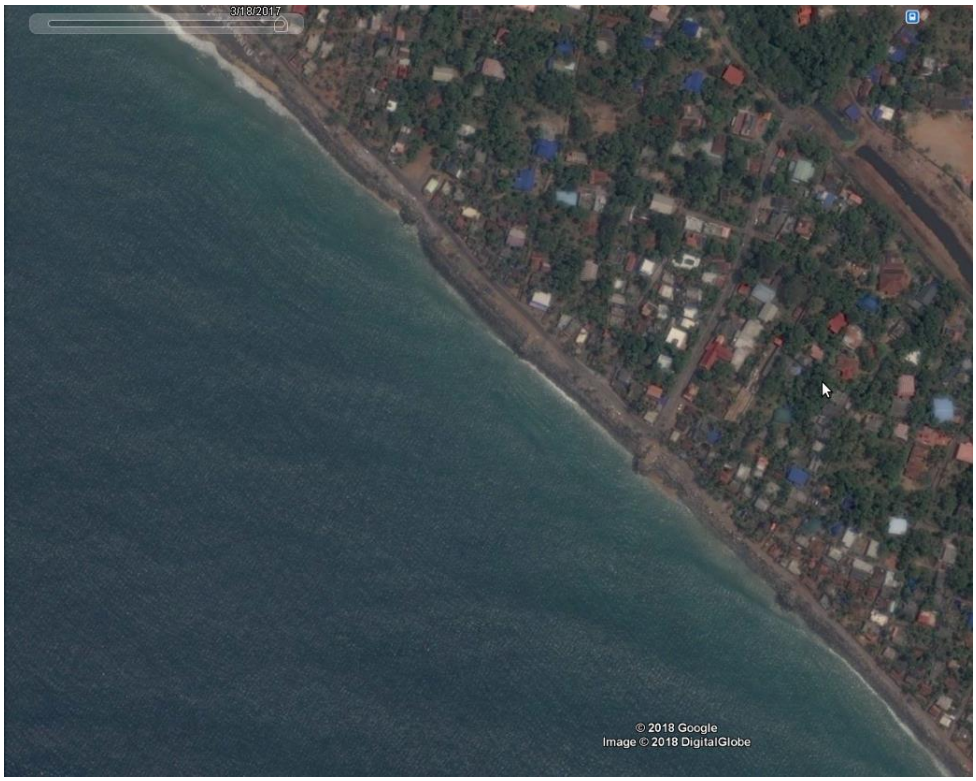
House damaged by Erosion in Eravipuram

House damaged by Erosion in Eravipuram

Eravipuram coat in 2003

Eravipuram Cost in 2009

Eravipuram Cost in 2017



5.2 Erosion, Displacement and Livelihood

The impact of coastal erosion on livelihoods of the fishermen community on the Kerala coast is a highly neglected public issue. Displacement is common challenge, however no government agency has the exact number of people displaced from the coast due to erosion. The only method is to count the number of houses in rehabilitation colonies. Loss of beaches stops the community from following their independent and autonomous livelihood practices and it results multiple types of livelihood adaptation in the area. The most common among them is the transformation of skilled independent fishermen to semi-skilled boat workers or move to inland fishing. While the youngsters move to the service sector, government services and other jobs, the fishermen who are displaced continue to pursue fishing as their main source of income. Displacement offered them environmental security, but changed their working pattern and gradual decrease the real income. The following case study based on the nineteen years of experience of a fishermen cooperative society. The Eravipuram Thekumbhagam Fishermen Development and Welfare Society (D.F (Q) 36/92) was started in 1992 and it is operating for fishermen dependent on single boat and net. This particular area is highly vulnerable to coastal erosion in Kollam district and beach erosion is very severe in this area. Eravipuram is the focal point of coastal erosion assessment in Kollam district. The society was one of the active cooperative societies in the area, which supported the local traditional and non-mechanised boat using fishermen. The society was active from 1992 to 1999 i.e year in which Thangaseery harbour and break water project begun. 1999 was a crucial year for the local fishing

community, since it was the year in which the areas started experiencing erosion. It gradually impinges on the livelihood practice of the fishing community and it forces the cooperative society to shut down its activities. The cooperative society operates only when its members get work and income.

Continuous coastal erosion made fishing impossible in the area in. Erosion has taken away the livelihood practices and fishermen were forced to relocate first and then search for livelihood options. The cooperative society also found it difficult to operate its conventional practices. The registers keep in the society show that from 1992 to 1999 the society was active in collecting the fishermen contribution of ten percent of the total auction as their contribution to welfare plan under fisheries departments and also support them from getting support from various fishermen welfare schemes. The society restarted its activities in 2015 with 27 fishermen who are engaged in traditional fishing methods. Beaches are completely eroded in these areas and hence the fishermen have to transport the boats to either harbour or nearby fishing landing areas. It costs Rs 300 per boat, so they have to work more or sacrifice the income.

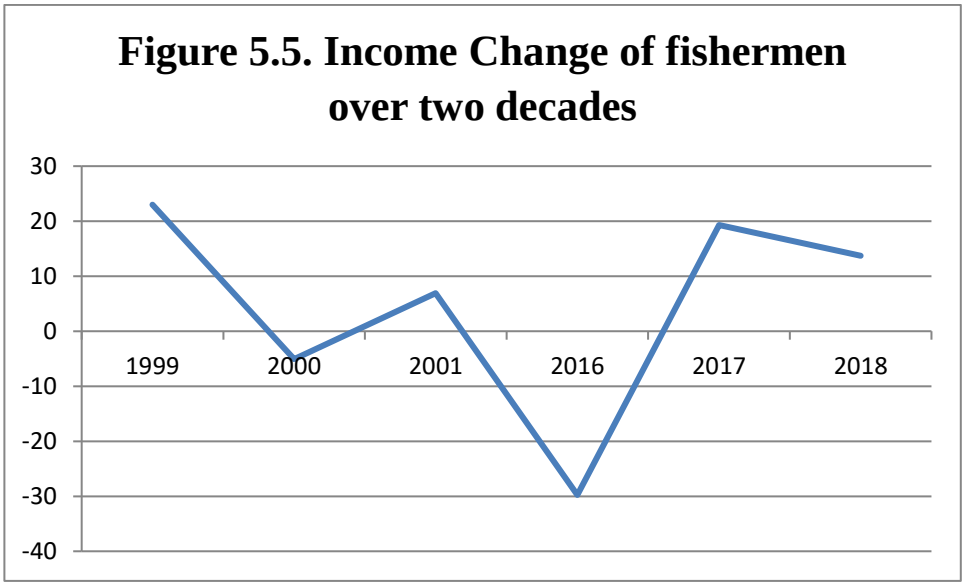
The documents available with this cooperative society prove that erosion displaces the local fishermen and push down the nominal and real income over a period of time. The table 5.2 proves that there is no substantial increase of income and working days of traditional and non-mechanised fishermen over two decades. It is evident from the table 4.2 that erosion has really impacted the income of the fishing community, however, no government agency accept this critical fact. Fisheries department offers relocation of house and not to ensure any financial support for livelihood loss. The member of this cooperative society had lost income for 16 years and they do not have any mechanism to ask for compensation or any replacement of income. It is a permanent loss of income and which widen the income gap between them and others.

Table 5.2 . Comparing Average income and working days in 1999 and 2017

Year	Average income in Rs	Working days	Year	Average income in Rs	Working days
Jan-99	908	11	Jan-17	697	10
Feb-99	977	16	Feb-17	1150	7
Mar-99	616	15	Mar-17	684	9
Apr-99	1230	23	Apr-17	1218	14
May-99	1578	15	May-17	1427	6
Jun-99	2503	13	Jun-17	1144	8

Jul-99	2892	22	Jul-17	1569	11
Aug-99	1408	21	Aug-17	1579	7
Sep-99	1674	16	Sep-17	1700	8
Oct-99	1029	16	Oct-17	1280	21
Nov-99	1145	14	Nov-17	940	19
Dec-99	934	22	Dec-17	983	10
Source:The Eravipuram Thekumbhagam Fishermen Development and Welfare Society (D.F (Q) 36/92)					

Quality of life is still at the critical edge and they do not subject to any economic mobility over two decades. The income change over two decades is classical case to prove the fact that the erosion has far reaching impacts on the community. See graph 5.5.



Source: The Eravipuram Thekumbhagam Fishermen Development and Welfare Society (D.F (Q) 36/92)

The member of this cooperative society is experiencing decreasing income change over two decades and which push them into vulnerable economic condition. Many fishermen give up their independent fishing practices due to poor access to beach and fishing landing centres on the coats. For instance, Mr. James, a 60-year-old fisherman who used to have his own equipments for fishing, said:

I started fishing at the age of 16 and used to have my own net and boat. Here was my house and I used to keep my boat and net here (he was pointing out the turbulent sea where his house was located 15 years ago). *I lost my house first and moved into a colony, and I*

lost access to the beach and ended up as a head load-worker in the harbor. I gave my net and boat to my relative, who is also unable to use it after being displaced from the coast. There are many like me who became casual workers in the harbor rather than fishing. Now I have lost the confidence of going to sea.

Similar experiences shared by Mr. Xaviour, a 53-year-old fisherman residing in the rehabilitated colony shares the livelihood impact of coastal erosion. He said:

I had my own boat and net, and I used to dock it at the beach only, and I had a routine work practice fully controlled by me and my needs. I chose to move to this colony since I did not have any legal land rights and was fed up of seasonal displacements due to erosion. When I moved here, I realized that I had no access to beach or a space to keep my livelihood equipment. I had to sell my belongings. Now I am earning Rs. 300 to 400 per day, as a worker in the boat and if not feeling well, I go for inland fishing. My wife also works as a fish vendor and earns Rs. 300 per day, depending up on the market. Some days, we face loss as well. We are now totally dependent on the harbor and local market for livelihood. We know that we have no option, so we accept whatever happened to us as a reality and face it.

This process is otherwise called de-skilling. It was evident from the FGD that the fishermen hardly prefer any other sources of livelihood than fishing. Another impact is the loss of local fish landing centres. There were a number of fish landing centres on the eroded coast that used to be the economic zones of the local fishing economy. Local fishermen used to enjoy full autonomy in negotiating with wholesale and retail fish merchants in these local landing centres. Those fish landing centres served as the local market and offered livelihood to other causal workers as well. Erosion has taken away those centres and livelihoods and created the need for centralized (harbor based) fishing and sales . Government and wholesale dealers prefer a harbour than a fish landing since it yields a higher revenue. Previous chapter has explained this in detail. The working hours of fishermen work in the harbour has increased considerably. The normal working hours of those who still use the remaining beach is 4 hours per day. Work start at 5 AM and back to shore with fish at 9AM. This is the routine timing, however it changes depend on types of fishes and interest of the fishermen. Also every day average two hours they spend for repairing and maintenance of nets. Those who move to harbour, need to start at 3 AM to reach the harbour and may work till evening. It could be read as natural transformation; however such extra efforts and labour do not bring any better income to the fishermen. They are experiencing a stagnant income and no social and economic mobility over two decades. The numbers of mechanized fishing boats have increased along with heavy dependency on harbour. So the livelihood of the fishermen in the eroded coats is directly dependent on the expansion of harbour and infrastructures. Government and fisheries department consider this dependency as consensus to focus on harbour based fisheries development and ignore other types of fishing activities.

Relocation completely reshaped the livelihood practices of the families living close to the shore. Though they were displaced due to the harbor, they now depend on the harbor for their livelihood. Centralized fishing and use of mechanized boats have become the livelihood source of the community. Mechanized boats are banned during monsoon time, which further enhances the economic crisis of fish workers and is even more severe in the

eroded areas. Fishermen having non-mechanized boats would still go for fishing in the monsoons; however, the loss of own equipment and autonomy are impoverish them.

5.3 Erosion and Permanent Displacement: The Story of a Vulnerable Colony

Coastal erosion has displaced many families across the study area. Among them, the experience of 63 families who were relocated in 1993 deserves special attention. It was the government's response to severe sea erosion from Vadi area to Pallithottam on the Kollam coast. Government order no. H.9315/93, dated 20-08-1993, mentioned that 174 families in these coastal areas were affected and were given temporary shelter in schools located in Kollam West. Among these, 63 families living in primary schools needed to relocate since the schools would lose class days. Under the norms of a flood rehabilitation project, the government acquired 2.46 acres of land in Perinad Village, which is 23 kms away from the erosion-affected coast. It is one of the most backward wards of the Panchayat and the community still bears a social taboo. While travelling to the colony, the researcher stopped at a junction and enquired the route to a passerby. He did not know the name of the colony written in the government order as *Punarathivasa Colony* (rehabilitation colony). When the whole history was explained to him, he understood and said that it was not *Punarathivasa Colony* (rehabilitation colony), it was *Vietnam colony.* He was referring to a popular Malayalam movie which portrays the people living in such colonies either as goons or supported by goons. It was shocking to see how the community was portrayed in the public imagination.

Every family that entered the list of 63 was given only three cents of land. The remaining land was used for roads and open spaces in the area., Although there were many oral offers including house, sanitation and livelihoods, there were none on record. As of now, only 25 families have the legal rights to land. They started moving to the colony in 1994. The land was not suitable for living at the time. The community made efforts to develop it. No house promises were fulfilled nor was water supply or sanitation provided. The residents arrived, found the land, and built temporary shelters which they are still living in, with a little bit of modification. Out of the 3 cents of land that they received, they had to give away 0.25 cents for the road. The legal land ownership has still not been transferred to many of them. Some of them have already sold the land and left the place.

23 years of displaced life have not brought any positive changes in their quality of life; they are still not free from the institutions of dominance. As Marx and Engels observed centuries ago, the developmental mobility of this section of the population depends on, "*replacing the domination of circumstances and chance over individuals by the domination of individuals over chance and circumstances*". Development projects offered to the community are limited to basic needs and hence, the domination of limitation continues. The information gathered through FGD justifies the argument that this section of the population has still not come out of the impact of displacement. Table 5.3 explains the status of the people residing there.

Copy of the government order

Plot no. 54 allotted

2 Rings + 1 Slab

എച്ച്1. 9315/93.

കളക്ടറേറ്റ്, കൊല്ലം
20.8.93.

കൊല്ലം ജില്ലാ കളക്ടറുടെ ഉത്തരവ്

വിഷയം:- വെള്ളപ്പൊക്ക ദുരിതാശ്വാസം-കടൽക്ഷോഭത്തിൽ വീടും സ്ഥലവും നഷ്ടപ്പെട്ടവരെ പുനരധിവസിപ്പിക്കുന്നതിന്- പെരിനാട് വില്ലേജിൽ 3 സെന്റുവീതം വസ്തു അനുവദിച്ച് ഉത്തരവ് പുറപ്പെടുവിക്കുന്നു.

സൂചന:- 1. ഈ ഓഫീസിലെ ഒരേ നമ്പരിലുള്ള 10.3.93ലെ ഉത്തരവ്.
2. ഈ ഓഫീസിലെ 27.3.93ലെ 13857/93-ാം നമ്പർ ഉത്തരവ്.
3. കൊല്ലം തഹശീൽദാരുടെ 19.8.93ലെ സി6.14830/93-ാം നമ്പർ റിപ്പോർട്ട്.

....

സൂചനയിലെ ഒന്നാം നമ്പർ ഉത്തരവു പ്രകാരം പെരിനാട് വില്ലേജിൽ സർവേ. 7405/1 ൽ 2.46 ഏക്കർ സ്ഥലവും സൂചനയിലെ രണ്ടാം നമ്പർ ഉത്തരവു പ്രകാരം സർവേ. 7726ൽ 92 സെ. സ്ഥലവും വെള്ളപ്പൊക്ക ദുരിതാശ്വാസ പദ്ധതി പ്രകാരം വിലയ്ക്കെടുത്തിട്ടുണ്ട്.

1993 ജൂൺ-ജൂലൈ-ആഗസ്റ്റ് മാസങ്ങളിൽ വാടി മുതൽ പള്ളി-തോട്ടം വരെയുള്ള കടലോര പ്രദേശത്തു രൂക്ഷമായ കടലാക്രമണത്തിൽ വീടും സ്ഥലവും നഷ്ടപ്പെട്ട 174 കുടുംബങ്ങളെ കൊല്ലം വെസ്റ്റ് വില്ലേജിൽ മൂന്നു സ്കൂളുകളിൽ ആശ്വാസ കേന്ദ്രങ്ങൾ തുറന്നു മാറ്റി പാർപ്പിച്ചിരിക്കുകയാണെന്നും ടി സ്കൂളുകളിൽ ആശ്വാസ കേന്ദ്രങ്ങൾ പ്രവർത്തിക്കുന്നതു മൂലം സ്കൂളുകളിൽ അദ്ധ്യയനം മുടങ്ങിയിരിക്കുകയാണെന്നും കൊല്ലം മുഹമ്മദൻസ് ലൈബ്രറി സ്കൂളിലെ ആശ്വാസകേന്ദ്രത്തിൽ താമസിപ്പിച്ചിരിക്കുന്ന 65 കുടുംബങ്ങളെ ഉടൻതന്നെ പെരിനാട് വില്ലേജിൽ സർക്കാർ വിലയ്ക്കെടുത്തിട്ടുള്ള സ്ഥലത്തു 3 സെ. വീതം അനുവദിച്ചു മാറ്റി പാർപ്പിക്കണമെന്നു തഹശീൽദാർ സൂചന 3 ലെ കത്തു പ്രകാരം റിപ്പോർട്ട് ചെയ്തിരിക്കുന്നു.

തഹശീൽദാരുടെ മേൽപ്പറഞ്ഞ റിപ്പോർട്ടിന്റെ അടിസ്ഥാനത്തിൽ താഴെ പറയുന്ന 65 കുടുംബങ്ങൾക്കു പെരിനാട് വില്ലേജിൽ സർക്കാർ വിലയ്ക്കെടുത്തിട്ടുള്ള സ്ഥലത്തു നിന്നും 3 സെന്റു വീതം സ്ഥലം അനുവദിച്ചിരിക്കുന്നു.

...2....

Houses in the colony

Table 5.3: General Conditions of the Relocated People		
Average daily income of the households after 23 years	Rs. 150-250 for five days in a week	80 percent of the respondents in the FGD
Type of Job	Casual Labour/ Housemaid	The participants of the FGD were casual workers and most of the women worked as housemaids.
Access to Water	Rs. 300 for 750 litres of water	All respondents, since they have no space for individual wells and the pipe water is defunct.
Status of House	Not livable	Two houses are concrete and the Panchayat has sanctioned four houses under the LIFE programme (Livelihood Inclusion and Financial Empowerment), which offers houses for all homeless and landless in Kerala. Rs. 4 lakh has been sanctioned for individual houses under LIFE project.
Sanitation condition	Pit toilets: Poor condition	A pit toilet is attached with every house and is in poor conditions
Source: FGD conducted in the area		

Condition of House

The number of families has increased over a period of time, thereby, deteriorating the living conditions. Unlike in other parts of the area or even the in the coastal area from where they were displaced, the families face acute poverty. Neither government nor public of Kerala accept the fact that there exists hunger in this colony. The participants in FGD stated that on an average, 15 to 20 days of casual jobs were available in a month with an average daily income of Rs. 200 while women working as maids earn Rs. 200 as average daily income of the month. The average per head income of a five-member family in the colony is between Rs. 20 to Rs. 26 per day. In case of more members in the family, the daily income is less than Rs. 20 per head. There are widows and senior citizens who still work for the family.

Ms Nabeesa is a 65-year-old woman who lost her son a couple of months ago. She works as a housemaid to look after her deceased son's family and her widowed step daughter. She owns the land given by the government to her husband, who was working as a head load-worker in fishing landing centres. She still lives in a temporary shelter turned into a house. She is desperately looking for a house for her children and grandchildren. She has submitted the application and is waiting for her turn.

There are people with similar conditions in the colony who have no other option except waiting for the local Panchayat's support for a house and land. Another story is of Ms Subaida, a 65-year-old woman, whose husband left her years back. She has three daughters, all of them married, and one son. One of her son-in-laws met with an accident and died on the day that her daughter gave birth to twin daughters. It was their 40th day celebration after the birth. Another son-in-law of hers divorced her daughter. All of them stay in the same house without any food or water security. The neighbours support them and share water with the family, as they cannot afford to pay Rs. 300 per week. Her son is working in a chicken shop as a daily-wage labourer and the income is insufficient to feed the family. She, at this age, goes begging for alms in front of mosques, and many a day, their income consists of that. The house is about to collapse and she is desperately looking for the local Panchayat's support for houses. They have no other option except to wait for government support.

The access to commodities for maintaining a bare minimum standard of life is considerably lacking in the area. Scarcity of essential goods is prevalent in these settlements. As Sen (2010: 16) observed, "*the achievement of functionings depends not only on the commodities owned by the person in question, but also on the availability of public goods, and the possibility of using private goods freely provided by the state. Such achievements as being healthy, being well-nourished, being literate, etc. would depend naturally also on the public provisions of health services, medical facilities, educational arrangements, and so on"*. Income classification in terms of Above Poverty Line (APL) and Below Poverty Line (BPL) is the first requirement for getting public provisions. Every household ensures that their income status (BPL) is noted in the ration cards. This is institutionally-driven capability building to eliminate deprivation. The demand for public support is derived from these deprivations.

The destitute women and old people in the colony are awaiting for the Muslim holy month of Ramadhan, not as devotees seeking blessings from the God Almighty, but to collect *zakat* (charity as per Islamic practice) money from Mosques and Muslim residential areas.

Old men in the colony also seek help from devotees coming in for Friday prayers in mosques.

Access to water is still a challenge to the community. Table 5.4 captures the existing water accessibility pattern in the community.

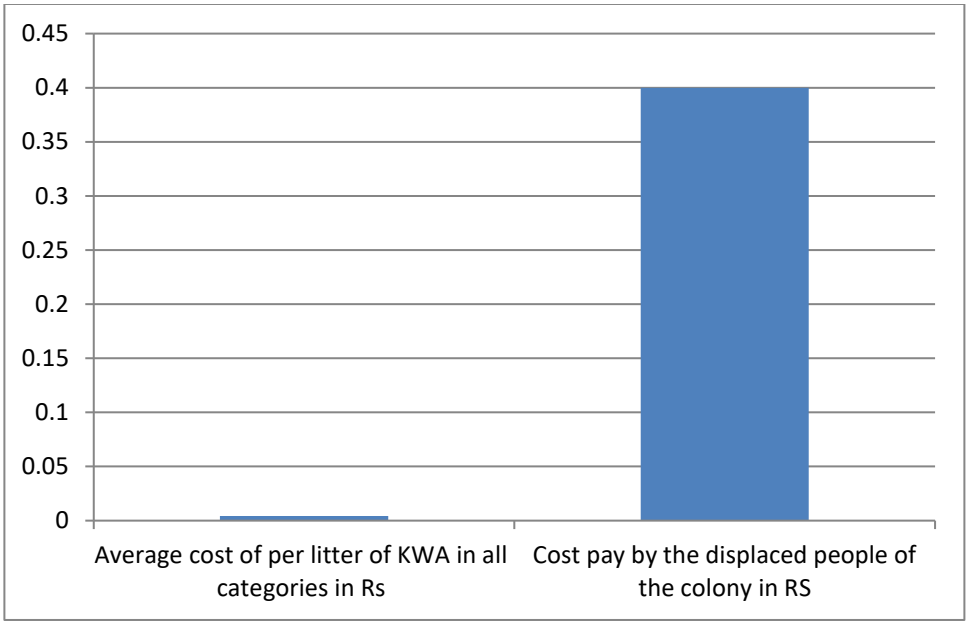
Table 5.4: Water accessibility and quantity consumption

Sr No	Category of consumers	Tariff from 2014 onwards	Rs. per litre	Cost paid by the people in the colony
1	Up to 5000 litres	Rs. 4.00 per 1000 litres with Minimum Rs 20.00	0.004	Rs 0.40 per litre
2	Above 5000 to 10000 litre	Rs. 20.00 plus Rs 4.00 per 1000 litres in excess of 5000 litres	0.002	
3	Above 10000 to 15000 litres	Rs. 40.00 plus Rs 5.00 per 1000 litres in excess of 10000 litres	0.00266667	
4	Above 15000 to 20000 litres	Rs. 6.00 per 1000 litres for the entire consumption (0 to 20000 litres)	0.006	
5	Above 20000 to 25000 litres	Rs. 7.00 per 1000 litres for the entire consumption (0 to 25000 litres)	0.007	
6	Above 25000 to 30000 litres	Rs. 9.00 per every 1000 litres for the entire consumption (0 to 30000 litres)	0.0009	
7	Above 30000 to 40000 litres	Rs. 12.00 per every 1000 litres for the entire consumption (0 to 40000 litres)	0.0012	
8	Above 40000 to 50000 litres	Rs. 14.00 per every 1000 litres for the entire consumption (0 to 50000 litres)	0.00028	
9	Above 50000 litres	Rs. 700 plus Rs 40.00 per every 1000 litres in excess of 50000 litres	0.014	
10	No water charges for BPL families consuming lessthan			

	15000 litres per month		
	Source: Kerala Water Authority website and file work		

Graph 5.6 shows the disparity of cost.

Graph 5.6: Cost disparity in water per litter



Source: Kerala Water Authority website and file work

The disparity in the cost of water incurred by this colony compared to that incurred by consumers of Kerala Water Authority deserves a critical assessment. Their total consumption of private water per month is maximum 6000 litres. If we compare them to KWA consumers, they should have paid Rs. 24 for the APL category or gotten it for free for the BPLcategory. Currently, they pay Rs. 1200 to Rs. 2400 per month for water, i.e Rs. 40 to Rs. 80 per day. It is still not sufficient for them; hence, they collect water from others' wells. This figure is quite shocking compared to other parts of the country. Irshad (2012) compared the private water consumption of unrecognized slums in Mumbai with consumption from Kerala Rural Water Supply and Sanitation Agency (KRWSSA). The paper discussed that every poor individual household of Mumbai paid Rs. 1.76 per litre, whereas the KRWSSA consumer paid only Rs less than 3 paisa/litre of water The tariff levied by the Kerala Water Authority is still less than that by KRWSSA. This discriminative water pricing is indeed an economic discrimination on the basis of deprivation. One of the respondents stated that water scarcity is severe during the summer and that they bathe on alternative days keep the consumption to a minimum during these days. This is an indicator of acute poverty and poor hygiene. It constitutes deprivation compared to the general living standard of Kerala.

There is a dilapidated open well and pipe system in the colony which does not cater to the needs of the families. The residents had to protest in front of the Chittumala Grampanchayat office 15 years ago to get water supply there. They marched in protest, blocked the Panchayat office and were arrested and released later without any charges. The Panchayat and the government still have no plans to ensure them a supply of drinking water.

Abdul Rehman, (72), was working as a casual labourer in the fish landing centre and was the first to move to this place. He acquired the land rights and a comparatively decent house with bare minimum facilities. He said,

It was a jungle at that time and nobody wanted this land. It was me who persuaded others to come here. We had suffered a lot due to sea erosion and had nowhere to go. I came first and my friends followed me. There were many promises, but nothing got implemented and we have to survive. I ask for money from those people whom I believe to understand our problem.

The FGD began at 11 am and continued till 4 pm. During the discussion, the researcher asked them whether they should take a lunch break. The reply was shocking. A respondent said that they don't have the habit of having three meals a day. Women doing domestic work came back at around five o'clock in the evening, which was the only time when they cooked. During the day, they try their best to make sure that children are eating something. They know who is not eating and share the food with them. Surprisingly, it is happening in a State that claims to have achieved higher human development and social security schemes for everyone. The fishermen who still live in the rehabilitation colonies on the coast, are not suffering from such deprivation.

The researcher spoke to the Panchayat President Mr. Anil Kumar and the local ward member Mr. Viswanathan Pillai (although he does not represent this ward, he showed willingness). Both of them are aware of the issues and want to support these families. They are willing to help them within the schemes and programmes available under a Gram Panchayat. The Panchayat President had a suggestion that he has shared with the colony people too. The Panchayat proposes to construct flats under the LIFE Mission (Livelihood Inclusion and Financial Empowerment-MISSION) project, along with a livelihood centre and other open community service centres. Though this suggestion sounds promising, the community has not shown any interest in it. This was discussed in the FGD where they expressed that they still did not want to share their land with anybody else. Rahim, a 63-year-old respondent, who was one of the early inhabitants of the area declined this offer and said:

Government gave this land to us and why should we allow all others to come and share our land? We have seen the Tsunami colony flat, we do not want that kind of a flat; it has no facilities and has only one door. It is too small and has no proper ventilation. We would lose our freedom and our right over the land is more important.

It is a collective voice. They still believe that the government would bring other homeless people into the colony. Quality of houses and the space available in the Tsunami flats are truly not sufficient for a family. Moreover, the community demands independent houses

for their identity and existence. Land is an asset and they know that moving into a flat would never give them the security of an asset such as in metro cities. For them, this small piece of land is the only asset they have and they are not willing to give it up for a flat. It could be considered a fight for maintaining the bare minimum capabilities to survive. As Nussbaum and Sen (1993:31) observed, "*the capability of a person reflects the alternative combinations of functionings the person can achieve, and from which he or she can choose one collection. The approach is based on a view of living as a combination of various 'doings and beings' with quality of life to be assessed in terms of the capability to achieve values functionings*."

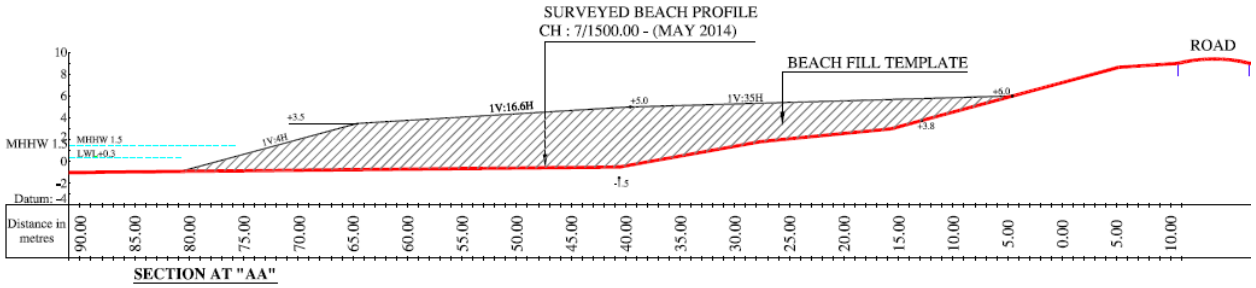
Even after 23 years, the impact of the coastal erosion haunts them. It is quite sad that the community is still forced to demand bare minimum necessities as 'development' in order to exist. This colony and the people are still not considered victims of coastal erosion. It is the responsibility of the local Panchayat to support them. The Panchayat President has declared that Government of Kerala has not extended any additional financial assistance to the Panchayat for this project. It could be considered a structural exclusion and permanent displacement of the community, caused by coastal erosion.

5.4 Potential Solutions to Erosion

The area selected for this research study is an exhibit of both natural and manmade reasons of erosion. Manmade reasons are more demonstrated in the coastal stretch of the study area. This report has put forward coastal protection measures as well, both structural and non-structural. Non-structural measures include: a) Artificial nourishment of beaches, b) Coastal vegetation such as Mangrove and Palm plantation, c) Sand bypassing at tidal inlets, and d) Dune reconstruction/ rehabilitation.

Artificial nourishment system is a commonly used technique across countries; it consists of dredging the sand from the sea and depositing it on the beaches where erosion has occurred (see illustration 5.5).

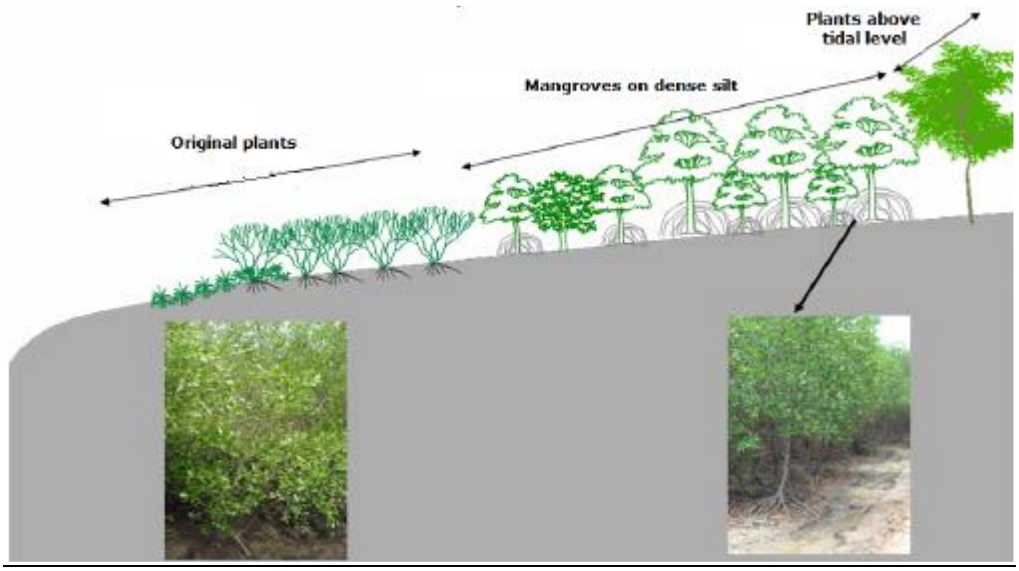
Illustration 5.5: Artificial Nourishment System



Source: Verhagen and Thi Loi (2012)

This technique requires huge investments and needs to be carried out every monsoon. It is not feasible in all the seasons and could be used as an interim measure to prevent coastal erosion. It requires regular maintenance. Another non-structural solution is Mangrove plantation, which is, perhaps, the least noticed solution by the government and agencies. Mangroves play a significant role in land accretion and can resist sea erosion effectively and economically. It stabilizes the sea floor, reduces the slope angle of the sea beds, and traps sediments. The basic principle behind this argument is that vegetation in coastal areas helps in consolidating sediments, improving slope stability, and dissipating onshore wave movements. Verhagen and Thi Loi (2012) showed how Mangroves can prevent coastal erosion, in particular, how they can reduce wave heights (see Illustration 4.6).

Illustration 5.6: Mangroves Protect Coasts



Source: Verhagen and Thi Loi (2012)

This study assessed various methods that prove the effectiveness of Mangroves in preventing erosion. The picture above justifies the use of Mangroves; however, such protection measures are not popular among government programmes and projects.

India has experienced severe erosion problems due to improvements of many inlets by jetties and/or dredged channels. This problem can only be solved by bypassing of material from the up-drift side of the inlet to the down-drift side. Improvement of the tidal inlets in India has some special features. Dune reconstruction or rehabilitation is also considered a unique natural protection measure. It acts as a storehouse of sand and sediments above the landward limits of normal high tides. It works as a barrier between the sea and the land.

Non-structural measures are less preferred in the country and Kerala is not an exception. Governments including the local self-governments prefer structural measures as solutions. Structural measures are otherwise known as hard solutions to prevent water from reaching the beaches. The measures include: a) Seawalls, b) Revetments, c) Off-shore breakwaters, d) Groins e) Off-shore Reefs, and f) Artificial headlands.

Structural measures are most popular; however, studies show that they ultimately lead to more erosion. The case of the Kollam coast is similar. Kollam coast is one of the most vulnerable coasts in Kerala. The coastal area selected for this research, from Mukkam, Mayynad to Kakathop area of the Kollam coast, show that structural measures do lead to severe erosion of the beaches. However, government-appointed committees and local fishermen together demand hard solutions to the problem.

The Department of Ocean Engineering in the Indian Institute of Technology of Chennai has conducted a series of studies on coastal erosion in Kerala. One of their studies, conducted in 2007, suggested groin construction as a permanent solution to the problem. This particular report emphasized seawalls and groins as solutions, and this argument is very popular among the bureaucracy and the community.

5.4.1 Economics of Hard Solutions

There are both soft and hard solutions to the problem of coastal erosion; yet, hard solutions are more common and promoted by the government. Hard solutions have become independent economic activities in these areas, with the government-contractor relationship more strongly demonstrated. The harbor engineering and irrigation departments are assigned to such constructions. Harbor engineering department was established in 1982 to conduct the investigation, planning, design, evaluation, execution, operation, maintenance and management of coastal development projects and ports. HarborIt was formed because of the realized need to set up an agency to establish ports and harbor. Major ports and harbors in Kerala came up after its establishmentharbor. Construction of seawalls and groins, on the other hand, are the responsibility of the irrigation department.

Seawall and groin constructions are age-old projects in Kerala and are still active endeavours since they involve huge money and a network of contractors. The Proceedings of the Kerala Legislative Assembly, dated 23rd March 1960, display how government thought about erosion decades ago. Mr. K. Hassan Ghani, MLA, raised a question in the

assembly on coastal erosion; the reply by the minister names these areas as affected by coastal erosion: Kannoor, Azhekal, Thalsherry, Manashery, Chellanam, Purakaad, Thrikunnpuzha, Pallana, Cheriazheekal, Alappad, Shkathikulangara, Varkala, Kaikkara and Anchthengi. A seawall costing Rs. 150 lakh was later constructed in these areas. Interestingly, the minister's reply stated that 184 miles of sea walls needed to be constructed. The assembly proceedings also shows two things: the issue of coastal erosion and the dependency on a conventional solution i.e. seawall construction. On 23rd June 1960, Mr. R. Sugathan, MLA, asked a list of questions on preventing coastal erosion in Kerala. The minister, in the reply, mentioned that the eroded coastal areas included Chellanam, Thalassery, Kanoo, Vypinkara, Cheriazheekal, Nedunganda Purakkad, Pallippatukara, Chavara, Shakthikulangar and Ararattupuzha. Approximately 19 miles of land were reported lost to erosion. Seawall was the most common suggestion. Government proposed only seawalls and groins as solutions[18]. One of the questions the researcher kept asking the respondents was the local method of preventing coastal erosion. However, interestingly, none of the respondents mentioned any alternatives to groins. A legislative assembly document dated 19th September, 1991 proved that there was an attempt to construct groins with rubber-coated coir sacks filled with sand. Government attempted it in a stretch of 250 m in Chettikad coast in Alappuzha. Every policy document refers to hard solutions and no other measures are considered to prevent erosion.

Local politicians and local political economy of the state often promotes seawalls as developmental interventions. It attracts the majority vote as it brings a structure in the area affected by erosion. The Election Manifesto of every political party states coastal protection as their first priority and once elected, all of them experience resource limitations for constructing sea protection structures. It is a continuous project, since seawalls are inadequate to withstand heavy waves and are destroyed during heavy monsoons. For instance, Thanni and Eravipuram areas are highly eroded coasts in Kollam district. This area has been experiencing erosion from the beginning of the Thangaseery harbor and breakwater project in 1990. Seawall construction is the only government intervention that has continued for more than two decades. However, no seawall has been permanent here; every wall has collapsed due to powerful waves. Nevertheless, the irrigation department was not bothered. It kept initiating more constructions next to the previous ones, which gradually led to shore loss. Currently, these areas do not have any, only rough rocks. Seawall construction has stopped now since the sea has encroached upon the coastal road and left no space to construct a wall. People living on the other side of the coastal road fear that they might also have to leave the area in case of further erosion. Irrigation department is the only agency maintaining a continuous presence in the area. Local fishermen do not get any meaningful employment in seawall construction; they prefer not to work under such projects.

Another widely accepted solution is the construction of a groin. Every scientific study suggests groins as a solution. Though science considers groins as a hard solution, some of them are still unsure about its feasibility. Prof. Anitha Joseph, Head, Department of Civil Engineering, TKM College of Engineering, Kollam has a different opinion. She stated that

[18] Proceedings of the Kerala Legislative Assembly, dated 23rd June, 1960

such hard solutions are not sufficient, considering the wave pattern and the geography of the area. Dr. Shahl Hamid, a retired scientist of National Centre for Earth Science Studies (NCESS), Thiruvananthapuram agreed that groins can prevent erosion if the waves move in a perpendicular direction, which is not the case here in Kerala, The waves are more powerful and hence, no structure can prevent the particle movements. Science recommends a controlled hard solution and agrees that it is not permanent. However, the local community continues to believe that groins and seawall would save them from erosion.

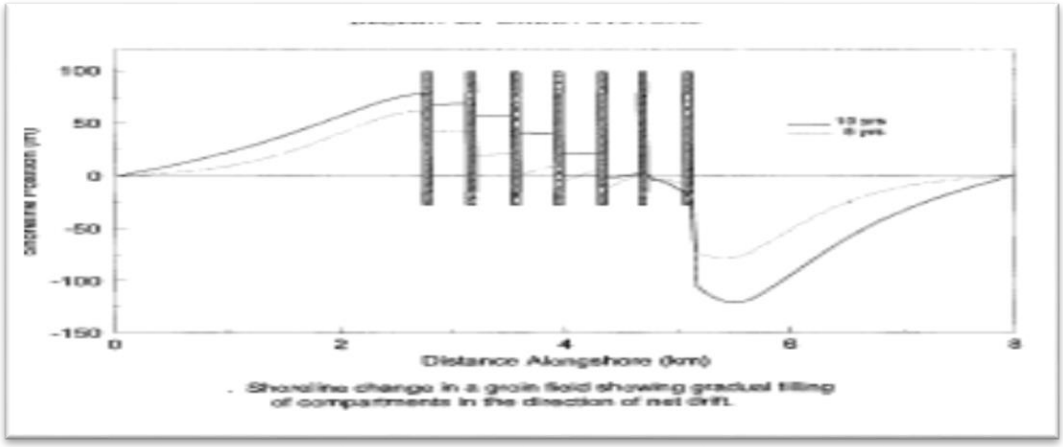
5.5 Community and Coastal Protection

In 2017, local fishermen of Eravipuram coast formed an organization called *Theera Samrakashna Samathi* i.e. 'coastal protection movement' to fight for the coast. They submitted a memorandum to the District Collector seeking his intervention. The memorandum gives an insight into the gravity of the problem and their articulation of it. The memorandum refers to the area from Lakshimipuram, Thanni to Papanashanm, Thirumullavaram. It begins by informing the administrator that coastal erosion has completely taken away this stretch and made life difficult there. It has affected their life for the last 20 years. The memorandum complains that every monsoon time when the sea becomes turbulent, the irrigation department puts a concrete block of destroyed drainage and canal dump on the coast. These concrete blocks carry lots of filth materials and wastes into the coast. They protested under the leadership of the local church by marching and blocking the national highway as a sign of protest.

Another important observation in the memorandum is the open acceptance of the impact of seawall construction on Thangasery harbor. They accept that the massive structure and its rock consumption led to environmental destruction in other areas. Interestingly, the memorandum also talks about the Indian Institute of Technology (IIT) Chennai study report and its suggestion of construction of 20 groins in the areas to save beaches. They also demand environmental protection, livelihood protection and timely completion of groins in the area. Most of them have not seen the IIT Chennai study, but know the content of the report. Every fisherman that the researcher met to discuss the erosion referred to the IIT-Chennai report, and most of them still believe that it has suggested long-term solutions to the problem. The community has their own apprehensions about the quality of the groins constructed across the shores. They stated that the irrigation and fisheries departments have not demonstrated any interest in maintaining the quality of groins. As a result of the prolonged crisis on the coast, there exists a sense of ownership of groins among the area. All other measures were found inadequate and hence, the community is under the impression that it is their responsibility to protect the structures. They suggest a triangle-shaped stone for groin construction. The current practice, according to the local community, is simply assembling rocks in different shapes without any scientific method. This could be read as local knowledge intervention and is an established academic area of research. It is evident from the FGD and from consultation with scientists that the local knowledge on hard solutions is in conflict with the science of groin construction. Based on their lived experience, the local community suggests that the length of the groins be 150 m instead of the under-construction 30 m. The local fishermen's main objection to the 30 meter groin is that it would not be sustainable and it cannot withstand the wave force. Their observations are based on their experiences. However, Dr. Sheela Nair of NCESS

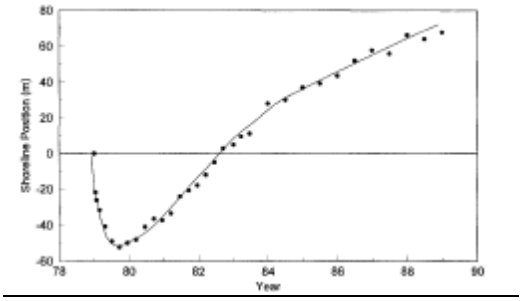
asserted that the length of the groins should be 30 m and it cannot be uniform across coasts. The conflict is that the irrigation and harbor engineering departments are the two institutions that own the science of groins and they are not mandated to listen to the local community. The knowledge owned by them drives the decisions, which are not countered by the government either. It is impossible to delink agencies involved in the construction of groins and the science of the construction. The irrigation department, the harbor engineering department and government never show interest in revisiting their policy or assessing the long-term feasibility of hard solutions. There are many assessments of hard solutions. Kraus et al (1994) studied shoreline changes and found that there is no guidance offered on groin functions and designs other than the rules. According to them, there are enough examples of poor performance of groins, as a result of which, society loses an effective shoreline protection mechanism. They suggest comprehensive, project-level monitoring of groin behaviour, including periodic shoreline surveys, beach profiling and sediment surveys (see the illustrations 5.7 and 5.8).

Illustration 5.7: Erosion and Accretion



Source: Kraus et al (1994)

Illustration 5.8: Accretion rate



Source: Kraus et al (1994)

Although the study mentioned above is based on an area in New York, their arguments somehow resonate with the local reality of the Kollam coast. More than two decades of experience of living with erosion influences the perception of the community. Mounting

risk and fear of displacement are the guiding factors behind their perception. Unlike an engineer, local fishermen are under no pressure to follow science in everyday life; they have the right to defend the coast. A close observation and interaction with the community proves that a long year of experience with seawall construction is still haunting them.

Seawall construction was promoted long back in the area as a step to prevent erosion. However, no seawall could prevent the rough waves and each one eventually submerged in the sea. Compared to seawalls, groins are more effective. Thus, the apprehensions of the communities regarding the length of the groin are connected to their risk perception. The primary concern is the capacity of such short-distance groins to prevent severe wave force. Neither any natural protection measures are available to prevent it, nor are the communities resilient enough, Hence, the quality of groin becomes a critical issue for them. There exists a consensus on groin construction since no other alternative method has been suggested. Harbor engineering and irrigation departments are the biggest beneficiaries of this consensus as it reduces the pressure on them to seek out other options. Groin construction needs continuous investments and involvement from the harbor engineering department, fisheries department and local self-government. Political parties prefer to opt for massive constructions of groins since it fetches political visibility. These constructions are often projected as achievements of the elected representatives. The idea of developmental interventions in the area has been limited to groin and seawall construction.

5.6 Emerging Conflicts

Anti-erosion measures cause accretions, but the society never see is as a natural event . Erosion displaces people from their livelihood practices and habitats. However, some do benefit from the erosion on the other side of the coast. The erosion in Thanni and Eravipuram has created huge accretion and beach formation in Thanni and Lakshipuram Thoopu area which is four kilometer from the severely eroded areas.. This is a natural process that ends up creating a sense of conflict between the regions. Mr. Joseph, a 56-year-old fisherman who has been relocated to the colony, said:

We lost our land, house, livelihood, peace of mind and everything due to harbor and erosion; see what those people got. We lost our land but their land value increased considerably because of new beach formation and they don't have to face any risk of erosion. They became rich while we impoverished. They still get the benefit of development and what not, but we have to move away. What kind of process is this? We still work in the harbor to ensure an income to the government and we are indirectly contributing to their economic prosperity.

Every participant of the FGD shared this view. The discussion was conducted in Thanni area, where people are raising questions about the length and quality of groins constructed. Increasing land value, formation of long beaches and a sense of a risk-free environment on one side of the coast at the cost of heavy erosion on the other stretch of the coast has given rise to a kind of conflict and is a potential threat to coastal social life. Their livelihood practices remain the same and they do acknowledge that there exists a conflict dividing the community across the coastal stretch. Nobody is willing to buy the coastal land in Thanni and Eravipuram where groins are being constructed. Accretion in the groin areas also

prevents any kind of land sales. Banks are unwilling to lend for lands with legal titles on the coast. Declining asset values drive the conflicts.

Areas benefited by huge accretions are able to offer space for docking boats and fishing equipments. A dredger trapped in the Mundakkal area near Eravipuram is actually serving the purpose of a groin, causing huge accretion that has benefited the local community.

The root cause of conflict is the changing value of resources over the coast and of the land. Homer-Dixon (1996) explained that the conflict induced by environmental scarcity are driven by three factors namely, the degradation and depletion of renewable resources, the increased consumption, and unequal distribution. He argued that scarcity of renewable resources can produce civil conflict and instability; large and destabilizing population movements aggravate racial, ethnic or religious tensions, and incapacitate political and social institutions. Depletion of coastal land, beaches and affected livelihood practices in the Mukkam to Kakkathope area of beach are the root cause of this conflict, and movements such as *Theera Samrakashna Samathi* are the result of this realization of losing the resource base. The movement, in fact, has the nature of a collective that aims to show the existence of a resource-based conflict in the area. It does not have a violent nature or any active local support. However, the members of the movement do not hide their opposition to the government's approach. Ms. Mary, a 60-year-old resident of the Eravipuram coast said:

Government officials listen to them (people benefiting from the new beach formation) and the local politicians also prefer that area because they do not take part in any protest. Our children do not have a playground; but they have a huge playground and I am sure that there would soon be hotels and restaurants there to attract tourism, and people would have a higher income than ours from fishing. I would not be surprised if they give up fishing completely.

As Dougherty and Pfalzgarff, Jr. (1981) stated, "*the term conflict usually refers to a condition in which one identifiable group of human beings in a given environment (whether tribal, ethnic, linguistic, cultural, religious, socioeconomic, political among others) is engaged in conscious opposition to or more identifiable human groups because these groups are pursuing what are, or appear to be, incompatible goals*". The communities living on eroded coasts are forced to engage in a conscious opposition to the communities from other areas of the coasts. Structural issues of development have created this conflict, which is likely to aggravate into a larger crisis later in terms of potential resource inequality in the area. Turner (2004) categorically argues that natural resource scarcity induced by physical and social causes leads to resource-induced conflicts. A declining supply of or increasing demand for natural resources could produce competition over these resources and push the community into conflicts. The entire coastal erosion conflict may actually be called as a conflict over Common Pool Resources (CPR). Coastal resources are never owned only by a particular agency or the resident communities. As McCay (2002) found, the institutional forms that have evolved to govern commons are considered socially-constructed and subject to change. The livelihood and collective existence of the coastal community is dependent on common access to resources; and hence, as Long (1992) argues, the historical, cultural and, to a great extent, symbolic importance of a certain resource contributes to conflicts. It results in a process of assessing

values of the resources. This is quite evident in this area, where one section of community assesses the economic benefits to the other section due to accretion at the cost of erosion and the other section has found positive externalities. Everybody is assessing the value of loss and gain by erosion and a clear binary of beneficiaries and losers have evolved. As Rannikko (1996) states, values seem more constant than an approach that can frequently change. Individuals often internalize those values and want to live with it. It leads to an identity. As Green (2010) observes, conflict over a resource may even become an element of a group's social identity, obstructing the efforts to reach a settlement. One could argue that this identity is largely derived from the conscious efforts to attain sustainable access to resources. As Blackburn et al (edt) (1994) argue, a community is considered sustainable when a healthy environment is maintained to support long-term development of the community. The conflict looming in the area has not yet attracted public attention or escalated into any violent form. The livelihood dependency and lack of economic mobility restricts the conflict to the community. It is a natural outcome of faulty environmental governance and negligence of a livelihood system. As far as the community is concerned, erosion is a recurring disaster that cannot possibly be entirely mitigated. This is evident from their response to early warnings. People still do not take such warning seriously. Mr. Johan, a 68-year-old ex-fisherman who lives in between the coast and the lake in Thani area of Kollam coast, decided to neglect the early the warning messages by police and other agencies due to inadequate support and money to move the family to a safer zone. Government and disaster management authorities often use police force to spread early warning messages when the sea-water rises. It is part of the procedure to inform the local community about the risk and prevent casualties. However, the local community often perceives it to be imposing. The most accessible and available option at such times is to stay in nearby churches and schools as 'refugees[19]'. Early warning system lost its significance in this area, people prefer to take risk rather than respond to the administration. The community developed various methods to live with coastal erosion risks and fight for solution. They prefer effective public action rather than imposed early warning of risks.

5.7 Conclusion

Coastal erosion has become a reality and existing preventive measures have added to the risk faced by the local community. Government has adopted relocating the community as a permanent solution from the beginning. As explained before, the poor economic and social conditions force the community to accept this policy. It is evident from the field assessment that the community did not oppose relocation and hence, government had complete autonomy in designing the relocation projects. The government proposed bare minimum support and neglected long-term sustainability and socio-economic mobility. Such structural exclusions discourage the community from further engagement with the government for any individual needs.

It is clear from the FGD and consultation with the experts that the current hard solutions such as groins and seawalls cannot prevent erosion. Erosion is increasing every year and more and more people living near the shores are subject to risks. Hard solutions and

[19] The community prefers to consider themselves as refugees and they are quite aware of its meaning. It reflects the level of disappointment among them.

relocations of the community enhance the risk and make government actions into continuing institutions. Coastal erosion is a recurring disaster and hence, every agency involved in rehabilitation and response has time to choose sustainable options and take action. However, for non-recurring disasters, agencies need to act without proper preparation and the expectations of the society are much larger in such cases. The next chapter discusses how a non-recurring coastal disaster affected and how it was managed to build community resilience.

Chapter VI.

Tsunami 'Rehabilitation': The Continuing Disasters

Introduction

Disaster highlights the inherent weakness of the society. There could be multiple forms of this weakness, out of which, the critical one in this context appears in the crisis faced by the society while handling rehabilitation. It also manifests in the development and rehabilitation policies. Development and rehabilitation are, in principle, interrelated. There is ambiguity about the idea of development vis a vis disasters. Cowen and Shenton (1996:7) argue the developmental activities in disaster affected areas on the one hand, it is virtually synonymous with 'progress' and on the other hand, it also refers to intentional efforts to 'ameliorate the disordered faults of progress' Thomas (2000) also defines that idea of development exists because it help to identity poor, so development according to Thomas development exist if it intervene the capitalism to alleviate poverty. The concept and idea of rehabilitation has not been subjected to any substantial change from the perspective of war-torn societies. Green and Ahmed (1999) also argue that rehabilitation after disaster mainly involves reconstruction of physical infrastructure and providing interim basic needs to survivors. Rehabilitation is more about *how* to rebuild what was destroyed in the disaster rather than *what* to rebuild. Rehabilitation is a supply-driven process and hence, rehabilitation interventions by the government, external aid agencies and NGOs consist of individual programmes that are implemented mainly at the local level and have few links with other reconstruction interventions.

Institutionally, rehabilitation and development are interrelated. The basic principle of rehabilitation is 'the provision of aid designed to help restore emergency-affected populations to self-reliance in meeting basis needs, and to reduce their vulnerability to future emergencies'[20].In an attempt to link rehabilitation to relief and development, Harvey and Campbell (1997[21])suggest that:

> *Rehabilitation...is part of a process of protecting and promoting the livelihoods of people enduring or recovering from emergencies. It aims to provide short-term income transfers, rebuild household and community assets, and rebuild institutions. Its key task is to help reinforce developmental objectives, notably livelihood security, participation, sustainability, gender equity, and local institutional capacity*

Essentially, rehabilitation and development manifest in institutions; otherwise they would remain abstract idesa. Ostram (1991) defines institutions as 'the set of working rules' that 'contain prescriptions that forbid, permit or require some action or outcome'. It is easy to see how these definitions facilitate the inclusion of belief and behavioural norms.

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[20] W Campbell, 'ODA Strategy for Rehabilitation Assistance to Ethiopia' Falmer, UK: IDS, 1996; M Korner et al, Management of Social and Institutional Rehabilitation: Perspectives from Seven African Countries, Proceedings of an International Workshop, Debre Zeit, Ethiopia, 1995, p 5

[21] Harvey, P., W. Campbell, et al. (1997). Rehabilitation in the Greater Horn: Towards a Strategy for

CARE. Brighton, Institute of Development Studies.

According to North (1990:3), who was the first to make a clear dissimilarity between institutions and organizations, institutions are humanly-devised limitations that shape human interaction; they constitute behavioural inducements. Organizations are groups of individuals that follow a particular set of constraints or rules.

Disaster devastates every existing social and economic infrastructure. Cuny (1983:12) observed that the government, as an institution, experiences a desire for change; pressure from the victims often evolves into demands for fundamental changes . These demands emerge either from a lack of opportunities in the pre-disaster situation or from aspirations for upward mobility. However, when a disaster strikes a backward region, the nature of response would be to overcome the status of life from the pre-disaster situation. Yet, the absence of institutions to carry forward such a system would disempower the communities.

6.1 Tsunami Incident

On 26th December, 2004, a deadly tsunami triggered by an earthquake off the coast of Sumatra claimed thousands of precious lives and caused huge damages to agriculture, livestock and infrastructure in Kerala, Tamil Nadu, Andhra Pradesh, Pondicherry, and Andaman and Nicobar Islands in India. Humanitarian agencies and governments across the world offered both relief and rehabilitation measures for the tsunami victims. Apart from humanitarian relief, disaster-affected people generally expect a proper social and economic infrastructure, which is generally absent in disaster-prone areas across the world (Blaikie et al, 1994). Public expenditures on such areas are significantly low in comparison with expenditures on other areas, which are not disaster-prone. Disaster financing has a multifaceted role. Developmental institutions are pivotal in disaster financing. Thus, any institutional failure does have its implications.

6.1.1 Tsunami: Impact, Loss and Assessment

Government of India had appointed a team to assess the loss caused by the tsunami and the cost of recovery. The committee recommended a special package of Rs. 3,644.05 crore named as ‘Rajiv Gandhi Rehabilitation Package for Tsunami-affected Areas’. The scheme was proposed for immediate relief and response, revival of fishery and agricultural sectors, immediate construction of temporary shelters, and repair/restoration of infrastructure. Out of this amount, Rs. 2,036.95 crore was approved for immediate relief and response, which included ex-gratia to the kin of the deceased, running relief camps and other essential relief services (See Table 6.1).

Table 6.1: Rajiv Gandhi Rehabilitation Package (Numbers in Crore Rs.)

	Tamil Nadu	**Kerala**	**Andhra Pradesh**	**Pondicherry**	**Andaman & Nicobar Islands**	**Total**
Relief & Response	233.33	17.16	8.12	26.03	107.35	**391.99**
Sustenance Allowance	118.8	12.3	0	1.05	23.04	**155.19**
Temporary Shelters	90	17.39	0.31	6.04	99.1	**212.84**
Permanent Housing	650	50	2.3	50	0	**752.3**
Relief Employment	54	26	12.6	1.95	9.75	**104.3**
Infrastructure	161.15	44.01	10.35	6.61	305.97	**528.09**
Agriculture & Animal Husbandry	32.35	3.52	1.16	0.8	261.66	**299.49**
Assistance to Fishermen	1007.56	78.98	35.16	63.14	15.01	**1199.85**
Total	**2347.19**	**249.36**	**70**	**155.62**	**821.88**	**3644.05**

Source: 'TSUNAMI - A Report to the Nation', June 3, 2005

In addition to the ex-gratia payment approved under the Rajiv Gandhi Special Package, additional ex-gratia payments of Rs. 1 lakh and Rs. 50,000 were approved from the Prime Minister's Relief Fund and the respective state's Chief Minister's Relief Funds, respectively. In case of A & N Islands, Rs. 2 lakh were additionally provided to each orphan. Some additional packages were announced for A &N Islands, such as Rs. 1 lakh of ex-gratia to the next of the kin besides Rs. 1 lakh from the Prime Minister's National Relief Fund. Similarly, unmarried girls and widows have been supported with the financial aid of Rs. 1 lakh each. Sustenance allowance has been approved for each of the affected family for a period of three months in the mainland and for six months in the Islands at Rs. 155.19 crore. 93,000 MT of food-grains valued at Rs. 93.00 crore were allotted for relief employment, which would generate 1.86 crore man days. For intermediate rehabilitation, Government of India supported construction of temporary (intermediate) shelters at a cost of Rs. 212.84 crore. A total of 39,171 intermediate shelters have been constructed in the States/UTs. Of these, 9,572 intermediate shelters were constructed in the A & N Islands.

This posed special logistic challenges. Considering the livelihood loss of the fishermen community, the Rajiv Gandhi Special Package allocated Rs. 1,199.85 crore for rehabilitation of fishermen[22]. Table 6.2 and table 6.3 provide the details.

Table 6.2: Immediate Relief

	Tamil Nadu	**Kerala**	**Andhra Pradesh**	**Pondicherry**	**Andaman & Nicobar Islands**	**Total**
Number of people rescued	9,500	9,950	0	0	9284	28,734
Number of people moved to safer places	487185	24978	34264	70000	30573	647,000
Number of Relief Camps opened	421	231	65	48	165	930
Number of inmates in Relief Camps	309379	171491	34264	45000	44201	604,335

Source: 'TSUNAMI - A Report to the Nation', June 3, 2005

Table 6.3: Norms for Assistance to Fishermen under the Special Package:

Sl No	**Scheme**	**Project**
a)	Replacement of catamaran Boats plus nets up to per unit cost of Rs. 32,000	Full subsidy (In case of A&N Islands it was Rs. 65,000, including transport from mainland)
b)	Replacement of Boats plus motor and nets up to per unit cost of Rs. 1.50 lakh	50% subsidy and 50% loan
c)	Replacement of mechanized boats plus nets up to per unit cost of Rs.	35% subsidy (with a ceiling of Rs. 5.00 lakh)

[22] Source: 'TSUNAMI - A Report to the Nation', June 3, 2005- PMO website

	20.00 lakh	and balance as loan.
d)	Repair of mechanized boats	60% subsidy (with a ceiling of Rs. 3.00 lakh) and balance as loan.
e)	Repair of all other types of boats	Full subsidy up to Rs. 10,000[23]

Source: 'TSUNAMI - A Report to the Nation', June 3, 2005- PMO website

Note: *Fishermen covered by the package indicated in paragraph (a) will have the option to opt for the package indicated in paragraph (b) above.*

6.1.2 Indirect Financial Support

Indirect financial support was announced in the form of loans with low interest rates and interest subsidy. The scheme directed the banks to offer loans at a low interest rate of 7% per annum and the government offered an interest subsidy of 2% if the borrower maintained prompt repayment. Besides, pending loans availed for livelihood equipments and activities were offered to be written off and a moratorium was also announced for loan repayment. The special package included Rs. 160.10 crore for permanent housing and immediate repair of damaged infrastructure. Out of this, an amount of Rs. 752.30 crore was earmarked for permanent housing. This amount would be a grant from the Government of India for the permanent housing plan being finalized by the Core Group in the Planning Commission. In case of A&N Islands, the Ministry of Urban Development finalized a project proposal of Rs. 656 core for construction of 9,350 multi hazard-proof houses with proper town planning and civic amenities. The designs and layout have been prepared in consultation with the beneficiaries (Refer tables 6.4 to 6.5).

[23]According to the assessment report, the following amount was spent as on June 3, 2005: replacement and reconstruction of boats on such a large scale required special efforts for organizing the material and production facilities; particularly for fibre glass boats. Logs for the wooden boats were in short supply and had to be arranged from other States. After Herculean efforts, they were tied up and there has been considerable progress on this front. So far, in Tamil Nadu, Rs. 33.12 crore have been provided as subsidy for replacement of catamaran boats plus nets for 11,657 units. For repair of 12,715 boats, a subsidy of Rs. 14.18 crore was given to the fishermen. Further, for out-board motors, in-board engines and for damage caused to fishing equipment, a subsidy of Rs. 45.86 crore has been disbursed. For mechanized boats and nets, a subsidy of Rs. 39.01 crore and a loan of Rs. 8.49 crore has been given in 254 cases. In Pondicherry, a subsidy of Rs. 13.92 crore has been provided for replacement of catamaran boats for 5,389 units. A subsidy of Rs. 8.01 crore has also been provided for 801 motor boats. For mechanized boats, subsidy of Rs. 8.19 crore has been given for 221 units. Similarly, 234 mechanized boats have been repaired with a grant of Rs. 7.65 crore. In Andaman & Nicobar Islands, 225 partially damaged boats have been repaired so far and orders for 324 boats have been given for replacement. In Kerala, 471 catamaran boats have been replaced and 553 repaired with a subsidy of Rs. 0.98 crore. 63 engine-fitted boats have been replaced and 581 repaired with the assistance of Rs. 1.11 crore. 146 out-board motors have been replaced and 199 repaired with an assistance of Rs. 1.71 crore. Rs. 3.95 crore have also been provided for nets. In Andhra Pradesh, 211 traditional boats have been replaced and 4095 repaired with a subsidy of Rs. 2.67 crore. 52 engine-fitted boats have been replaced and 2111 repaired with an assistance of Rs. 1.85 crore. An amount of Rs. 7.69 crore has also been provided for replacing fishing nets.

Table 6.4: Sector-wise Allocation

Sl No	Sector	Rs. in Crore	Percentage
1	Housing, internal infrastructure (water distribution, sewerage systems, roads, power distribution and village level water & sewerage)	3298.71	34
2	Livelihoods, including agriculture, fisheries and social welfare programmes	1519.42	15
3	Medium/ long-term reconstruction covering ports & jetties, roads & bridges, power & communication, tourism and social infrastructure	3773.53	38
4	Environmental/ coastal protection measures	828.59	9

Source: 'TSUNAMI - A Report to the Nation', June 3, 2005

Table 6.5: Replacement of Fishing Vessels

Sr. No.	States	Catamarans (100% subsidy)	Boats with motors (50% subsidy)	Mechanized boats (35% subsidy)	Total
1	Andhra Pradesh	1,000	0	362	1,362
2	Kerala	95	2,416	8	2519
3	Tamil Nadu	31,383	9,700	2,655	3,881
4	Pondicherry	6,280	1,241	239	7,760
5	A&N Islands	413	0	376	789
6	Total	39,171	13357	3640	

Source: 'TSUNAMI - A Report to the Nation', June 3, 2005

Table 6.6: Short and Medium Term Government of India Requirement Rs. in lakhs

Sr. No.	State/UT/GoI	Short term	Medium term	Total
1	Andhra Pradesh	5751	25765	31,516.00
2	Kerala	51,759.00	168,003.00	219,762.00
3	Tamil Nadu	172,095.00	265,183.00	437,278.00
4	Pondicherry	5566	36,267.00	41,833.00
5	A& N Islands	133,541.00	236,169.00	369,710.00
6	Ministry of Ports	18,936.00	74,438.00	93,374.00
	Total	387648	805825	1,193,473.00

Source: 'TSUNAMI - A Report to the Nation', June 3, 2005

Table 6.7: Estimated Total Package for Tsunami Relief, Rehabilitation and Reconstruction

Sr.No.	Source of Funding	Amount in Rs. Crore
1	Rajiv Gandhi Rehabilitation Package	3644.05
1A	Of which Permanent Housing &	752.3
1B	Other Permanent Infrastructure	854.71
2	Multilateral Agencies Distributed among States	3610.35
3	Other Sources e.g. Plan Assistance, Banks, Financial Institutions, etc.	4652.89
4	**Grand Total (1+2+3)**	**11907.29**

Source: 'TSUNAMI - A Report to the Nation', June 3, 2005

Table 6.8: External Assistance and Gap

Sr. No.	State/UT/GoI	External Assistance (UD$ Mn)				GoI Requirent (UD$ Mn)	gap (UD$ Mn)
		WB	ADB	UN	**Total**		
1	Andhra Pradesh	40	0	5.49	45.61	72.45	-26.84
2	Kerala	10	57	8.18	75.38	505.2	-429.82
3	Tamil Nadu	456	143	19.38	618.86	1005.24	-386.38
4	Pondicherry	47	0	4.94	51.94	96.17	-44.23
5	A&N Islands	0	0	0	0	214.65	-849.91
6	Ministry of Ports	0	0	0	0	214.65	-214.65
	Total (UD$ Mn)	553	200	38.79	791.79	2743.62	-1951.83
	Total (in Indian Rs MN)	24,055.50	8,700	1,687.40	34,442.90	119,347.30	-84904.4
	External assistance is 29% of requirement.						

Source*:* India Tsunami Rehabilitation & Reconstruction Program. Presentation to High Level Coordination Meeting K. S. Sidhu, Chief Coordinator, Tsunami Rehabilitation Program Planning Commission, Government of India Manila, March 18, 2005

The Central Government did not request for any external aid for immediate relief and instead, sought funds for the rehabilitation project. The government approved external assistance from multi-lateral agencies such as World Bank (WB), Asian Development Bank (ADB) and UN Agencies for long-term rehabilitation/ reconstruction in Tsunami-affected States/UTs. Bilateral assistance was also to be accepted if routed through the multi-lateral agencies. (See Table 6.6 to 6.8)

6.1.3 Scenario in Kerala

In Kerala, Tsunami had affected Kollam, Alappuzha, Ernakualm , Kannur and Trissure. Of these districts, Kollam and Alappuzha were most heavily damaged in terms of life and material, Aratupuzha and Alappad coastal Panchayats in particular. There was a separate damage and loss assessment done for each State. Gulati Institute of Finance and Taxation (GIFT) conducted a monitoring of the Tsunami Rehabilitation in 2012 which carried a revised assessment of damage and loss. Table 6.9 shows the details.

Table 6.9: Damage and Loss in Kerala

Component	**Initial Assessment**	**Revised after In-depth Assessment**
Coastal length prone to sea erosion (Kms)	250	590
Penetration of water into the mainland (Kms)	2-Jan	5
Average height of the tidal wave (Ms)	3 to 5	5 to 10
No. of villages affected	187	226
Population affected (In Lakhs)	4.25	10
Human lives lost (Nos)	171	238
Persons moved to safer places (Nos)	24978	24978
Dwelling places destroyed	2919	2919
Livestock lost (Exc. Poultry)	883	883
Crop area affected, including riverbank near the seashore (Ha)	949	3989
Boats destroyed (Nos)	10882	3989
Source: Disaster Management Department, GoK quoted in GIFT report		

After the disaster, the Planning Commission (India had the Planning Commission at the time of the disaster, it has now been replaced with the, The National Institution for Transforming India (NITI Aayog) approved the Tsunami Rehabilitation Programme (TRP) costing Rs. 1,441.75 crore. There were other sources of funding as well (Table 6.10).

Table 6.10: Sources of Funding for Tsunami Rehabilitation

Sources of Fund	**Name of the project**	**Money Received (Rs. in Crore)**
Government of India (additional central assistance)	Tsunami Rehabilitation Programme (TRP)	1148
ADB	Tsunami Emergency Assistance Programme (TEAP)	252.13
External	Japan Fund for Poverty Reduction	3.45

Source: Response to RTI- No. 60534/TRP C2/2009/DMD, dated 22.10.2010

Asian Development Bank lent Rs. 245.46 crore, of which, Rs. 103.86 crore was a grant and 141.60 was a loan. Table 6.11 denotes the schemes in which the money was spent.

Table 6.11: ADB's Fund Allocation and Sector

Schemes	**Rs. in Crore**
Means of sustenance	38.62
Reconstruction of roads and bridges	68.51
Ports and harbor	35.78
Water distribution	56.73
Rural basic infrastructure	37.31
Project completion aid	8.51
Total	**245.46**

Source: KLA -012-00132-00005, 8th March 2007, Thursday

Tsunami rehabilitation was not a very large financial burden for the Government of Kerala, since there was considerable Central Government assistance for every State affected by the disaster. Also Kerala's state budget for 2009-2010 allocated Rs 37 crore as supplementary demand for grants to meet additional requirements during the implementation of Tsunami Rehabilitation Project (TRP).

State government had to float a special administrative cell within the State secretariat to implement TRP. As far as the government systems were concerned, TRP was no different from a routine development project of the government and hence, the idea of rehabilitation has not been an integral part of TRP. The method of implementation was similar to that of a routine State-driven development project.

6.2 Post-disaster Rehabilitation

Post-disaster rehabilitation is a buzzword in the disaster management sector. Every agency involved in rehabilitation has a sense of controlling the whole life and livelihood of the affected people. It is true that the survivors have fewer choices in designing rehabilitation even though a participatory method is adopted. This research is being conducted 14 years after the incident, which has provided us enough ground to strongly argue that the rehabilitation of Tsunami survivors was not a big institutional challenge to the Government of Kerala. The government acted as both a facilitator and an agent. The major tasks were construction of houses, replacement of lost livelihoods, relocation of people within the 50 HTL, replacing social overhead capitals, and timely completion of pending projects of infrastructure development. . Active bureaucratic interventions were required and ensured in each phase of the project, proven by the long list of agencies involved in housing rehabilitation (Table 6.12).

Table 6.12: Houses Offered by Agencies in Kollam and Alappuzha Districts

Kollam		**Alappuzha**	
Agency	**No. of Houses**	**Agency**	**No. of Houses**
Mata Amrita Math	1480	Mata Amrita Math	150
Kerala Catholic Bishops Council	466	Malaya Manorama	52
CASA	73	Deepika	65
Malayala Manorama	-95	CASA	25
Kerala State Housing Board	3	Carithas India	205
INFARM	10	CPM	30
NRI Returnees Assn.	5	KSEB	1

OXFAM	41	World Vision	171
POABES, Tiruvalla	9		
KSEB	1	Seva Bharathi	51
OISCA International	2	Malankara Orthodox Church	20
YMCA	22	RECCA Seva Society	2
Marthoma Syrian Church	75	Samagra Vikasana Social Welfare Society	15
Union Bank of India	2	Salvation Army	56
Good Samaritan Project	30	NRI Returnees Assn	5
World Vision	494		
Carbone Lorraire (P) Ltd	16		
Malankara Orthodox Church	20		
KE Abraham Foundation	12		
Christian Church of Christ	9		
Salvation Army	21		
Communist Party of India	69		
Rev. KP Yohannan	10		
Alumini Forum, UAE	1		
Total	**2776**	**Total**	**149**

Source: South Indian Federation of Fishermen Societies, Kerala Information Centre – December 2005

Water supply and sanitation were pressing demands by the community even before Tsunami and the area-specific schemes were pending for a long period of time. All of these pending schemes were included in the TRP list and completed.

6.3 Rehabilitation, Basic Needs and Common Property Rights

Rehabilitation is, in general, a challenging project since the agency is accountable to the State as well as the society. One of the biggest challenges regarding Tsunami rehabilitation was the relocation of survivors. It is still an incomplete project in the two most heavily affected coastal villages- Azheekal and Alapad. 1131 families were relocated away from the coastal area, clustered in 56 colonies and provided with 3 to 4 cents of land and houses[24]. The government also offered them debt relief, livelihood support and educational assistance (Tsunami Scholarship) to students. Individual and collective needs of the community did not receive priority in decision making. The researcher has consistently visited the area since 2010 and issues pertaining to rehabilitation still exist. In fact, new issues are emerging. The community is fed up of being subjects of academic research but is still willing to talk. It is imperative to study the life of this displaced community after 14 years of a disaster.

6.3.1 Life of Tsunami-affected Communities

All the houses constructed in Alapad and Azheekal Panchayats have an area of 340 Sq Ft only, including the common structures and facilities. The plinth area of the newly constructed houses is not more than that of previously owned houses. None of the agencies engaged in providing houses has made any attempt to increase the existing norms of the minimum habitation concept. Houses with an area of 340 Sq Ft are common to all subsidized or free housing schemes for the deprived sections in Kerala[25]. Considering that the construction cost for these houses was calculated to be Rs. 3,00,000, no agency could construct a house having a larger area.

Moving into indistinguishable houses creates a new cultural identity for the survivors. Developmental disparity existing in the coastal areas was a guiding tool for the rehabilitation. It seems that rehabilitation was a conscious effort to simply replace what previously existed such as small houses and limited access to public services. Upward economic and social mobility were not the focus of rehabilitation. It looks like a well-defined project aimed at ensuring bare minimum provisions as rehabilitation, while also imposing a new identity on the community. Government records recognize them as 'Victims of Tsunami'[26]. Tsunami *Veedu* (Tsunami House) is a common term used in Malayalam to refer to these houses. A new person entering the area can also easily recognize the houses and identify the agency that has constructed them. It contributes to an identity of the people living there and is often considered a landmark in the area. To counter the burden of this new identity, some of them have altered the designs of the houses. A deeper analysis could be conducted to examine the complexity of this problem

[24] Tsunami Rehabilitation Project Unit, Kollam district.
[25] The famous M N One lakh housing for Scheduled Caste population and the ongoing tribal housing schemes are following a norm of 325 to 410 sq ft.
[26] Panchayat documents, income certificates, water supply connections, electricity bills and land taxes to local self-governments etc possess a specific note about this.

and would need a different theoretical framework. Multiple social boundaries and identities have been formed within the same community. The cultural geography of these villages has been subjected to the 'interest and limitations' of the rehabilitation agencies and has therefore, created 'boundaries' as well. The public memories retain this question of identity for years to come. Government assessments often look into the structural aspects and ignore the social implications. Yet, even the government assessment report does not appreciate the housing rehabilitation projects. The GIFT assessment needs to cross-refer with the field data.

The GIFT evaluation report explains that the initial project was to construct 11,000 houses and resettle the coastal households to a safer area away from vulnerable locations. It was later narrowed down to 9,124 houses. About 19.74 acres of government land and 120.74 acres of private land were acquired for the project across nine districts. Private land was purchased by the government. An amount of Rs. 331.66 crore was allocated for the project by the erstwhile Planning Commission of India. There were three categories of houses constructed: agency-implemented cluster housing, beneficiary-driven cluster housing, and *in situ* housing. Agency-driven houses were constructed by agencies from governmental and non-governmental sectors. The cost of houses was estimated on the basis of the prevailing rates and the release of funds was based on completion of construction. In beneficiary-driven houses, the families from the vulnerable coastal areas were allotted plots for constructing houses at the rate of Rs. 2.78 lakhs/house. *In Situ* houses were constructed on the land owned by the beneficiaries and an amount of Rs. 2.50 lakh was allotted for construction of each house, which was carried out by the beneficiaries themselves. GIFT also conducted a sample survey of 54 houses and found that these families have now settled down in 3 cents of land when they had owned more than that before Tsunami had owned more than 3 cents of land before Tsunami and they have now settled down in cents of land. The GIFT team rated the rehabilitation of housing as average. The report of the GIFT assessment is accurate and hence, has long-term impacts. The situation is more complex when it comes to colonies.

Displacement of disaster-affected communities is a global phenomenon. International Displacement Monitoring Centre, in its 2014 assessment, stated that disasters displaced an average of 270 lakh people every year between 2008 and 2013. This report is based on a global assessment which also found that 80.9 percent of these people belonged to Asia. This macro-level picture points to the severity of the issue and the absence of a comprehensive disaster risk management plan. The life of the people who were relocated to 56 colonies is an important focus of this research and hence, detailed qualitative interviews and FGDs have been conducted in the colonies.

Disaster-induced displacement has two phases: displacement due to disaster and displacement as part of rehabilitation. Tsunami has contributed to the creation of these two distinct types. Tsunami made life impossible for people living near the sea due to future risks. Thus, displacement of these survivors was an essential component of rehabilitation. They were provided with 4 cents of land and 410 Sq Ft houses. There are 56 rehabilitation colonies set up as part of the scheme. However, according to a survey conducted in 2011, not all of the residents were landless before Tsunami. Refer to Table 6.13 for the details.

Table 6.13: Land Occupied in the Previous Place

Sr. No.	Cents	Number of Respondents	Percent
1		27	39
2	0	25	36
3	1	1	1.4
4	1	1	1.4
5	10.5	1	1.4
6	2	1	1.4
7	2.5	6	8.7
8	3	3	4.3
9	3.5	1	1.4
10	4.5	1	1.4
11	5	1	1.4
12	7.5	1	1.4
13	**Total**	**69**	**100**

Source: Irshad (2014)

Table 5.13 shows the pattern of land ownership among the coastal community. This is a common feature of all coastal areas in Kerala; majority of them possessed *Puramboke land* i.e., land under government ownership. Currently, they enjoy legal ownership of 4 cents of land and the rest of them are entitled to a land for the first time. Providing 3 to 4 cents of land to the landless community is a routine practice in Kerala with its roots in the Kerala land reforms of 1971. It is an established fact that the land reforms hardly benefited the Scheduled Caste tenants, or the *kudikidappukar,* who lease a house-site and a piece of land from landowners, but virtually owned no land. Such tenants constituted almost half of all tenants. On an average, the *kudikidappukar* only received one-tenth of an acre of land per household (400 Sq m) under the land reform. The agricultural workers in rural areas were provided with 10 cents of land and those in urban areas, with 5 cents of land. The reform also set up huge colonies for the Scheduled Caste communities[27]. A close examination of Tsunami rehabilitation would convince us of the spectre of domination and assignment of land rights to the depressed section that was experienced during land reforms still operate in the Tsunami colonies. Theoretically, Caste-based discrimination is a criminal offence and is non-existent in the country. However, the incidents of Caste-based discrimination in

[27] *Bumi, Jathi Benthanam*-2004

a government welfare school for Scheduled Castes immediately after Tsunami are a matter of serious concern.

6.3.2 Scheduled Caste Welfare, State and International Non Governmental Organisation (INGO)

Shrayikkad Harijan Welfare School is an example of a contemporary rehabilitation programme; State failure compels the local population to invite an International Non Governmental Organisation (INGO) to ensure education to the children of fishermen. This incident shed light on the emerging development governance and the changing relationship of the public with the State. Public generally demand rehabilitation efforts from the State assuming that the State caters to their requirement in a democratic manner. However, when the State failed to fulfill its promises, it was, in principle, a violation of rights and led to public protests. In Kerala, there are many examples of this phenomenon. People in Srayikad village sought support from an INGO rather than fight for government support. This is a micro-level case of the *'NGOisation'* of development and rehabilitation. Besides, State negligence towards a Scheduled Caste (SC) welfare school is also concerning.

Tsunami had washed away the main building of the school. The classes for the next six months were conducted in a temporary building offered by Matha Amrthanandamayi Math. Tsunami gave a chance to the local community to demand a better infrastructure. The community was fully aware of the amount of money flown to the area for rehabilitation. The Parent Teacher Association (PTA) of the school had sought Rs. 25 lakh from the government for construction of the school. They demanded a building with 7 classrooms, since the school had classes from pre-primary to fourth standard. Yet, the Panchayat did not recognize their need and offered only Rs. 5.5 lakh for constructing two classrooms[28]. There are two issues here that need to be critically assessed: i) Negligence towards public education, and ii) Negligence of a SC welfare school. The acts of the Panchayat amounted to denying the right of the children of poor fishermen to quality education. On the contrary, private schools in the surrounding area received immediate financial support from the Panchayat for facilitating relief after Tsunami while Srayikad School was completely ignored. For instance, temporary sanitation facilities provided for the victims were not removed on time. The septic tanks caused severe health problems and the PTA had to resort to a protest march on the Panchayat office for their removal. The mid-day meal provision to the school was also interrupted. The PTA had to pay the primary teachers' salaries from their own account.[29] On 24th November, 2008, the PTA submitted a memorandum to the then SC Welfare minister Mr. A K Balan requesting him to sanction the full required amount[30]. The Education Department and SC Welfare Department denied their request. The PTA then approached 'World Vision India', an INGO, for financial support[31].

[28] PTA's letter to the then Chief Justice of India, dated 31-12-2008
[29] PTA's letter dated 24-11-2008
[30] PTA's letter to the Minister of SC Welfare, dated 24-11-2008
[31] PTA's letter to District Collector, Kollam District, dated 17-3-2009 and World Vision's letter to The Deputy Director of Education, Kollam District, dated 12-03-2009

The office of the Deputy Director, Department of Education in Kollam district accepted the PTA request and gave an approval to World Vision to construct the school building, with the following conditions[32];

a) The school building and classrooms have to be constructed in accordance with Kerala Education Rules
b) Construction of the work must be under full supervision of the Gram Panchayat
c) The ownership of the new building must be vested with the Education Department
d) The new building will not create any hurdles to the future expansion of existing buildings
e) Each stage of the construction must be verified by the Assistant Executive Engineer and handed over to education department
f) Full cooperation of PTA should be ensured

Thus, the intervention of an INGO was facilitated with a governmental approach. The government negligence had multiple causes: i) Lack of interest in uneconomic public schools; ii) Flaws in SC welfare projects, and iii) Changes in the principles of governance. Public education system in Kerala is getting less support from government, especially for infrastructure. The transfer of responsibility of public education to local self-governments has made interventions from the PTA necessary as never before. This is one of the reasons that PTA in Srayikad School directly approached World Vision. Support from an INGO happened to be the solution for the local people.

World Vision was the last resort for the PTA. Children of poor fishermen were forced to sit in a temporary building for 5 years without proper access to sanitation and water supply. The issue ought to be analyzed from a human rights perspective. The PTA president had also sent an appeal to the then Chief Justice of India to intervene in this regard[33].

6.3.3 The New Identity of Tsunami Colonies

Tsunami was the first experience of its kind for the survivors. Major material losses consisted of houses and livelihood equipments. The lost lives, however, are irreplaceable and continue to be painful after 14 years. The survivors moved into the rehabilitation colony after staying in a temporary shelter with poor support systems for one-and-a-half years. They were excluded from the public life and underwent a grave struggle in order to survive. It was not easy to ask them to recollect the past for the purpose of this study. The life of the survivors changed after that and the mental stress and physiological disorders were regular in the area. Still, some were open to talks. For instance, Mr. Suman (52) lost his daughter in Tsunami. The family got an ex-gratia payment of Rs. 1 lakh. Another survivor Mr. Ram (62) lost his son. His pain too, is unending, and will last till his last breath. Those who did not lose their loved ones have adapted to the new system, rather have been forced to adapt. However, families of the deceased are still struggling to accept the truth. Mothers who lost their children have not come out of the trauma. It was also discovered that some women had spent money on treatment to get pregnant[34].

[32] GO No F 2-4 200/09 dated 24-3-2009
[33] PTA President K. Sudha's letter to the then Chief Justice K G Balakrishnan, dated 31-12-2008
[34] The respondents were reluctant to share more details in spite of having a personal meeting with them.

Every natural calamity leaves various imprints on its survivors. It may take time for them to come to terms with the reality. Once settled down, the survivors revisit the manner in which they were treated at the time of the disaster. 14 years of living in rehabilitation colonies made Tsunami survivors contemplate the government's approach towards them when the disaster had struck. As Ms. Devika (58) narrates, *the government misuses this panic situation*. According to her, government agencies took advantage of the situation and decided about relocation and compensation according to its own interests and convenience. The State exercises its power over the weak and interprets the lives of the people made vulnerable and disempowered by natural disasters. It could be read as lack of interface between government agencies and Tsunami victims. However, the Tsunami survivors believe that the government misused the situation as the government was aware, more than anyone else, that the people needed its support to survive and hence, there would be total acceptance of government programmes and policies.

One of the objectives of this research project was to understand the 14 years of experience of living with the facilities provided by government and non-governmental agencies. The researcher has been in contact with the community for the last 8 years and did not expect any positive narratives from the survivors. One of the respondents narrated that the facilities provided it had affected '*our work, food system and income sources also'*. This is true, since many of them have been displaced from practicing decentralized traditional fishing to being boat workers. They have lost their access and social power on the coast, which allowed them complete freedom in docking fishing boats, drying fish and even selling it. For them, Tsunami took away their community life and forced them to lead a highly regulated and controlled social and economic life. Mr. Sudhakaran (55) termed it '*re-plantation'*. Although the administrative language defines it as relocation that prevents them from further exposure to hazard, it was 'replanting' for the community in terms of psychological pressure and isolation. Sudhakaran put it in simple yet powerful words, '*We can't hear the sound of sea*'. The statement expressed every aspect of their pain. Isolation has disempowered them and stopped them from taking advantage of relocating to a safer area.

Moving to the settlement colony was not a direct passage. When Tsunami struck on 26th December, 2004, the local victims were moved to temporary relief camps constructed by government and NGOs. Many survivors eventually moved to their relatives' houses and later to the settlement colonies. The respondents stated that they had accepted this solution since they did not have the option to bargain with the government. There are several issues with their residence. They were initially offered pipe water and electricity free of cost, but had to pay for them later. Another issue is space congestion, which is even more significant for the fishermen who were accustomed to open coastal areas and had to settle in a small settlement. In addition to the altered lifestyle, they also have to bear the demeaning public perception of them as people living under mercy. The new identity is unpleasant for the community.

Every resident of the settlement wished to return to the areas from where they were relocated. However, that is not easy, since the government has implemented the 'Coastal Regulation Zone, 2011' (CRZ) notification to restrict new constructions there. Facilities such as housing, sanitation and water supply are unavailable and difficult to acquire. The

latest CRZ draft notification permits fishermen to e stay within 50 m of the CRZ. Tsunami survivors then realized that returning was not an option and that they would have to live in the settlement colony till the very end.

People who survived or were injured in the disaster had to stay in temporary shelters and camps with inadequate facilities for a year. They were forced to accept the poorest sanitation facilities and other challenging circumstances for lack of a better option. Respondents shared many experiences of living with mental stress and the emotional pain of losing their family members. Ms. Susheela (56) said, *'We lost everything, clothes, furniture and documents, so we had no choice left except to move to the camp and live with the support offered by others*'. None of them wished to continue their dependency on others for essential needs, and took up jobs as far as possible. However, access to livelihood practices is also a serious issue. Fishermen have to start their days at 1 am to reach the shore in time. Sometimes if there is a possibility of a good catch, they start even earlier and many of the residents of the rehabilitation colony are unable to join.

One of the most sensitive and critical questions pertaining to relocation is social isolation. It also reflects how the society views the victims, especially in Kerala. The survivors' experiences with the settlement are far more worrying than what the disaster rehabilitation management envisages. They have acquired a new identity- The *Tsunami Colony*. Mr. Madhu (48) narrated it saying, '*Outsiders wanted us to be obedient to them as if we are under their mercy'.* School children complain that teachers often treat them differently because '*S/he is from Tsunami Colony'*. There exists an undeclared boycott for residents of *Tsunami Colony*. Such boycott gradually disempowers the survivors. Social boycott is demonstrated in keeping them away from public functions and private gatherings where they can interact with outsiders. It could be argued that rehabilitation efforts excluded such communities further while ensuring them security from coastal hazards. Government programmes or projects are not going to stop such social exclusion. It needs a larger transformation in the society to view it as a violation of rights.

Rehabilitation has actually become an impediment to the socio-economic mobility of the survivors. It is in violation of the 'International Covenant on Economic, Social and Cultural Rights[35]',. This convention talks about the inherent dignity of human beings. The government, with respect to Tsunami rehabilitation, ensured basic needs to the survivors, inevitably constituting to promotion of the 'excluded' method of rehabilitation. Large-scale changes are necessary in the approach towards rehabilitation.

Building a life after disaster is a complicated process in developing countries, more so due to the dependency on agencies supporting survivors during the crisis. The survivors unanimously agreed that the government often considered them *beggars.* This opinion formed simply because of the dominating approach of the bureaucracy towards them. It is true to some extent that the bureaucracy treated them as people who constantly seek support and keep complaining. Also, social and cultural diversity were neglected while planning rehabilitation, which, according to the survivors, was because government and bureaucracy never wanted to discuss the matter and possible solutions with them.

[35] adopted and opened for signature, ratification and accession by General Assembly resolution 2200A (XXI) of 16th December, 1966

6.4 Incomplete Tsunami Rehabilitation

Tsunami rehabilitation project had been a massive developmental intervention in the area, so it is imperative to see the its status and potential impact on social and economic mobility of the affected community and the area. The following part discuss this critical issue based on filed data, Government's assessment report and local community organization's data base.

6.4.1 Infrastructure Investment

During this period, the State government had carried out interventions in the area; however, all of them were being demanded by the people in the locality from a long time. For instance, the Ayiramthngu-Azheekal Bridge was constructed with the financial assistance of Rs. 21.72 crore by ADB under the Tsunami Emergency Assistance Programme[36]. It had been a strong demand by the local population for decades, but materialized only after Tsunami and utilized rehabilitation funds. The drinking water project financed by the World Bank with community participation was actually planned before Tsunami struck. Local people who have not been affected by Tsunami still perceive the disaster as an opportunity. The delay in providing development assistance and letting other agencies for rehabilitation persuaded the victims to revisit the services provided by the government immediately after Tsunami. In fact, the initial relief work done by government agencies was not satisfactorily delivered to all the victims. For instance, the respondents are still not free from the stigma generated while staying in the temporary shelter offered by the government. They were provided with basic amenities; yet, the quality and quantity was a matter of concern. The GIFT assessment, which had a set of mandate to operate, rated the infrastructure rehabilitation as 'good'. However, an assessment conducted by a local activist group in 2014 based on information collected through the 'Right to Information Act' (RTI) reveals another dimension of infrastructure development after Tsunami[37]. It is discussed in the following part.

6.4.2 Drinking Water

Coastal areas are known for their drinking water crisis. After Tsunami, a special project called Ochira Drinking Water Supply Project was announced exclusively for Tsunami survivors. An amount of Rs. 16.54 crore was sanctioned for the project (AB.4-104/2014-23-04-2014). The RTI reply from the government agency showed that Rs. 16.14 crore were already spent and an additional Rs. 38.31 crore from the ADB fund was also allocated to drinking water supply. In Alappuzha district alone, approximately Rs. 8,51,91,000 were spent on drinking water supply projects (A5-1496/06 Date 4-01-2014). However, the crisis of drinking water accessibility still exists. The project has not yet been completed and many pipes and accessories laid as part of the project were unutilized and eventually rusted.

[36] TEAP Evaluation report.2009

[37] Tsunami Area after 10 years: An Assessment Study. Prepared by Coastal Area Protection Council

6.4.3 Old Age Home in Alappad and Arattupuzha

The old age homes constructed with the help of Member of Legislative Assembly (MLA) and Member of Parliament (MP) funds have not yet been occupied.

6.4.4 Health Care

Public health care facilities in the region have faced neglect by the government; for instance, the maternity and child health centre in Kochochira. No funds have been allocated to the centre and the doctors are not regularly present. Another example is the Shraikkad Ayurvedic dispensary. The building of the dispensary was damaged by the disaster and was reconstructed with Rs. 24 lakhs sponsored by All India Bank Employees' Association. The then minister for food and civil supplies promised that the dispensary would upgrade to a hospital, but no action has been taken yet. The secondary health care centre in Alappad was upgraded from a primary health care centre and renovated at the cost of Rs. 1,39,50,000. It has not been opened yet for public use. Another unfulfilled promise is the 24-hour-operating primary health care center of Alzheekal. The fisheries hospital in Tharayil Kadav is running with only three staff members and no other facilities. None of the demands of the local community were approved by the government in spite of many efforts and protests.

6.4.5 Coastal Protection

TS Canal is an important water source in the area and has cost the Irrigation Department Rs. 16,47,84,000 (A2-833/06). Although the Department claims to have spent money on protecting the western part of the canal, that part is completely destroyed and the remaining canal is also disappearing. The local community demands implementation of scientific measures of coastal area protection. The expert team from IIT-Chennai had recommended four groins in Azheekal. Government agencies ignored the recommendations and constructed groins in the Shraiykkad area, which resulted in coastal erosion in other areas. Erosion has badly affected the public facilities in the area, such as the Government Harijan Welfare School, *Shrayikkad* Ayurvedic dispensary, Ochira drinking water pipelines etc. Despite government claims of huge spending on coastal area protection, the Kakaththuruth part of Shraikkad is disappearing day-by-day due to heavy erosion.

6.4.6 Education

The ‘Right to Education Act’ (RTE) recommends that there must be an Upper Primary (UP) school present every three kilometers. However, the Pandarathuruthu Government Primary School has not yet upgraded to a UP school. Coastal Area Protection Council has conducted many demonstrations and protest marches for upgradation of the school. Local fishermen are now paying for the school bus fuel. Running the school has become their responsibility more than the Education Department’s.

Kuzhithura Fisheries Higher Secondary School was constructed in 1954, with another building added in 1964. Many students of the school lost their lives in the Tsunami. A building with 11 classrooms was washed away by the Tsunami. Later, the then Minister of State for Energy Mr. KC Venugopal recommended that the rural electrification corporation

build schools. They offered a new building with 6 classrooms. The then Member of Parliament Mr. P Rajendran offered them support in 2007from the MP local area development fund. The construction was completed in 2014. There is still no boundary wall for the school and no part of the Tsunami funds was allocated to the school to buy land for expansion.

6.4.7 Valeazheekal Higher Secondary School Aratupuzha Panchayat:

Classes are conducted in an Asbestos-roofed building with insufficient toilet facilities. The new construction has stopped in between. Government officials and contractors are profiting from it and the bureaucracy is unaffected by the denial of rights of poor fisherman's children.

Thrikkunnapuzha Government Lower Primary School:

The reply from the Education Department to a request filed under RTI claimed that Rs. 55,76445 out of the sanctioned Rs. 58,25,000 was spent on development of the entire schools, of which, Rs. 8,00,000 were allocated to the Thrikkunnapuzha Government Lower Primary School and Rs. 7,74,448 were actually spent. (H7/9714/13, dated 27-06-2013). However, the construction of the building is still unfinished.

6.4.8 Integrated Child Development Scheme (ICDS) Centres

There are 27 ICDS centres in Alappad, of which, four do not have a building and three are running in rented premises. Government sanctioned Rs. 25 lakh for ICDS centre, but the construction is incomplete with no assurance of completion from the government agencies. Ochira block Panchayat has sanctioned Rs. 8,00,000 for ICDS centre, but unavailability of land has stalled the project. There are about 40 ICDS centres in Aratupuzha Panchayat. Out of them, 19 do not have a building or land. Centre no. 29 in the 9th ward of the Panchayat is being run in a prawns peeling shed. There are 30 ICDS centres in Thrikkunnapuzha Panchayat, of which, 21 do not have a building and 19 possess no land. There are 30-year-old ICDS centres in the region which still have no proper basic facilities.

6.4.9 Road Development

The Public Works Department (PWD) claimed that it spent Rs. 48,52,78,483 on road development in Tsunami-affected areas (A6-RTI-1/2014, dated 4-03-2014). It also stated that Rs. 47,79,69,997 was spent on the Azheekal-Alappad Road, the Paravoor-Pozhikara Road, and the Shakthikulangara-Thangashery Road. However, the present conditions of these roads completely contradict the claim. This road connects with the fishing harbour and the Jangar jetty and hence, the development of fishing harbour in the area has been badly hit. Another road connecting with the Perumbally Kuriyappsheril Temple was constructed by collecting contributions from the local community, although Tsunami funds were available. The proposed Jangar Service between Valeeazheekal-Azheekal is still an unfulfilled promise. Kerala State Transport Corporation services connecting the Tsunami-affected areas have been withdrawn.

6.4.10 Labour Sector

Infrastructure development of the local fishing sector is completely neglected by government agencies. The Chereazheekal fish landing centre is mostly used by traditional fishermen using Catamaran boats (local boat), and the long standing community demands for improvement in the quality of the harbour have met with no action. The community is also demanding a harbour in Kayamkualam for the last 50 years; however, no action has been taken to improve the facilities. It has affected the auction of the fish, forcing the fishermen to sell the fish on the shore and causing a huge economic loss to the State. The government has wasted huge amounts of money on constructing an auction hall, wharf, internal road and developing the North bank in the Valeeazhekal fish landing centre. The Harbour Engineering Department has spent Rs. 4,06,84,543 (RT-22/2014/EE/H/ECL (A) dated 27-01-2014) for this. The government has spent Rs. 14,87,56,850 from theTsunami Rehabilitation funds on non-affected areas of West Kallada, Thevalakkara, Paravoor, Neendakara, Mantro Island etc, while neglecting the local area where the community lives and works.

6.4.11 Basic Infrastructure

The Community Resource Centre in *Shrayikkad* was meant to promote various Livelihood Training Centres; however, no such activities take place there. Agricultural Department has spent Rs. 2.43,32,306 for various agricultural development projects in K S Puram, Klappana, Aalappad, Karunagappaly, Kollam, Iravipuram, Shakthikulangara, Panmana, Mayyanad, Paravoor, Chavara and Neendakara villages. The government spent money for for industrial development as part of Tsunami rehabilitation, especially on the textile printing project in Alappad; yet, nobody in Alappad Panchayat knows its location. Though Tsunami mainly hit the fisheries sector, only Rs. 59,75,808 was sanctioned for the sector, of which, Rs. 57,19,996 was spent by Kollam corporation , Karunagappaly Municipality and Alappad Gram Panchayat. The independent social audit that yielded these findings was done by the Coastal Area Protection Council (*Theeradhesha Samrakshna Samathi*). It does not have legal authority; but has authentic sources of data and hence, needs to be put in as on part of the CAG report. Interestingly, no local politicians or parties wanted to take it up and question the authorities. This approach shows that the political establishment and bureaucracy consider disaster relief as charity and those who possess the power can make decisions according to their wishes. This approach needs to be revisited.

6.5 Livelihood and Tsunami Rehabilitation

Livelihood rehabilitation was not the biggest challenge since the fishermen community primarily chooses fishing and allied activities as their livelihood. Thus, there was no pressure on the centre or the State government to look for alternative livelihoods for the affected communities. Table 6.14 tells provides details of conventional (fishing) livelihood support programmes implemented by the government.

Table 6.14: Assistance to Conventional Livelihood Activities

Sl No		Cost in Lakh		No. of Units		No. of Beneficiaries
	Schemes	**Allocation**	**Utilization**	**Proposed**	**Achieved**	
1	Repair and replacing of marine fishing input	216.8	147.88 (68.20%)	1476	1332 (90.24%)	1332
2	Repair and replacement of inland fishing input					
3	Introduction to LPG kit for OBM	31.65	4.42 (13.96%)	750	104	
4	Vehicle for fresh fish marketing	279.2	38.8	100	12 (12%)	66
5	Working capital for revolving fund	150	254.85 (169.33%)			10015 (Fisherme n)
6	Assistance to women fish vendors for fish marketing	79.99	79.99			1704

Source: GIFT Assessment Report 2012

There was a comparatively higher involvement by the government in the fishing livelihood rehabilitation. GIFT has rated the performance as average. This macro-level data needs to be assessed with facts and truth at the micro level.

6.5.1 Livelihood Rehabilitation at the Local Level

A qualitative assessment of cases from the relocated colonies was conducted to examine the complex nature of livelihood rehabilitation after a disaster. Since it is a fishing community, every single coastal disaster first affects their livelihood by taking away livelihood equipments and displacing livelihood practices. Ms. Sheena, a fish worker, mentioned that her family lost all their livelihood assets. For her, '*We lost all our life and life support systems'.* She had to start from scratch and depend on support from agencies,

both public and private. The survivors seldom had a chance to follow a selective approach to agencies. Instead, they had to seek support from whoever was willing to offer it.

The NGOs and other non-State agencies actively supported survivors immediately after the disaster. Government offered an immediate cash support , and NGOs and religious organizations offered clothes and essential utensils to the community. It is also true that government agencies were not able to differentially assess individual needs at the time of the calamity. They wanted to view them as a homogenous community and provide a common support system. This has some demerits. Primarily, individual resilience is never taken into consideration; instead, a collective mechanism is offered and community mobilization for resilience is expected. A critical feature of rehabilitation was that no non-governmental agency was effectively involved in the livelihood promotion projects. Some NGOs offered fishing equipments to those who lost it to Tsunami.

Loss assessment is considered a key component of disaster rehabilitation and economic recovery. Ms. Sheena (46) recollected that they stayed in camp for months and the officials and government agencies kept informing them that they would be compensated for their loss to Tsunami. She remembered that no one could assess their real loss. Later, they rented a house and the government paid them Rs. 7000 for vacating the house and Rs. 1000 for the rent. A proper assessment of needs was not done and the community was not consulted with for the same. According to her, *'Government and bureaucracy were busy demonstrating their ability and did not consider the community or protect the coast'*. This comment came 14 years after Tsunami, which is a reflection of how the institutions approach Tsunami survivors. It is also true that the bureaucracy holds undue power when a natural calamity strikes in an economically backward area. They can define the need of the society according to their institutional norms and power.

The community had to put in a lot of hard work and effort to recover from the Tsunami impact. Creating new livelihood options and searching for new income sources consumes their time and energy. There is no surplus income generated; they have to struggle to sustain themselves.

The government introduced micro-finance initiatives as part of livelihood rehabilitation, a micro finance initiatives is called Theeramythri. It was funded by ADB in 2005 and was later upgraded by the erstwhile Planning Commission of India to ensure supplementary income to the women affected by Tsunami. The Society for Assistance to Fisherwomen (SAF), which was registered under Travancore- Cochin Literary and Charitable Societies Act, 1955, and was known as the *Theeramythri project, was unique in terms of fund allocation. However, its activities are not new to the community. The project was meant to ensure livelihood to women and cost Rs.* 89 crore under the TRP. It aimed to establish a chain of micro-enterprises in the coastal villages. *Theeramythri* is a cooperative society for livelihood promotion and hence, emphasizes participation from community members. Tsunami survivors joined the scheme expecting better incomes and livelihoods. However, only some of the schemes are under operation now. The reason to invest in understanding the success and failure of Theeramythri is that it was projected as a unique experience in disaster rehabilitation in Kerala.

Though the government claims it as a successful community-based project, other assessments contradict the claim. Salim et al (2017) observed the key factors that sustain the Theeramythri project in the entire state of Kerala. They found that approximately 2500 micro-enterprises were initiated immediately after Tsunami and only 1000 have survived till now. 500 units were closed in 2016 itself. Increasing liabilities, low turnover and low profit have led to several dropouts.

The unit which is still operating is proof of the contribution of its members in sustaining it. Some members approach Theeramythri for membership and sometimes, Theeramythri coordinators approach and persuade the members to join. The groups that have relied on simple micro-credit initiatives are running successfully. For instance, the projects such as hotels and lunch services are still operating. The harbour and the fish auction centres provide the market for their business. Strong market linkages and collective action have allowed these groups to succeed. The number of collectives dropping every year since the inception of the scheme is alarming. The success of the groups depends on their ability to capture the market and be aligned with the local politics.

One of the members of a closed Theeramythri collective, Ms. Meenakshi (53), joined this micro credit initiative in 2017. It was a six-member organization with a total investment of Rs. 13000. The members received a bank loan for the project. They produced sambar powder, rasam powder, teyyal mix, pickle powder and vegetable masala. The production was dependent on the immediate surroundings and the local market. Competition between groups within Theeramythri also caused many units to end. The concept of micro credit is dependent on various networks at the grass root level. Community mobility is the most celebrated concept of such initiatives; it is good for the society to come together and work together. However, becoming a full-fledged commercial entity requires forward linkages with the market. The community accepted Theeramythri as it was necessary for them to survive at the time. Everybody considered it to be an opportunity for upward economic mobility and the hope to overcome livelihood loss. This particular scheme continued only for six months but could be restarted with government help. No member is against the project; they like the idea of coming together to work. However, it is a challenge for them to identify the project as part of Tsunami rehabilitation and engage with it as an institution for recovery. Theeramythri extends across the coastal Kerala and has been offered a stabilization package of Rs. 4 crore by the Government of Kerala[38] in spite of a large number of dropouts. It seems that the government desperately wanted to continue with the institutional form of support. Community mobility did exist in the beginning since the communities were in search of alternative social spaces to identify themselves as victims of Tsunami. Thus, Theeramythri was a collective hope rather than a supplementary income support project. The project itself does not wish to be identified as a disaster rehabilitation project. At present, it is operating through conventional self-help groups in the coastal area. The victims of Tsunami do not own Theeramythri. This means that, although it proved to be a success for non-victims, it should to be treated as a failure. The GIFT assessment in 2014 showed that there is no change in the overall business volume of the scheme.

[38] GIFT Evaluation report

It is apparent that the government spent money; yet, it has not had a considerable impact on the quality of life of the survivors. However, regardless of the challenges faced by the community, the mining economy did benefit from Tsunami.

Livelihood security of the fishermen live in the colonies is a neglected concern. As in the case of coastal erosion affected areas, the fishermen live in the relocated colonies have to spend more time than their colleagues in non-Tsunami affected area. They have to start at 3 AM to reach the shore or harbour i.e to travel additional seven kilometre to reach the harbour. The working hours increased but not the income. Fishermen who had own boats and nets give it up and become workers in the boat since they cannot keep it on the shore. As discussed in the previous chapter the survivors have to depend on harbour for livelihood and not earning any better income after displacement. The economic inequality between the colony and others proved this. They do not have supplementary income to meet even the maintenance expenditure of houses.

6.6 Mining, Tsunami and Coastal Regulation Zone

The study was first conceived as a study of the rehabilitation problems of Tsunami victims in Alzheekal and Alappadu villages. Interactions with office bearers of the Coastal Area Protection Council (A local movement by fishermen to protect the coastal resources) exposed some of the critical issues pertaining to Tsunami rehabilitation and the issues of community rights over non-fishing resources in the area. Relocation of Tsunami victims from the coast has another crucial economic dimension in the region. Government record is completely silent on such alienation of victims from the non-fishing resources in the area. So it needs thorough analysis to see the link between displacement and resource alienation of the survivors. The following part discuss this in detail.

These two villages are well known for their mineral deposits. Two public sector companies namely Kerala Minerals and Metals Ltd (KMML) and Indian Rare Earth (IRE) Ltd have full control over the sand mining and extraction process. Mining has gone on for more than three decades here. Mining has resulted in a continuous sea surge in Ponaman and Vellanamthurutu villages in the Kollam District of Kerala and devastated them. Extensive mining has taken away the land of these villages to such an extent that they now only exist in government records. Unscientific mining has reduced the distance between the sea and the lake in the Ponmana area into 10 m in the South and 20 m in the North. The local people demand reclamation of the mining area with the waste sand and want deep level mining instead of the present upper layer mining. Their demand is also highlighted in the ‘Mineral Conservation and Development Rules, 1988’ framed under the Mines and Minerals (Development & Regulation) Act (MMDRA) of 1957 and the Mines Act of 1952. Under the MMDRA, 1957, and the rules therein, the companies are bound to fill back the mined area with the waste sand after separation of minerals with a view to restore the land to its original form and undertake rehabilitation and restoration of the affected land. The legal protection of the community has been violated by these public sector companies.

Decades of mining has snuffed out an area nearly 2 kms in length and half km in width in the Ponaman village. A recent resurvey conducted by the Land Revenue Department found that the parts of the land under the following survey numbers are missing: survey nos 45, 46, 47, 87,88, 93, 94, 252, 253, 257, 258, 256, 263, 264, 265, 266, 296, 297, 298, 300, 301,

302, 327, 329, 330, 332, 336, 341, 342, 344, 346, 349, 350, 354, 355, 356, 357, 359, 362, 368, 371, 372, 373, 374[39]. Thazhayil Kadave Junction is an area that completely disappeared within 20 years[40]. KMML had purchased the land in Ponaman for mining at a high rate from 900 families, out of which, only 50 are now left in the village. KMML had ensures land reclamation by using the residual sand after segregating minerals. However, the company now sells this sand in the local market at Rs. 150/Ton[41].

As per the provisions of the MMDRA, mining activities can only be carried out as per the approved mining plan given by the Department of Atomic Energy under the Conservation and Development Rules of 1988. KMML had more than 50 acres of land in Ponmana Ward and IRE possesses a larger piece of land in the adjacent Alappad Panchayat. As per the license given to IRE and KMML, they are entitled to do mining operations within the area specified in the license, meaning that they could carry out mining operations within the area of 50 acres or 60 acres respectively. Yet, there are 580 acres of non-leased land in Ponmana Ward alone, out of which, 438 acres of leased land has been mined. Now these lands are submerged by sea surge and a large area of the leased land has also been encroached upon by the sea.

The companies were asked to undertake deep sea mining covered with a seawall. Yet, since their inception, they have only been carrying out surface mining in which sands only from the surface up to the height of 2 or 2.5 feet are taken. This made it easy for seawater to enter that the mined area and after this procedure continued repeating, the entire area was gradually encroached upon by the sea. Rule 34 mandates that every license-holder of a mining lease undertake restoration, reclamation and rehabilitation of the land affected by the prospect of or the actual mining operation and shall complete the work. Rule 41 also states that the lease-holder shall restore, to the extent possible, other flora destroyed by mining operations. The heavy mining and its environmental impacts has forced a local resident, Mr. G. Bhagavan Sing, to file a Public Interest Litigation (PIL) in the High Court of Kerala[42]. Mr. Singh is the petitioner while the Union of India and others are the respondents of the case. The petitioner has attached a study conducted by Dr. P. G. Kurup under the direction of The Kerala State Human Rights Commission, which found that '*the damage already done is beyond the magnitudes that can be allowed under any consideration*'. The studywent on to say that the claim made by the companies that the damage caused is not due to the mining but is a result of the natural wave action is incorrect. The study recommended construction of a seawall[43]. This evidence submitted by the petitioner led to legal and scientific interventions.

For instance, the National Institute for Interdisciplinary Science and Technology (NIIST) found that the Chavara coastal stretch has undergone erosion and that mining increased it. The study also found that mining was the only man-made cause for it. Other reasons include destruction of protective sand dunes and tough dune vegetation. The study also referred to another study conducted by the Centre for Earth Science Study which

[39] Survey no L A.7/24074/81. Kollam Collectorate, dated 19.5.1981
[40] Mathrubhumi daily, 5-11-2009
[41] Mathrubhumi daily, 6-11-2009
[42] W.P. (C) No. 33196/2009
[43] Report Submitted to State Human Rights Commission, dated 07/08/2000

recommends 60,000 Transaction Per Second (TPS) sand to be mined. The extraction by beach washings collection exceeds this amount. According to the production data of KMML (KMML 2010), 2,89,490 tonnes of raw sand was consumed at their Chavara Mineral Separation Plant (MSP) in 2008-09. Out of which 1,82,263 tonnes was extracted from Ponmana. However, the actual collection must have been more than that since 34,068 tonnes of sand was already pre-concentrated at the Ponmanna before transportation to MSP. In the absence of data, the actual sand collected for the Ponmanna is estimated to be 6 times 34,068 tonnes and 2,04,408 tonnes. Hence, a total of 352603 tonnes of sand was removed from Ponamana beach alone. Assuming sand bulk density to be 2650 Kg/m3, the volume of sand lost is 133000 m^3. The volume loss at shoreline would manifested as lowering of land elevation and land submergence. There is no definite estimate of submergence. Merely for the sake of understanding, provided that there is no net accretion or erosion in the absence of mining, the removal of 133000 m^3 of sand would imply loss of an area of 13 ha to the sea as a result, if the beach elevating decreases by 1 metre.

These studies recommend recovery of heavy minerals from sea-bed deposits instead of beach washing for long-term. They state that environmental costs of seabed mining are expected to be less than that of beach washing collections. This report recommended further mining on the following conditions: a) Beach washing collection: Redeposit rejected sand on beach and gradually cease beach washing collection and adopt other methods; b) Inland mining with dredge concentration plant should be continued; c) Seabed mining: New projects must be developed by the concerned mining companies to recover seabed deposits and rebuild beaches[44]. In response to the NIIST study, the Industries Department filed an affidavit to the High Court of Kerala (W.P (c) No:33196 of 2009, dated 12th January, 2011, stating that NIIST study is fully silent about the extent of land lost and the damage caused to the land as a result of natural wave action. The affidavit also states that there are no definite estimates of submergence of land.

6.6.1 Mining of KMML and IRE

KMML replied to a request under RTI[45] and provided information that it has taken up 152 acres of land under notification no L A.7/24074/81. The company fixed the price as shown in Table 6.15.

[44] Report on Beach Sand Mining and Erosion at Chavara Coast by National Institute For Interdisciplinary Science and Technology, dated 30-december 2010

[45] TP/RIA/PIO/11/1443, dated 16th March, 2011

Table 6.15: Prices of Land Acquired for KMML

	Basic	**62% package benefit**
Dry land	11351	18388
Reclaimed dry land	7566	12256
Wet land	4555	7379
Water-Logged land	2277	1411

Source: TP/PIO/RIA/10 dated 07/07/2010/4152

The company states that there is 0.574 MT of waste sand in every MT of mineral sand. The weighted average percentage of quality in feed material (mineral sand) during the period from April 2010 to January 2011 was 57.4 percentages. The company claims that the waste sand is stored for future systematic reclamation. The product extracted out of mining are: a) Ilmenite, b) Rutile, c) Zircom, d) Sillimanite. KMML refused to provide any information regarding its revenue from the sale of waste sand. However, it had earlier furnished some data related to this[46]. The company replied to another RTI request dated 28/06/2010 and provided details of the quantity of sand sold to private parties. Table 6.16 mentions the quantities.

Table 6.16: Waste Sand Sold by KMML from 01-01-2009 to 31-12-2009

Month	**Quantity (MT)**
Jan-09	no sale
Feb-09	833
Mar-09	3321
Apr-09	2318
May-09	2700
Jun-09	4078
Jul-09	5250
Aug-09	8287
Sep-09	5623

[46] TP/PIO/RIA/10, dated 07/07/2010/4152

Oct-09	2909
Nov-09	3947
Dec-09	287
Total	**39553**

Source: KMML Letter to Sri S. Ramanan dated 07/07/2010

The company sold the waste sand at Rs. 115 per MT (including royalty at Rs. 10/- and taxes) from February 2009, which was subsequently increased to Rs. 170 per MT (including royalty and taxes) from September 2009[47]. The reply by KMML to the above RTI and the information disclosed later is contradictory and exposes a critical environmental issue. The lack of reclamation increases the environmental vulnerability in these areas, but neither government nor the companies think over it. Mass movements are increasingly taking a form similar to the local protest led by the Coastal Area Protection Committee.

6.6.2 Mining of IRE

IRE has taken up 71.81 acres of land in Alappad Panchayat. The company fixed rates for the land as shown in Table 6.17.

Table 6.17: Prices of Land Acquired for IRE

Sl No	**Particulars**	**Cost (Rs.)**
1	Land with tar road access	34983
2	Land with gravel road access	31485
3	Land without road access	27986
4	Reclaimed dry land	19590
5	Wet land	13993
6	Water-logged land	6997

Source: RTIA-2005/11. Dated 7/3/2011

The company went on to state that in addition to this, it pays 62% of basic land value as solace and 7% of basic land value as incentives to eligible landowners as per the negotiated package of the purchase.

[47] KMML Letter to Sri S. Ramanan dated 07/07/2010

As far as IRE is concerned the waste sand in one MT of mineral sand presently mined from Alappad Panchayat area is 60% to 65%. Similar to KMML, IRE also claims that waste sand is presently used to refill dredge mined areas and low lying land owned by IRE Chavara[48]. The product extracted out of mining are: a) Ilmenite, b) Rutile, c) Zircom, d) Sillimanite, and e) Leucoxene. Though mining provides employment to the local community, there is a large-scale protest against it, which includes PILs.

The case of Mr. Bhagavan Singh filed in the High Court of Kerala explains the public resistance against mining. The local communities of Vellanamthuruthu and Ponman are not involved in the anti-mining struggle since they unanimously sold the land to company. Thus, technically, the company mined their own land for the last decade and the local community had no legal rights to protest. The intervention by Mr. Bhagavan Singh is in the form of a PIL that caused multiple kinds of conflicts in the area. Not everybody supports Mr. Sing; for instance, the educated middle class aspiring employment in mining companies resist any attempt to mobilize people against mining. There are some success stories too; for instance, the local movement led by the Coastal Area Protection Council was able to hold back the launch of a mineral plant promoted by Westralian Sand Limited and Renisen Gold Field Corporation Limited in 1994[49]. The protest movements are still active and the private mining companies are not yet permitted in the area. Tsunami 2004 has opened new opportunities for mining. Relocation of families and the 2011 notification of CRZ opened new business opportunities for mining in the area. The notification made it clear that "a) projects relating to Department of Atomic Energy; (c) mining of rare minerals" are exempted from CRZ rules. . Page 4 of the notification mentioned that '*those rare minerals not available outside the CRZ area*' are completely exempted. IRE comes under the purview of the Department of Atomic Energy and is hence not subjected to any correction. Draft notification 2018 also permitted manual mining of coastal areas by agencies under Atomic Energy Corporation.

A new social media-based campaign movement 'Save Alappad' is being formed in the area to protest the land acquisition for further mining. The movement is active in articulating their concern wherever possible. The land from where people were relocated after Tsunami has now become a conflict zone. One could see that post-tsunami rehabilitation is, in fact, alienate the survivors from the local resource ownership. These complexities of rehabilitation have not been discussed in the public domain. More than 300 Kerala Niyamasbha (Legislative Assembly) Documents accessed through the archives were reviewed to study how the legislature of Kerala discussed Tsunami rehabilitation and its complexities.

6. 7 Kerala Assembly and Tsunami-related Discussions

On 7th February, 2005 the opposition MLA raised a question in the assembly on the amount of money spent for Tsunami relief and received a reply that as on 19th January 2005, Rs. 917.36 lakh were spent among different districts of the State. There was a discussion on convening a meeting with all the MPs from Kerala to put pressure on Central Government for financial support. The document also states that Kerala Government

[48] RTIA-2005/11. Dated 7/3/2011
[49] K C Sreekumar, 'Conspiracy behind Mineral Sand (Malayalam)', *Kalakaumudi Weekly*, 13/10/2002

received Rs. 61.30 crore under the Natural Calamities Relief Fund and Rs. 100 crore under Natural Calamity Contingency Fund from the Central Government.

On 2nd August 2005, the opposition questioned the schemes supported by the Chief Minister's Disaster Relief Fund (CMDRF). They indicated irregularities; however, the Chief Minister's reply carried all pertinent data. Out of Rs. 27.95 crore, 4.58 were spent for distributing free ration, 0.487 for welfare scheme, 20.5 for building seawalls and 2 for the maintenance of hatchery and harbour. Questions and answers on coastal protection after Tsunami on 22nd June, 2006 reflect how legislatures and the government implement coastal protection. It was mentioned in the reply that seawall construction as part of tsunami rehabilitation was initiated in Tsunami-affected or prone areas such as Jayanti Colony, Cheriyazheekkal, Kovil Thottam, of Alappad Panchayat of Kollam district, and Arattupuzha, Tharayilkkadavu, Kayamkulam, Ottamassery, Andhakaranazhi, Ernakulam district- Chellanam,Edavanakkadu, Kozhikkod- Kolavippalam in Alappuzha-Harippad constituent assembly. In the reply, it is mentioned that Rs. 21.27 crore were allocated for this. The legislative document indirectly indicates that legislatures were not aware of the recurring seawall fall and erosion in the area. There were discussions on the amount of money received through CMDRF. The legislative discussions were on the amount of money spent for different schemes and surprisingly, there was no serious discussion in the assembly on the quality of rehabilitation and the social isolation caused by it. Control and Auditor General's report in 2006 found some irregularities in fund spending by the government. Apart from these, there are no assessments of the Tsunami rehabilitation projects.

6. 8 Conclusion

This study is based upon fieldwork conducted 14 years after the incident and a review of existing studies and documents. Tsunami rehabilitation is not considered as a model to be emulated in other crises. Multiple institutions and organizations participated in the effort. It could be argued that all agencies acted according to their mandate. Survivors were not consulted with and the vulnerability of the community was taken for granted while providing support. The affected community was given no choice but to accept what was assigned to them as rehabilitation. Every agency enjoyed full autonomy in defining the others' life world. Tsunami was a disaster; however, the rehabilitation created secondary disasters in the form of deprivation, social isolation and poor socio-economic mobility. There is no public discussions nor any active government involvement in addressing these critical complexities of Tsunami rehabilitation in the state. The agencies assigned for disaster management also not put any efforts to prevent the secondary impacts of disasters in among the survivors.

Chapter VII

Cyclone Ockhi: Faults in Information Dissemination and the Resultant Struggle

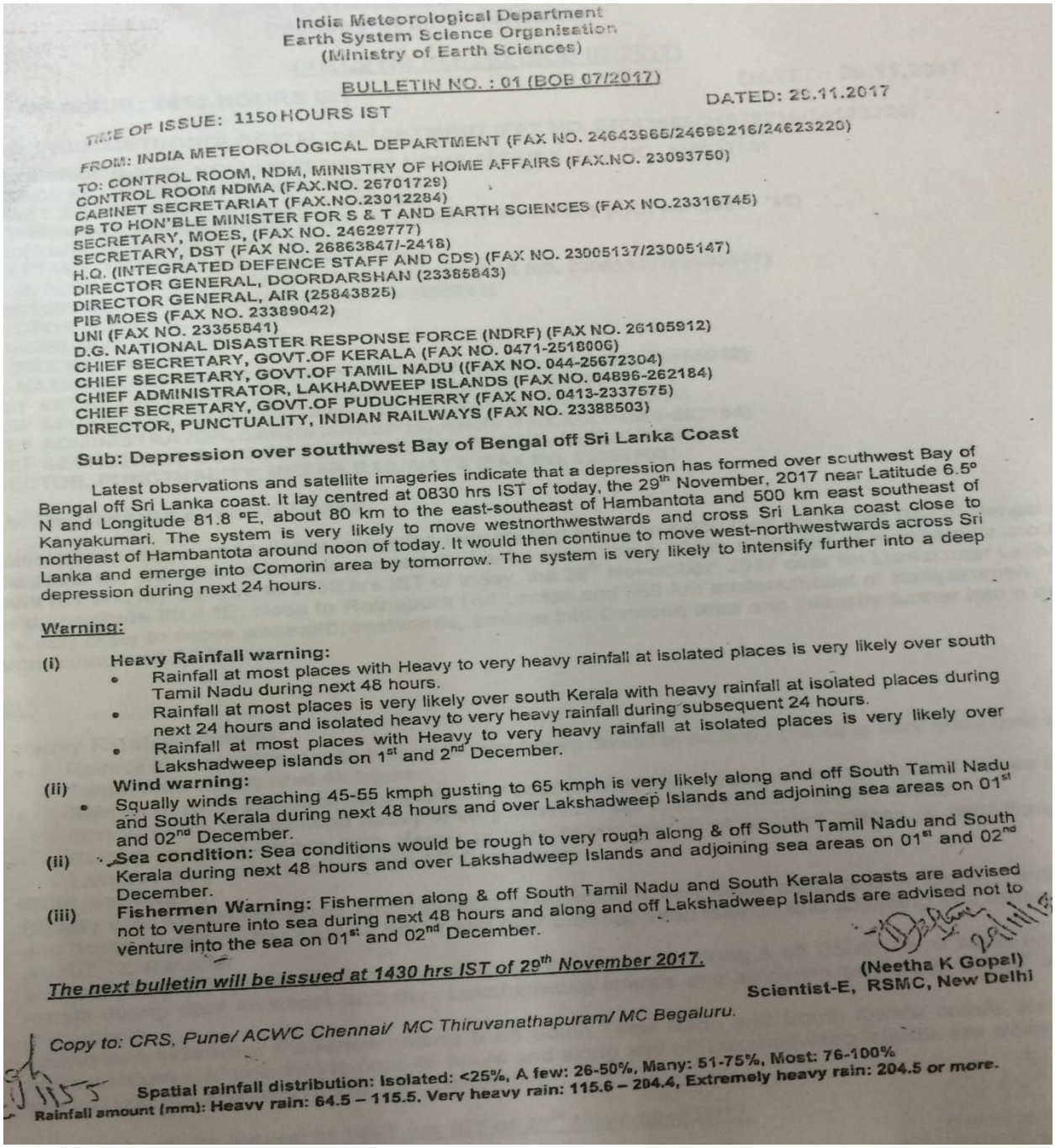
Introduction

The third case analyzed in this research is the Cyclone Ockhi in 2017 in Kerala. Kerala is not experience any devastating cyclone before as Odisha and Andhra Pradesh. The administration has no prior experience of dealing with Cyclone as well. Although Kerala and Tamil Nadu were both affected by Ockhi, this research is focused on Kerala since its objective is to study cases of coastal disasters in the State. Coastal erosion and Tsunami rehabilitation did not create any controversy in the State and no government official or minister faced any public rage. Ockhi, in Kerala, was a controversial event in terms of management. On November 27th of 2017, the local fishermen in the Vizhinjam area of Thiruvananthapuram district noticed some unusual weather changes in the sea. They informed the local church leaders, who tried to contact the administration. There were no signs of a major disaster up to this point. Fr Eugene Pereira, the vicar of Thiruvananathapuram diocese, was one of the leading spokespersons of the community during the crisis. The researcher interviewed him to understand the ground reality. He said:

On the morning of the 27th, I got a call from the coasts that said that there was some unusual change in the sea and that they were not able to contact the fishermen. I asked them to wait. In the evening, I again got a panic call that the fishermen had not come back. Then I rushed there. People were panicking and boats had not come back on their usual time. I called the Fisheries Minister first and asked her to do something; she said she would be there but did not arrive that day. I stayed there till 7.00 pm awaiting the Minister. I called the office of Mr. Shashi Tharoor, Member of Parliament, and informed them. I called everyone with power and position in my capacity and prayed for help. There was complete silence on the first two days. No idea of the number of boats that had gone for fishing and were in sea. Later the administration paid for this silence and it was the root cause of controversies related to Ockhi Cyclone. The local fishermen community perceived this silence as the collective attitude of administration towards fishermen and it was read as exclusion.

Meanwhile, Kerala State Disaster Management Authority (KSDMA) sent constant warnings of turbulent weather to the fishermen and advised them to avoid going fishing. There was total negligence and a lack of proper assessment of a potential threat in the first three days. Indian Meteorological Department's (IMD) institutional credibility was questioned by the scientific community as well as local fishermen. The researcher collected and analyzed the warning bulletins given by IMD to Government of Kerala from 29th November, 2017 to 1st December, 2017.

IMD Warning on 29th November, 2017 at 1415 Hours:



India Meteorological Department
Earth System Science Organisation
(Ministry of Earth Sciences)

BULLETIN NO. : 01 (BOB 07/2017)

TIME OF ISSUE: 1150 HOURS IST DATED: 29.11.2017

FROM: INDIA METEOROLOGICAL DEPARTMENT (FAX NO. 24643965/24699216/24623220)

TO: CONTROL ROOM, NDM, MINISTRY OF HOME AFFAIRS (FAX.NO. 23093750)
CONTROL ROOM NDMA (FAX.NO. 26701729)
CABINET SECRETARIAT (FAX.NO.23012284)
PS TO HON'BLE MINISTER FOR S & T AND EARTH SCIENCES (FAX NO.23316745)
SECRETARY, MOES, (FAX NO. 24629777)
SECRETARY, DST (FAX NO. 26863847/-2418)
H.Q. (INTEGRATED DEFENCE STAFF AND CDS) (FAX NO. 23005137/23005147)
DIRECTOR GENERAL, DOORDARSHAN (23385843)
DIRECTOR GENERAL, AIR (25843825)
PIB MOES (FAX NO. 23389042)
UNI (FAX NO. 23355841)
D.G. NATIONAL DISASTER RESPONSE FORCE (NDRF) (FAX NO. 26105912)
CHIEF SECRETARY, GOVT.OF KERALA (FAX NO. 0471-2518006)
CHIEF SECRETARY, GOVT.OF TAMIL NADU ((FAX NO. 044-25672304)
CHIEF ADMINISTRATOR, LAKHADWEEP ISLANDS (FAX NO. 04896-262184)
CHIEF SECRETARY, GOVT.OF PUDUCHERRY (FAX NO. 0413-2337575)
DIRECTOR, PUNCTUALITY, INDIAN RAILWAYS (FAX NO. 23388503)

Sub: Depression over southwest Bay of Bengal off Sri Lanka Coast

Latest observations and satellite imageries indicate that a depression has formed over southwest Bay of Bengal off Sri Lanka coast. It lay centred at 0830 hrs IST of today, the 29th November, 2017 near Latitude 6.5° N and Longitude 81.8 °E, about 80 km to the east-southeast of Hambantota and 500 km east southeast of Kanyakumari. The system is very likely to move westnorthwestwards and cross Sri Lanka coast close to northeast of Hambantota around noon of today. It would then continue to move west-northwestwards across Sri Lanka and emerge into Comorin area by tomorrow. The system is very likely to intensify further into a deep depression during next 24 hours.

Warning:

(i) **Heavy Rainfall warning:**
- Rainfall at most places with Heavy to very heavy rainfall at isolated places is very likely over south Tamil Nadu during next 48 hours.
- Rainfall at most places is very likely over south Kerala with heavy rainfall at isolated places during next 24 hours and isolated heavy to very heavy rainfall during subsequent 24 hours.
- Rainfall at most places with Heavy to very heavy rainfall at isolated places is very likely over Lakshadweep islands on 1st and 2nd December.

(ii) **Wind warning:**
- Squally winds reaching 45-55 kmph gusting to 65 kmph is very likely along and off South Tamil Nadu and South Kerala during next 48 hours and over Lakshadweep Islands and adjoining sea areas on 01st and 02nd December.

(ii) **Sea condition:** Sea conditions would be rough to very rough along & off South Tamil Nadu and South Kerala during next 48 hours and over Lakshadweep Islands and adjoining sea areas on 01st and 02nd December.

(iii) **Fishermen Warning:** Fishermen along & off South Tamil Nadu and South Kerala coasts are advised not to venture into sea during next 48 hours and along and off Lakshadweep Islands are advised not to venture into the sea on 01st and 02nd December.

The next bulletin will be issued at 1430 hrs IST of 29th November 2017.

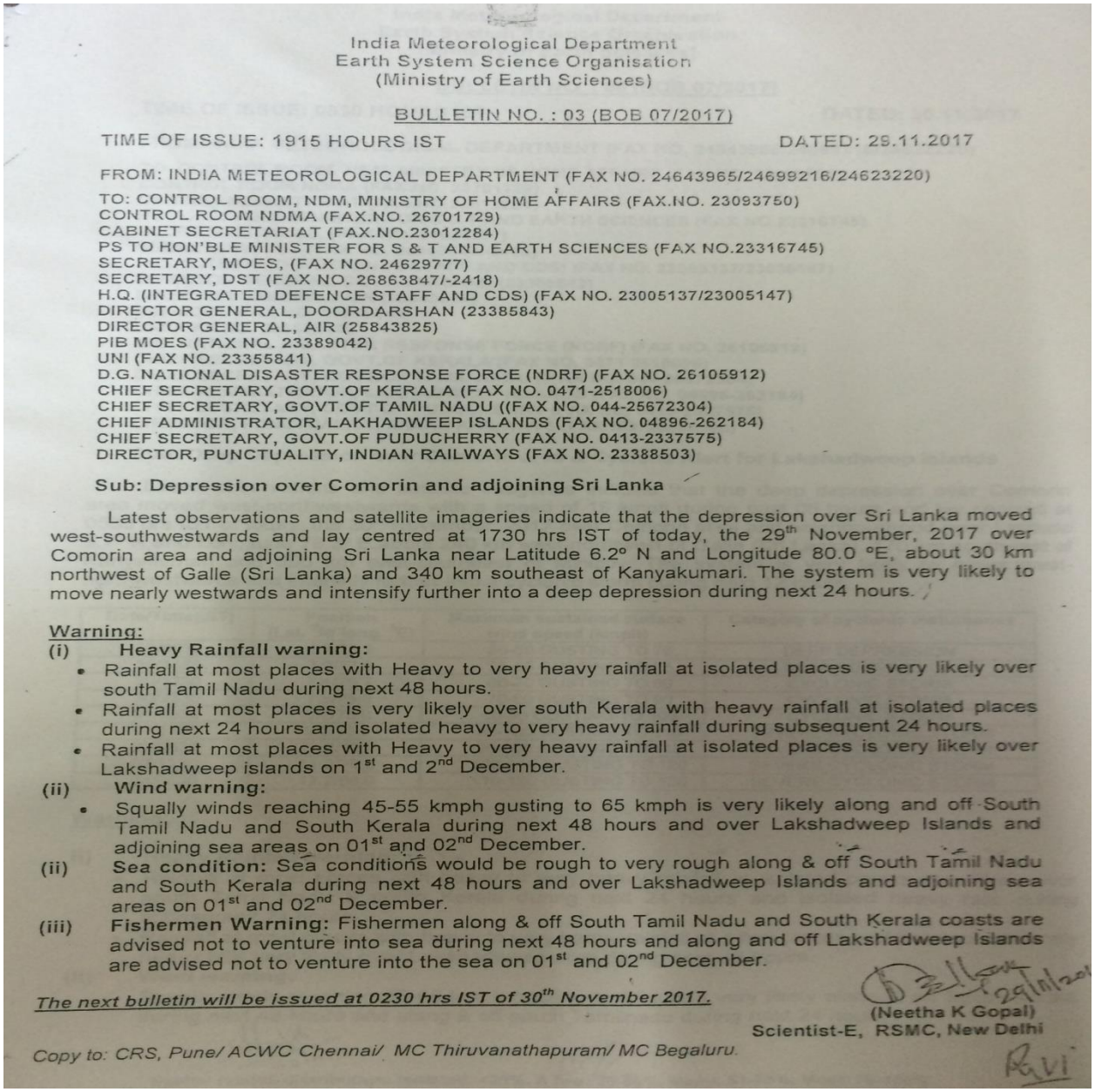
(Neetha K Gopal)
Scientist-E, RSMC, New Delhi

Copy to: CRS, Pune/ ACWC Chennai/ MC Thiruvanathapuram/ MC Begaluru.

Spatial rainfall distribution: Isolated: <25%, A few: 26-50%, Many: 51-75%, Most: 76-100%
Rainfall amount (mm): Heavy rain: 64.5 – 115.5, Very heavy rain: 115.6 – 204.4, Extremely heavy rain: 204.5 or more.

It warns of a heavy rainfall and advises fishermen to avoid going fishing on 1st and 2nd December.

IMD Warning on 29th November, 2017 at 1915 Hours:



India Meteorological Department
Earth System Science Organisation
(Ministry of Earth Sciences)

BULLETIN NO. : 03 (BOB 07/2017)

TIME OF ISSUE: 1915 HOURS IST DATED: 29.11.2017

FROM: INDIA METEOROLOGICAL DEPARTMENT (FAX NO. 24643965/24699216/24623220)

TO: CONTROL ROOM, NDM, MINISTRY OF HOME AFFAIRS (FAX.NO. 23093750)
CONTROL ROOM NDMA (FAX.NO. 26701729)
CABINET SECRETARIAT (FAX.NO.23012284)
PS TO HON'BLE MINISTER FOR S & T AND EARTH SCIENCES (FAX NO.23316745)
SECRETARY, MOES, (FAX NO. 24629777)
SECRETARY, DST (FAX NO. 26863847/-2418)
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CHIEF SECRETARY, GOVT.OF KERALA (FAX NO. 0471-2518006)
CHIEF SECRETARY, GOVT.OF TAMIL NADU ((FAX NO. 044-25672304)
CHIEF ADMINISTRATOR, LAKHADWEEP ISLANDS (FAX NO. 04896-262184)
CHIEF SECRETARY, GOVT.OF PUDUCHERRY (FAX NO. 0413-2337575)
DIRECTOR, PUNCTUALITY, INDIAN RAILWAYS (FAX NO. 23388503)

Sub: Depression over Comorin and adjoining Sri Lanka

Latest observations and satellite imageries indicate that the depression over Sri Lanka moved west-southwestwards and lay centred at 1730 hrs IST of today, the 29th November, 2017 over Comorin area and adjoining Sri Lanka near Latitude 6.2° N and Longitude 80.0 °E, about 30 km northwest of Galle (Sri Lanka) and 340 km southeast of Kanyakumari. The system is very likely to move nearly westwards and intensify further into a deep depression during next 24 hours.

Warning:

(i) **Heavy Rainfall warning:**
- Rainfall at most places with Heavy to very heavy rainfall at isolated places is very likely over south Tamil Nadu during next 48 hours.
- Rainfall at most places is very likely over south Kerala with heavy rainfall at isolated places during next 24 hours and isolated heavy to very heavy rainfall during subsequent 24 hours.
- Rainfall at most places with Heavy to very heavy rainfall at isolated places is very likely over Lakshadweep islands on 1st and 2nd December.

(ii) **Wind warning:**
- Squally winds reaching 45-55 kmph gusting to 65 kmph is very likely along and off South Tamil Nadu and South Kerala during next 48 hours and over Lakshadweep Islands and adjoining sea areas on 01st and 02nd December.

(ii) **Sea condition:** Sea conditions would be rough to very rough along & off South Tamil Nadu and South Kerala during next 48 hours and over Lakshadweep Islands and adjoining sea areas on 01st and 02nd December.

(iii) **Fishermen Warning:** Fishermen along & off South Tamil Nadu and South Kerala coasts are advised not to venture into sea during next 48 hours and along and off Lakshadweep Islands are advised not to venture into the sea on 01st and 02nd December.

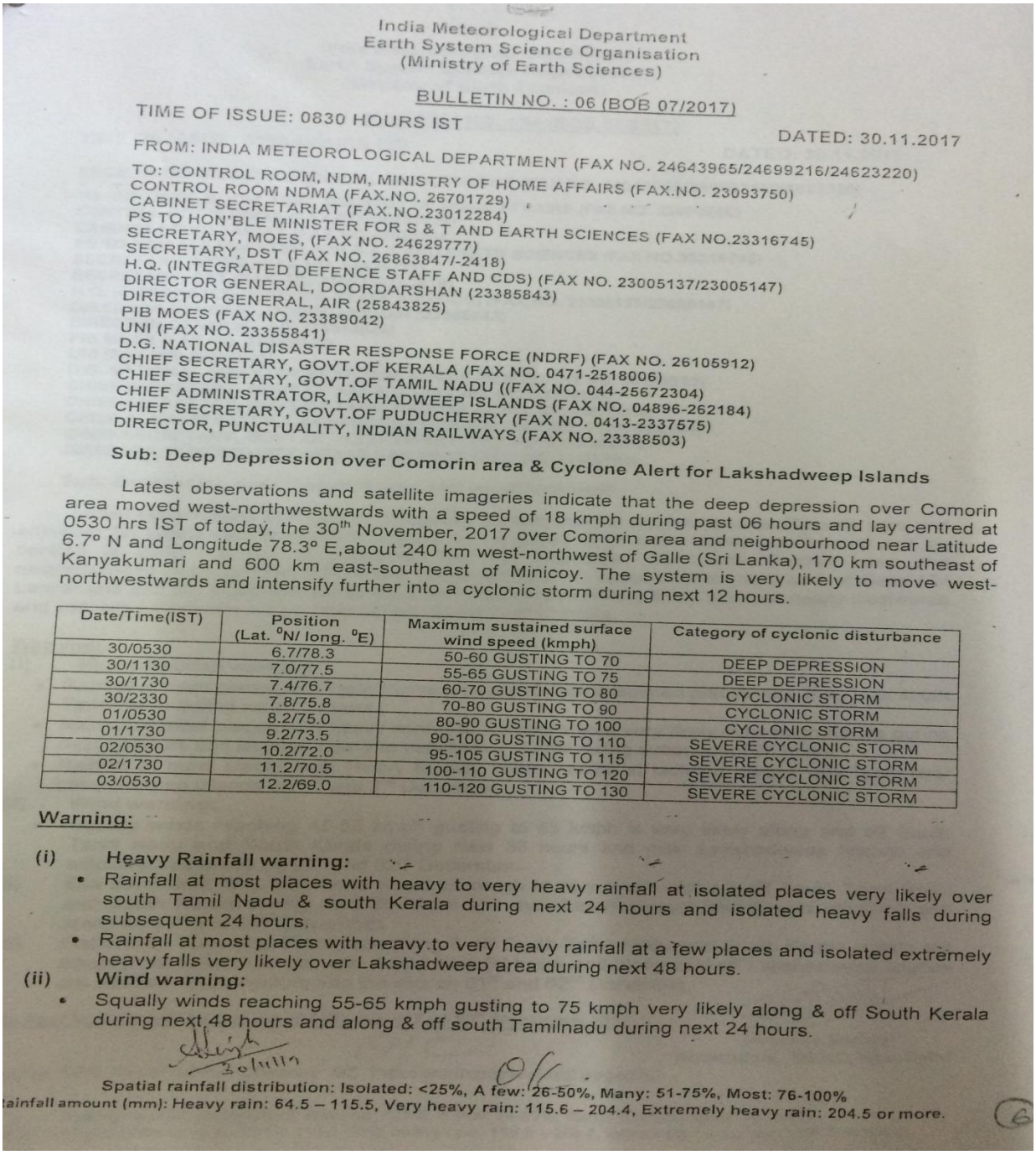
The next bulletin will be issued at 0230 hrs IST of 30th November 2017.

(Neetha K Gopal)
Scientist-E, RSMC, New Delhi

Copy to: CRS, Pune/ ACWC Chennai/ MC Thiruvanathapuram/ MC Begaluru.

It warns of a heavy rainfall and advises fishermen to avoid going fishing on 1st and 2nd December.

IMD Warning on 30th November, 2017 at 0830 Hours:



India Meteorological Department
Earth System Science Organisation
(Ministry of Earth Sciences)

BULLETIN NO. : 06 (BOB 07/2017)

TIME OF ISSUE: 0830 HOURS IST

DATED: 30.11.2017

FROM: INDIA METEOROLOGICAL DEPARTMENT (FAX NO. 24643965/24699216/24623220)

TO: CONTROL ROOM, NDM, MINISTRY OF HOME AFFAIRS (FAX.NO. 23093750)
CONTROL ROOM NDMA (FAX.NO. 26701729)
CABINET SECRETARIAT (FAX.NO.23012284)
PS TO HON'BLE MINISTER FOR S & T AND EARTH SCIENCES (FAX NO.23316745)
SECRETARY, MOES, (FAX NO. 24629777)
SECRETARY, DST (FAX NO. 26863847/-2418)
H.Q. (INTEGRATED DEFENCE STAFF AND CDS) (FAX NO. 23005137/23005147)
DIRECTOR GENERAL, DOORDARSHAN (23385843)
DIRECTOR GENERAL, AIR (25843825)
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UNI (FAX NO. 23355841)
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CHIEF SECRETARY, GOVT.OF TAMIL NADU ((FAX NO. 044-25672304)
CHIEF ADMINISTRATOR, LAKHADWEEP ISLANDS (FAX NO. 04896-262184)
CHIEF SECRETARY, GOVT.OF PUDUCHERRY (FAX NO. 0413-2337575)
DIRECTOR, PUNCTUALITY, INDIAN RAILWAYS (FAX NO. 23388503)

Sub: Deep Depression over Comorin area & Cyclone Alert for Lakshadweep Islands

Latest observations and satellite imageries indicate that the deep depression over Comorin area moved west-northwestwards with a speed of 18 kmph during past 06 hours and lay centred at 0530 hrs IST of today, the 30th November, 2017 over Comorin area and neighbourhood near Latitude 6.7° N and Longitude 78.3° E,about 240 km west-northwest of Galle (Sri Lanka), 170 km southeast of Kanyakumari and 600 km east-southeast of Minicoy. The system is very likely to move west-northwestwards and intensify further into a cyclonic storm during next 12 hours.

Date/Time(IST)	Position (Lat. °N/ long. °E)	Maximum sustained surface wind speed (kmph)	Category of cyclonic disturbance
30/0530	6.7/78.3	50-60 GUSTING TO 70	DEEP DEPRESSION
30/1130	7.0/77.5	55-65 GUSTING TO 75	DEEP DEPRESSION
30/1730	7.4/76.7	60-70 GUSTING TO 80	CYCLONIC STORM
30/2330	7.8/75.8	70-80 GUSTING TO 90	CYCLONIC STORM
01/0530	8.2/75.0	80-90 GUSTING TO 100	CYCLONIC STORM
01/1730	9.2/73.5	90-100 GUSTING TO 110	SEVERE CYCLONIC STORM
02/0530	10.2/72.0	95-105 GUSTING TO 115	SEVERE CYCLONIC STORM
02/1730	11.2/70.5	100-110 GUSTING TO 120	SEVERE CYCLONIC STORM
03/0530	12.2/69.0	110-120 GUSTING TO 130	SEVERE CYCLONIC STORM

Warning:

(i) **Heavy Rainfall warning:**

- Rainfall at most places with heavy to very heavy rainfall at isolated places very likely over south Tamil Nadu & south Kerala during next 24 hours and isolated heavy falls during subsequent 24 hours.
- Rainfall at most places with heavy to very heavy rainfall at a few places and isolated extremely heavy falls very likely over Lakshadweep area during next 48 hours.

(ii) **Wind warning:**

- Squally winds reaching 55-65 kmph gusting to 75 kmph very likely along & off South Kerala during next 48 hours and along & off south Tamilnadu during next 24 hours.

30/11/17

Spatial rainfall distribution: Isolated: <25%, A few: 26-50%, Many: 51-75%, Most: 76-100%
Rainfall amount (mm): Heavy rain: 64.5 – 115.5, Very heavy rain: 115.6 – 204.4, Extremely heavy rain: 204.5 or more.

It warns of heavy rainfall and winds, but does not mention a cyclone.

IMD Warning on 30th November, 2017 at 1200 Hours:

India Meteorological Department
Earth System Science Organisation
(Ministry of Earth Sciences)

BULLETIN NO. : 07 (BOB 07/2017)

TIME OF ISSUE: 1200 HOURS IST DATED: 30.11.2017

FROM: INDIA METEOROLOGICAL DEPARTMENT (FAX NO. 24643965/24699216/24623220)

TO: CONTROL ROOM, NDM, MINISTRY OF HOME AFFAIRS (FAX.NO. 23093750)
CONTROL ROOM NDMA (FAX.NO. 26701729)
CABINET SECRETARIAT (FAX.NO.23012284)
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SECRETARY, MOES, (FAX NO. 24629777)
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D.G. NATIONAL DISASTER RESPONSE FORCE (NDRF) (FAX NO. 26105912)
CHIEF SECRETARY, GOVT.OF KERALA (FAX NO. 0471-2518006)
CHIEF SECRETARY, GOVT.OF TAMIL NADU ((FAX NO. 044-25672304)
CHIEF ADMINISTRATOR, LAKHADWEEP ISLANDS (FAX NO. 04896-262184)
CHIEF SECRETARY, GOVT.OF PUDUCHERRY (FAX NO. 0413-2337575)
DIRECTOR, PUNCTUALITY, INDIAN RAILWAYS (FAX NO. 23388503)

Sub: Cyclonic Storm 'OCKHI' over Comorin area & Cyclone Warning for South Kerala, adjoining districts of south Tamil Nadu and Lakshadweep Islands- ORANGE message

Latest observations and satellite imageries indicate that the deep depression over Comorin area moved west-northwestwards with a speed of 38 kmph during past 06 hours and intensified into a cyclonic storm **'OCKHI'** and lay centred at 0830 hrs IST of today, the 30th November, 2017 over Comorin area and neighbourhood near Latitude 7.5° N and Longitude 77.5° E, about 340 km west-northwest of Galle (Sri Lanka), 60 km south of Kanyakumari, 120 km southwest of Thiruvananthapuram and 480 km east-southeast of Minicoy. The system is very likely to move west-northwestwards towards Lakshadweep Islands and intensify further into a severe cyclonic storm during next 24 hours.

Date/Time(IST)	Position (Lat. ^{0}N/ long. ^{0}E)	Maximum sustained surface wind speed (kmph)	Category of cyclonic disturbance
30/0830	7.5/77.5	60-70 GUSTING TO 80	CYCLONIC STORM
30/1130	7.8/77.0	60-70 GUSTING TO 80	CYCLONIC STROM
30/1730	8.5/75.8	70-75 GUSTING TO 85	CYCLONIC STORM
30/2330	9.0/75.0	80-90 GUSTING TO 100	CYCLONIC STORM
01/0830	9.5/74.2	90-100 GUSTING TO 110	SEVERE CYCLONIC STORM
01/1730	10.4/72.7	95-105 GUSTING TO 115	SEVERE CYCLONIC STORM
02/0830	11.4/71.2	100-110 GUSTING TO 120	SEVERE CYCLONIC STORM
02/1730	12.4/69.7	110-120 GUSTING TO 130	SEVERE CYCLONIC STORM

Warning:

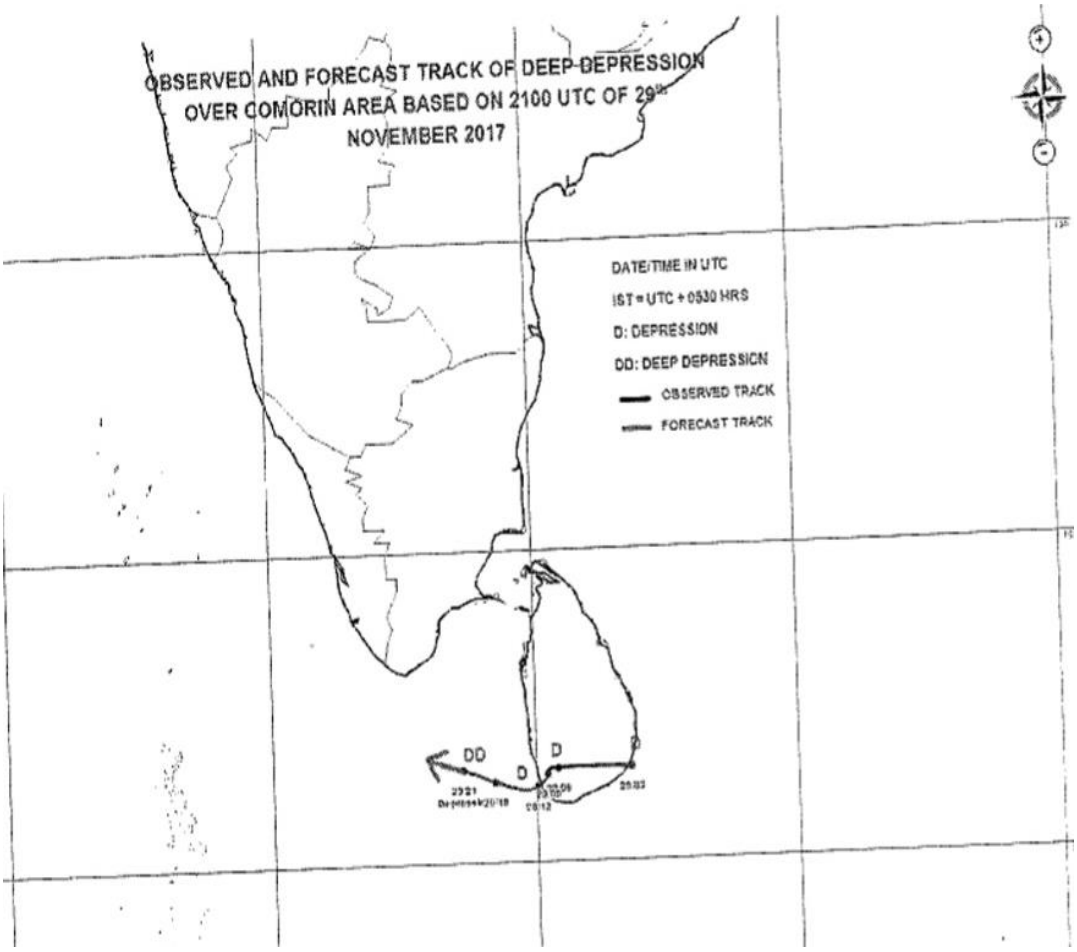
(i) **Heavy Rainfall warning:**

- Rainfall at most places with heavy to very heavy rainfall at isolated places very likely over south Tamil Nadu & south Kerala during next 24 hours and isolated heavy falls over interior Tamil Nadu and Kerala during subsequent 24 hours.
- Rainfall at most places with heavy to very heavy rainfall at a few places and isolated extremely heavy falls very likely over Lakshadweep area during next 48 hours.

(ii) **Wind warning:**

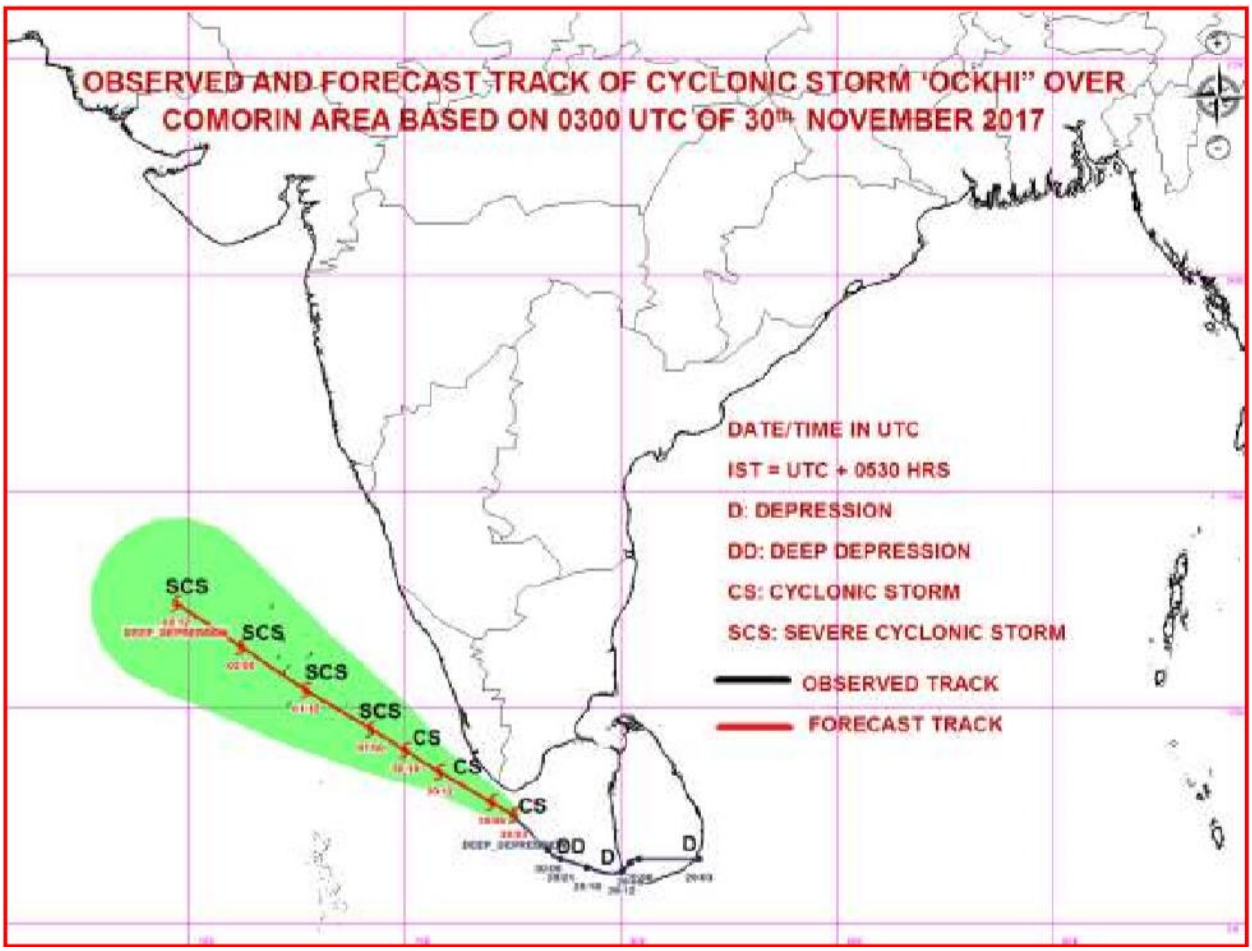
The first warning of a cyclone came at around 1200 hours on 30th. By this time, fishermen had already been to the sea for a couple of days.

The warnings collected from KSDMA justify their claim that there were no cyclone warnings from IMD.



Forecast:

1. Moving in S-W direction
2. Likely to emerge as a **Cyclonic Storm** in 12 hours i.e., before 5.30 pm on 30.11.2017
3. Warning to Fishermen: Advised not to venture into sea for 36 hours



7.1 Authenticity of the Warning

It seems that both government and elected representatives were dependent on an early warning by the 'authentic agency' to respond. There are two critical issues pertaining to this: One is the heavy dependency on an authorized source of information and the other is the social and economic position of the community. Cyclone warning has four stages: In the first stage, a Pre-Cyclone Watch is issued 72 hours in advance. In the second stage, cyclone alert (Yellow alert) is issued 48 hours in advance and contains information on the location and intensity of the storm and the likely direction of its movement. In the third stage, cyclone warning (Orange alert) is issued minimum 24 hours in advance. The fourth stage is 'Post Landfall Outlook' (Red alert), which is issued at least 12 hours in advance of the expected time of rainfall. In case of Ockhi, a cyclone warning was issued on 30th November, 2017, by which time it had already resulted into landfall. KSDMA issued a statement justifying their response with a clear reason. The statement said that KSDMA had not received any clear alert, and argued that they cannot act unless they are given a proper cyclone warning. KSDMA is entitled to pass only 'scientific' information and hence, depend only on scientifically validated sources. These conflicts indirectly indicate the need to build scientific society and the need for its engagement with the large public. As Douglas (2003: 9-10) observed, "*Science has not produced a run of people who do not wish to dominate one another. Industrialization has not produced a race of human beings*

disinclined to use danger in the rhetoric that protects the public good. The difference is not in the quality of knowledge but in the kind of community that we want to make, or rather, the community we are able to make, or I should say, the community that technology makes possible for us". IMD represents a scientific community and hence state depends on its scientific agency to disseminate the knowledge and put its administrative responsibility according to IMD's response. KSDMA is not bound to respond to the non-scientific transformation of knowledge. KSDAM is not duty bound to act outside its 'scientific administrative domain', so they are not entitled to answer public apprehensions on early warning. The conflict between IMD and KSDMA over the warning system is, in fact, a conflict over knowledge and domination. Cyclone warning is within the jurisdiction of the IMD, and the State government can respond to it and act within the federal systems. KSDMA and State Government (Kerala) are not entitled to declare a cyclone without a clear indication of the cyclone, its speed and landfall. This could be read as the official position on disaster management and community or local agencies demand for early response never overrule it informed position. It is simple to understand that the State government was awaiting an official and scientifically validated warning. What is missing here is the power to define a disaster and community and its agents are completely left out in this process. This could be the reason why Minister and MP's office never respond to the request of Church leaders. However, in a democratic system they are bound to respond and listen to the community. Conflict may arise with such action, yet it is the fundamental rule of a democratic administration. It was a conflict over power to define a scientific process. It also forces us to think about the institutional capability and power of State government to assess and disseminate information about a disaster. It is a simple matter of communication between administrative levels that can be settled without any mutual threat. Hence, at the administrative level, the mismanagement of the cyclone is not a big issue to be discussed and debated. It is the community which bear the brunt of itThe local fishermen who survived the Ockhi said:

'We were in the sea and did not get any warning of the cyclone. My boat got broken and I was helped by the rescue ships'.

Every respondent gave a statement that there were no early warnings given to the community about the cyclone. The Hindu newspaper, on 7th December 2017, carried a response of the Chief Minister regarding the early warning. He was quoted as saying, "On November 28, the Indian National Centre for Ocean Information Services (INCOIS) had published an advisory on its website asking fishermen to be cautious while going into the sea. At this point, the government had received no alert message through email or fax. On November 29, INCOIS issued a communication asking fishermen not to venture out to sea. The advisory was carried by some media. At 8.30 am on November 30, an IMD bulletin said that a depression centered 170 kms south of Kanyakumari was intensifying into a deep depression. No cyclone warning was issued at this stage, but the fishermen were advised not to go out to sea". The newspaper continues to state that "It was only at 12 noon that the IMD declared a cyclone. Within five minutes, the State Disaster Management Authority (SDMA) alerted all key officials and the media, but by that time a large number of fishers had gone out to sea". "By 1 pm on November 30, the Navy, Air Force, and Coast Guard were alerted and the Army was requested to be on standby. A massive operation was launched to rescue fishermen missing at sea. Steps were taken for evacuation of families

from vulnerable areas of the coast. Relief camps were opened to accommodate affected families." The CM did give an explanation as to why early warning was delayed and put the responsibility on IMD. It was easy at that time pass on the responsibility, however there was no official response on initial days silence on repeated requests. Regardless of what the justification was, it was true that fishers were not alerted. The information did not reach them on time and the absence of any organizational setup at the grass root level was underlined. The non-state agencies and community movements were target the KSDMA since it is only agency responsible for disaster. The Swathantra Matsya Thozhilali Federation, a fishermen collective, had conducted a protest march against the SDMA office in Thiruvananthapuram city. They blamed the SDMA for not issuing an early warning and not conducting proper rescue operations. Government and KSDMA had to find valid reason to justify them publically, otherwise it would have questioned the very rational of these agencies. The issue was brought to the notice of Indian Parliament and a standing committee was constituted to assess it. Following is an excerpt from the committee report dated 9th April, 2018:

The committee observes that the advisory issued on 29th November did not clearly predict a cyclonic storm, and therefore, it was not taken with the seriousness it deserved. Moreover, rapid intensification did not leave enough time for the IMD to issue a cyclone watch or alert, and therefore, both the affected State governments and the people were not sufficiently alert. Officially, a cyclone specific advisory was issued only on 30th November 2017, the very date of the arrival of cyclone Ockhi; but by then, many fishermen would have already ventured out to sea. This was a clear departure from the Standard Operating Procedure wherein the first cyclone specific advisory, the Pre-Cyclone Watch is issued three days prior to the landfall of the cyclone. While rapid intensification of a cyclone is a reasonable justification for this omission, the fact remains that the State Government machinery and the people may not adequately understand the technicalities and therefore, should be proactively informed in each case. The committee is of the opinion that the advisory issued on 29th November, 2017 would have been taken more seriously had it clearly forewarned of an impending cyclone. The committee, therefore, recommends that the IMD should be more proactive and take every instance of weather disturbance with utmost seriousness in the future.

The Parliamentary Committee recognizes and endorses the position of the Government of Kerala on cyclone risk management. It was relief for Kerala Government to defend the public protest. An improper early warning does mean disasters that take lives. One could be pursued to believe that the Government of Kerala was not responsible for the deaths. However, they are answerable for the ineffectiveness of the rescue operations and the huge local resistance that they invited. The dilemma in sending early warnings continued in the rescue operations as well. It was the first time in Kerala that the community showed a lack of trust in the administration at the time of natural disaster. There were multiple kind of protest against administration. The localites did not permit the Chief Minister to get out of his official car. His car was damaged by the local community in Vizhinjam and he had to use his colleague's car to move out from the area. Mr. Jayan, a 42-year-old fisherman in Vizhinjam area, said:

'It was not a protest against the government. We were registering our disagreement with the government. No minister or official visited us during the crisis period; they started coming three days after the cyclone hit. They have no commitment to the community; they were just playing politics.'

He was right in saying that there were no official visits to the area. The community connected it to their social and economic conditions. Public even argued that government neglect them since they are poor fishermen. It was too difficult to counter such articulation while assessing the post-disaster rescue operations in the area. Administrative negligence was attributed to the attitude of the bureaucracy towards fishermen. This was the topic of discussion on social media platforms and during the community meetings in the coastal area. A close examination of the manner in which the rescue operations were carried out makes it difficult to disagree with this argument. An independent public inquest team led by Justice B.G. Kholse Patil, Former Judge, Maharashtra High Court and other eminent persons from academia and civil society conducted an assessment in Kanyakumari district after the cyclone and observed that the government seemed to undervalue the lives of fishermen. The committee titled their report 'Cyclone Apartheid'. One of the important observations of the committee was about the poor early warning system of the government. Though no formal assessment of similar method have done in Kerala, still the local fishermen and their agencies corroborate the argument of the study report in Tamil Nadu.

On 30th November, the fishermen community recognized that it was a disaster and by that time, the casualties had already happened[50]. There was nothing left to do except search for dead bodies in the sea. The Hindu newspaper, on 19th December 2017, reported the experience of a 34-year-old fisherman, Mr. Sahayam, from Vizhinjam. The newspaper quoted him saying, '*I haven't seen waves as high as that in all my years of fishing. I had tied one of my hands to the boat, and thus managed to stay afloat even after the waves crashed into us mercilessly. A day later, a small ship passed us by. Even though they could not rescue us, they intimated the Navy about our location. The winds had taken us 54 nautical miles away from the Kollam coast by then. Sadly, not all of us could survive. I don't know if I would ever go back to the sea again. I am scared at the thought, although there is no other way to survive'*. He was saved by INS Ja ship. Though the Navy and the Coast Guard were involved in rescue, the delay made the community opt for a public protest. Fr. Eugene Pereira, who was actively involved in the process, said:

We lost confidence in the system and the community lost their patience. It is inhuman to keep them waiting for their loved ones. They knew that they may not come back but it was painful. So they were left with no option but to come out on the street and demand early rescue.

On10th December, 2017, the kin and relatives of the fishermen organized a massive protest march in the city area[51]. It was disappointing to see relatives of the victims assembled in a public space narrating to the public that the government's efforts had been inadequate. The

[50] Still there were no government statement on whether it was disaster or not
[51] The Hindu, 10th December, 2017

protesters were demanding effective interventions from the government to identify missing persons. The community expressed their dissatisfaction with and lack of faith in the rescue agencies. They demanded inclusion of their kinfolk in the Coast Guard and Navy rescue operations. This was not unprecedented in the State. Survivors of the 2004 Tsunami had also expressed dissatisfaction with the government machinery and wanted local people to take the lead. This lack of faith was indicative of the manner in which the establishments undertook relief and rescue operations. These agencies are assigned tasks based on national and international rules and regulations. The most critical of the regulations was the boundary restrictions. Coast Guard had a limited boundary of operations and could not listen to the demands of the community to move beyond it. Coastal police patrol up to 12 nautical miles from the coast, the Coast Guard patrols from 12 to 200 nautical miles from the coast and Indian Navy patrols beyond 200 nautical miles[52]. Such conflict over boundary was reflected in the rescue and infact delay the action. The major fight was between the 'official operating boundary' of Coast Guard v/s real working boundary of local fishermen. They travel more than what Coast Guard operates.

It was new information to the general public that the fishermen of Kerala travel more than 300 nautical miles into the sea for fishing. This built mistrust in the Coast Guard and the Navy. As a result of the protest, the government and the rescue team agreed to take 11 local fishermen onboard for further rescue operations. 105 local fishing boats joined in the search and rescue operations[53]. Fishermen who were part of the rescue operations reported that the Coast Guard personnel were reluctant to listen to them and travel beyond the permitted limit as they did not have the required training. The Navy was active in the rescue and could bring back more dead bodies. No rescue agency could claim that their intervention saved many lives. The community felt that the participation from local fishermen sped up the rescue operations and saved more lives. .

The Hindu reported on 10th December that the State government had urged the Southern Naval Command, the Southern Air Command and the Coast Guard Commander (Western seaboard) to persist with the rescue operations for the next ten days. Continuing rescue until people were convinced of the deaths. Government wanted to keep the rescue forces in place to manage the public anger against the government and to portray them as an active presentation of State efforts. It was critical for the agencies as well, since they had to prove their efficiency in a specific context in which their institutional capability was under question.

The affected community has the right to protest and demand for inclusion of their people in the rescue mission along with the Navy and Coast Guard; however, it is not easy for these organizations to include 'civilians' in their work. Mathrubhumi Daily, on 6th December, carried a detailed interview of Kerala-Mahi District Commander of Coast Guard Mr. Neeraj Tiwari. According to him, a proper warning of turbulent sea conditions was passed on to the Fisheries Department at 9 am. At 11 am, and coast guard had received the message that 13 fishing boats and 38 fishermen were missing. According to him, the Coast

[52] http://ficci.in/spdocument/20955/Smart-Border-Management-study.pdf
[53] The Hindu, 19th December, 2017

Guard did not want local fishermen in the rescue ships to coordinate the activities. If local fishermen had been allowed on the very first day, the Coast Guard would have moved into a different direction as per the request of the fishermen. It is clear from this statement that the Coast Guard wanted to streamline their activities before listening to the fishermen. It is clear indication of risk blaming and giving up responsibility at the time of crisis. As Douglas (2003: 16) explained, risk reduction has become another form of the blaming system which has replaced the moralist condemning of victims believing their incompetence to be responsible for their risk exposure. Government and Coast Guard wanted to protect their autonomy and never wanted public (civilian) to interfere with it. The government and members of the ruling party actually challenged the interpretation of the Church based organization of the disaster as a cyclone before any official statements. It was inevitable for them to blame Church organizations to retain the public confident as state agency. Prioritizing the institution and its protocol over other concerns is a usual practice of establishments. Government and ruling party were simply following this critical rule of political governance in this context..

On 7th December, 2017, there was a report that about 30 local fishermen took part in the rescue along with the Coast Guard. Mr. Ripson, a 30-year-old fisherman who was part of the rescue operation, said:

Ockhi hit 22 nautical miles away from the sea at 2 am on 1st December, 2017. The Church asked us to prepare our boats and be ready to go to sea to rescue the fishermen. We kept 12 boats ready; each manned by four of us. We brought seven dead bodies. The next day, we brought seven more dead bodies. In all, 26 people died here. We did not go to rescue people; we had gone to collect dead bodies of our brothers. We did not get any support in the beginning; neither the Navy nor the coastal police were there in the beginning. After two days, two naval boats came from Kochi. It was a good lesson for us to realize that nobody wanted us; neither the government nor the general public had any concern for us.

What Mr. Ripson said is the collective view of the community, which cannot be reduced to conflict over compensation distribution. This was the root cause of the conflict between the Church and the government.This conflict needs to studied and analysed in this critical context.

7.2 Conflict between Church and Government on Ockhi Cyclone

From the time the first notice of the cyclone came out, the Church organizations became active and put in all the resources to fight and correct the government approach to Ockhi cylone. It was quite unprecedented in Kerala that the public forums be used to debate on poor response by the government and its implications. Lack of information dissemination and ownership on information were the focus of this debate.

The Ockhi Cyclone disaster exposed the information asymmetry that existed in the State. Every agency maintains their functional autonomy and is not interested in coordinating with other agencies. Malayala Manorama reported on 7th December, 2017 that the Government of Kerala had initiated a project to develop a software programme with the help of National Informatics Centre to track the fishing boats going out to the sea using a registration number. The project began in 2008 and saw no progress after. There was no

data available about the number of fishing boats at sea at the time of the cyclone. When a disaster strikes the community, the establishment is reminded of the cost of delaying important initiatives. There is agreement all over that such software could have reduced the number of casualties. Government agencies were found to have no reason to explain the delay, except for the usual redtapism functioning. It indicated that the early warning system also operates in a bureaucratic structure.

The conflict between Church and Government emerged from the confusion over the number of fishermen missing. It began with the demand to be part of the rescue operations. The church leaders made an open statement saying: "*There is destruction all around. Many of those who were with us until recently have gone missing. Our boats and equipments have been destroyed. But the government is yet to fulfill its promises. We have not received any of the promised assistance, including the free ration.*[54]". Media also divided in this fight. Among them, the news reports by Deshabhimani daily (run by the ruling party Communist Party of India (M) and Malayala Manorama daily (always oppose the left politics) deserve special references.

Deshabhimani reports were focused on what the government did and how it saved the people. The daily went on praising the Navy and the Coast Guard and countered the allegations by the Church and the local fishermen[55]. Deshabhimani reported on 9th December, 2017 that the victims of the Ockhi cyclone in Tamil Nadu demanded a rehabilitation package similar to the Kerala Model of the Ochki Cyclone Package. Their reports questioned Malayala Manorama daily's criticism of the response of Government of Kerala to the cyclone. Manorama wanted to expose the failure of the government since it is closely associated with the Latin Catholic Churches and opposes the left government. Both newspapers have different agendas; the competitive reporting exposed the institutional failure and community vulnerability at the time of the cyclone. On the same day, Malayala Manorama[56] carried a report saying that the Latin Catholic Diocese had demanded that Ockhi cyclone be declared a national disaster. A major conflict was that the government rescue agencies limit their operation to 30 nautical miles away from the coast while fishermen go for fishing more than three hundred nautical miles away. The Diocese raised an objection against the exclusion of representatives of fishermen in all the party meetings to address the impact of the disaster. Manorama continued reporting on missing fishermen and supporting the movement of the Church whereas Deshabhimani was not keen on these aspects.

The Latin Dioceses conducted a mass protest march towards Rajbhavan, demanding an effective rescue operation and proper rehabilitation packages. It was a rally by the fishermen. The political parties kept a considerable distance from them. Media reports about the rally indicate how multiple interests guide the media. Pro-government media projected the rally as unwanted and a result of the vested interests of the Church[57]. Chief Minister Mr. Pinarayi Vjiayan cautioned the church for using emotion against the

[54] The Hindu on 6th December, 2017
[55] The news paper report were ignoring the fact that Navy and Coast Guards were collecting dead bodies and not the rescue the people.
[56] 9th December, 2017
[57] Manorama on 12th December, 2017

government at the time of a disaster. It was an open remark that enabled the left parties to come down heavily on the Church. The social media handles of the left parties criticized the approach of the Church. The Churches and priests were trolled.

Disaster is an opportunity for every ruling party to gain political clout, as exemplified by the Gujarat earthquake in 2000. The Kerala government and the ruling party were trying to take ownership of the support services and rescue operations. However, Ockhi cyclone did not offer them much political gain. On the contrary, the government and the ruling left front went into crisis and the community challenged all of their claims[58]. Government had to take a position to safeguard all state agencies while the community lost faith on such agencies. This is a political dilemma as well, however, the fact is that the left party could have maintained a realistic position and not to speak in favour of the government.

Unlike other organizations, Churches have an unparalleled influence over Christian fishermen communities, as known to everybody. They have a complete involvement in community life, from religious services to social welfare. As mentioned in chapter three, the Church even collects two percent levy on the price of the fish to support social welfare programmes. Therefore, their attempts to mobilize the community to demand effective rescue and relief received full support from the community. Mr. John, a 32-year-old fisherman, said the he used to get early warnings from the Church's announcement over speakers and would keep approaching them for further clarifications. On the first day of cyclone, they assembled in the Church premises and informed the Reverend Vicar of the diocese about the disaster. The Church was far ahead of the government in collating number of dead bodies found and missing people. Their machinery worked faster than the government in damage and loss assessment. The Churche provided the list of boats gone out to the sea, which was not there with the government. The church possessed details of missing persons, their family members, their educational status and details of debts of deceased fishermen, including the source of the debt. The families have to repay them from the ex-gratia payments that they received. These details did not appear in the government list.

[58] 11th December 2017

Table 7.1 Ockhi-Affected Dead Persons in the Latin Archdiocese of Trinandrum

Sl. No.	Parish	Name of Effected Person	Age	Address	Details of Members in Family	Relationship (Wife/Son/ Daughter/ Father/Mother Brother/Sister)	Age	Educational Status	Job Status
1	Fathimapuram	Thomas Joseph	43	Kanalpurampok, Fathimapuram, Chittattumukku	Sherly Thomas	W	36	SSLC	
					Praveen Thomas	S	18	Plus 2	
					Praveena Thomas	D	16	Plus 1	
					Sanu Thomas	D	14	9 Class	
2	Thumba	Jerald Karlose	48	Kadalpurampok Ph-9567431369	Baby Jerald	W	42		
					Nithin	S	18	Plus 2	
					Vivek	S	17	SSLC	
3	Vettucaud	Shibu Xavier	35	Thaivilakom House, TC 80/1027, Vettucaud Ph:	Selva Mary	W	23	7th Class	

				9567431369					
4	Vettucaud	Thomas Cruz (Roy)	42	TC 80/1604, Vettucaud Ph: 9747185880	Latha	W	39	SSLC	Nil
					Diya	D	6.5	1st	
					Dheeraj	S	4.5	Nursery	

Source: TVM Dioceses

Table 7.3 Ockhi –Affected Missing Persons in the Latin Archdiocese of Trivandrum

Sl. No.	Parish	Name of Effected Person	Age	Address	Details of Members in Family	Relationship (Wife/Son/ Daughter/ Father/Mother Brother/Sister)	Age	Educational Status	Job Status
1	Anjuthengu	Gilbert	38	Anjengo, Kadakavoor P.O.,	Sophia	W	33		
					Swapna	D	10	5th Class	
					Geethu	D	15	SSLC	
					Neethu	D	9	9th Class	

2	Thumba	George Kumar	44	Valiavilakom, Thumba, Pallithura P.O.,	Defin Medona	W	41		H.W
					Sharon Kumar	S	20	SSLC	No job
					Shalini George K.	D	18	Deg.-II	Student
3	Thumba	John Manuel D'cruz	54	Love Dale, Thumba	Lizy John	W	52	PDC	Nursing
					Joyc John	D	22	B. Sc (N)	Student (JMH)
					Joyce John	D	20	B. Sc (N)	Student (JMH)
4	Thumba	Antony Rajappan	62	Kadalpurampok Ph-9526270679	Eliamma	W	60		
					Leema	D	40	SSLC	
					Sheeba	D	37	8th class	
					Bavachan	S	35	SSLC	

Source: TVM Dioceses

Table 7.3 Financial Debt of Ockhi –Affected Persons from the Latin Archdiocese of Trivandrum

Sl. No.	From	Parish	Name of Effected Person	Age	Address	Type of Effect (Dead/Missing/Return/ Affected)	Loan Amount	Bank / Loan Category
1	**PUT**	Thu	Cicil Fernandez	52	Puthuvalpuraidom, Thumba, Pallithura P.O.	M	700000	House
2	**KOV**	Poon	Christy	62	TC 66/1066, Cheriyamuttom Ph-7560887096	D	400000	Arban Bank, Ayurveda College, TVM
3	**KOV**	Poon	Johnson Babiyans	52	TC 69/744, Cheriyamuttom Ph: 9400856819, 9526214487	D	800000	From local
							37500	Kudumbasree
4	**KOV**	Poon	James Baviance	43	TC 66/214(a) Ph: 904866549	D	250000	Corporate Bank, Ambalathura
							250000	Corporate Bank, Ambalathura

5	**KOV**	Poon	Xavier Joseph	42	TC69/1902 (TC 47/1026), New Colony, Poonthura Ph: 8139009974	D	200000	From local
							200000	Bank of Baroda
							200000	Canara Bank

Source: TVM Dioceses

List of missing persons -

No.	Name	Age	Address	FIR No.
1	Antony Rajappan	59	Eliyamma, Kadalpurambokveedu, Araattuvazhi, Thumba	CR NO. 1902/2017 U/S 57 KP ACT
2	John Manual	Age not known	S/o Manual Delmi, Latha Dale, Back of thumba church	CR NO. 1902/2017 U/S 57 KP ACT
3	Kuttappan (Georgekumar)	Age not known	, s/o albijames, Valiyavilakomveedu, Thumba	CR NO. 1902/2017 U/S 57 KP ACT
4	Cicil Fernadez	Age not known	s/o Xavier, Puthuvalpurayidom, Thumba	CR NO. 1902/2017 U/S 57 KP ACT
5	Antony Adima	65	S/o Peter, Ambalathumoola, Chovvara	CR NO. 2322/2017 U/S 57 KP ACT
6	Vincent	50	S/o Soloman, 10/507, Viji House, Adimalathura.	CR NO. 2322/2017 U/S 57 KP ACT
7	Lawrence	35	S/o Peter, 17/261, Abhaya Cottage, Adimalathura, Chowara	CR NO. 2322/2017 U/S 57 KP ACT

Source: Kerala Niyama Sabha

When the Prime Minister visited the area, the Church submitted an appeal to him that contained several suggestions and requests, including a special package proposal of Rs. 3500 crore.(See Table 7.4)

Table 7.4 Details of the Components of Special Package Requested

Component	**Amount in Crore Rs.**
A sustainable compensation fund for the deceased, the missing and permanently disabled	300
Satellite tracking system and VHF radio sets	80
Marine ambulances	70
Compensation for lost vessels and replacement of small vessels	800
Integrated housing with basic amenities	1250
Coastal protection measures	750
Disaster preparedness and rescue operations	250
Total	**3500**
Source: 'The dreadful 'Ockhi' cyclone 2017 and its Aftermath: an Appeal to the Honorable Prime Minister of India', by Thiruvanathpuram Dioceses	

The appeal listed some of the burning issues in the coastal area including coastal erosion. While it is not necessary that the government should accept such requests, every citizen has the right to submit an appeal to the Prime Minister. The demands presented in the appeal were specifically for the fishermen community and were not unrealistic in nature. Interestingly, the 'Reconstruction and Rehabilitation Package proposed for Coastal Kerala' submitted by the Chief Minister to the Prime Minister on 19th December, 2017 had some of the demands and requests in common with the diocese's appeal. The community trusts the Church more than the government in this regard. There were many testimonials for it. Mr. Jaison, a 53-year-old fisherman, said:

Church is helping us in preparing documents and we need the Church to mediate between us and the government.

The idea of 'government failure' was successfully established with active involvement from non-State actors and Church organizations. Mr. Vijayan, a 48-year-old fisherman in the Vizhinjam area, said:

Government could have done more to save lives. None of us got the message and nobody wanted to come to us. We were fishermen, so they didn't want to come to us.

This is a common narrative by the individual and community with many strong reasons behind it. The process of identification of dead bodies and the painful wait for the results made the families show all sorts of anger towards the administration. Dead bodies were collected from various parts of the Kerala coast. The Hindu reported on 14th December, 2017 that nine bodies of fishermen were found in Kozhikode in highly decomposed conditions. The body of a 50-year-old fisherman, Mr. Cyrus from Vizhinjam, was found in Neendakara, which is more than 100 kms away from Vizhinjam. The bodies floated to other parts of the State, many of them decomposed, requiring DNA-based identification. Blood relatives had to give their own DNA samples for the officials to identify the bodies[59]. Going through this procedure was a mentally-stressful exercise and hence, expecting compliant behaviour from these people was unrealistic. It was heart-breaking for the relatives to wait for the results. The temporary camps were witnessing loss of hope every day. Each body identified by the rescue operators devastated the person's family members and temporarily relieved others. Some of them had still kept the hope alive till the end. The argument made by Church organizations that they were campaigning for the cause was convincing. This kind of campaigning could be read as advocacy of disaster survivors and is essential for a country such as India. Similar to any other non-State agency, the Church has quite a few limitations to fight with the government. There are limitations to overrule the political power of the state at the end people have to depend on state for long tem recovery and rehabilitation. Like other disasters Government of Kerala took the initiatives in rehabilitation and came up with multiple project proposals.

7.3 Kerala Government and Ockhi Cyclone

Unlike other agencies, Government possesses the power and resources to manage calamites to the largest extent. Bureaucratic control over disaster management is a tradition in the country since the famine code of 1883. Schneider (1992) argues that what the government wants to do does not necessarily reflect in the actions, and there exists the conflict. Conflict arises when there is a mismatch between institutional capability and demands of the community. In case of Ockhi, the government gradually took over the rehabilitation project. It was in search of appropriate damage control measures and interventions and hence, the best way was to ensure high ex-gratia payments to the family members of deceased individuals.

Government Order No. 114/2017/ DMD, dated 21/12/2017, stated that government has sanctioned Rs. 20 lakh (Rs. 4 lakh from State Disaster Response Fund and Rs. 16 lakh from Chief Minister's Disaster Relief Fund) to the family members of the deceased. The following methods of distribution were suggested: Rs. 2.5 lakh for parents; Rs. 5 lakh for unmarried sisters (in case of the sister being a minor, the money would be deposited in a joint account with parents); Rs. 10 lakh and the remaining money after paying parents and sisters would go to wife and children. In case of the nominee being a minor, the money

[59] The Hindu, 14th December, 2017

would be deposited in a joint account with relatives as a five-year fixed asset with an adult relatives This was for the family members of the individuals whose bodies were found. For the families of the missing persons, the government decided to pay Rs. 10000 per month as support from the Chief Minister's Relief Fund. This was inadequate for the community concerned and the Church had to pressurize the government again to remove the barrier of the 'found' status of the body. . The government accepted the request and allowed the same compensations to family members of individuals whose body had not been found yet. There were additions to the ex-gratia payment later, making it the highest amount in the country for people dying in natural disasters. Prime Minister's Relief Fund sanctioned Rs. 2 lakh for them. Also, those holding insurance with Matsyafed received Rs. 5 lakh. Thus, the total compensation came up to Rs. 27 lakh.

It took months for the government to determine on the number of deceased and missing persons. The number of persons still missing is 91. On 27th March, 2018, the Disaster Management Department issued a government order categorically declaring the 102[60] missing people as dead along with the other 60 deaths[61]. The Church had maintained the exact number of deaths since the beginning.

Government of Kerala submitted two memorandums to Central Government for additional financial support for comprehensive rehabilitation. A proposal of Rs. 422.16 crore was submitted to Central Government under the National Disaster Response Fund. Details are mentioned in the table below: (See Table 7.5)

Table 7.5. Request for Additional financial support to Government of India

Item	**Actual Loss (in Rs. Crore)**
Gratuitous Relief	
Ex-gratia payment to families of deceased persons	44.28
Grievous injury requiring hospitalization	4.68
Gratuitous relief for families in dire need	33.2
Search and rescue	60
Relief measures	
Provisions for temporary accommodation, food, clothing, medical care etc. for people affected/evacuated and sheltered in relief camps	15.5

[60] LOK SABHA STARRED QUESTION NO. *151 TO BE ANSWERED ON THE 06TH MARCH, 2018 /PHALGUNA 15, 1939 (SAKA). https://mha.gov.in/MHA1/Par2017/pdfs/par2018-pdfs/ls-06032018/151.pdf. Accessed: 2nd October 2, 2018

[61] ibid

Agriculture	
Assistance to small and marginal farmers	
Input subsidy (where crop loss is >50%)	
For agricultural crops – rain fed, irrigated and perennial	14.07
Fisheries	
Assistance to Fishermen for repair/replacement of boats, net	9.63
Housing	
Fully damaged/destroyed houses:	
Pucca Houses	11.05
Severely-damaged houses:	
Pucca Houses	173.6
Damaged/destroyed huts	2.7
Infrastructure : Repair/restoration of damaged infrastructure:	
Roads	2.05
Community-owned assets	6.4
Drinking water supply works	7.5
Irrigation (Seawall)	25
Power (KSEB)	12.5
GRAND TOTAL	**422.16**

Source: KSDMA

Apart from that, a special package of Rs. 7340.45 crore for livelihood and coastal area development projects was also submitted to Central Government. Below are the details. (See Table 7.6)

	Table 7.6 Special assistance to the families of deceased fishermen and for individuals whose livelihood has been affected	Amount (in Rs. Crore)
	Special assistance to dependants of deceased fishermen	12.50
	Livelihood support for fishermen disabled for fishing	1.50
	Pension to fishermen disabled for fishing	1.80
	Livelihood support for family of deceased fishermen	12.15
	Special assistance for educating the children of deceased fishermen	7.50
	Training to the dependents of deceased fisherman for better employment	0.29
	Special package for socio-economic planning of the fishermen community	
	Upgradation of 'motorized traditional fishing craft' into 'mechanized deep sea fishing boats'	625.00
	Establishment of Solar-based Desalination Plants in fishing villages in coastal Kerala	500.00
	Upgradation of educational infrastructure facilities in coastal areas	
	Government Regional Fisheries Technical High Schools	100.00
	Upgradation of Government Schools (General) in the coastal areas	306.00
	Community Production Centres	50.00
	Residential Marine Skill Development Institutes	50.00
	National Skill Institute for Fishermen	100.00
	Marine ambulances	63.00
4.2	**Housing sector**	3002.71
4.3	**Agriculture sector**	50.00
4.4	**Animal husbandry**	75.00
4.5	**Health**	140.00

4.6	**Social welfare**	315.00
4.7	**Coastal police**	35.00
4.8	**Tourism**	5.00
4.9	**Disaster early warning system**	60.00
4.10	**Community-centered digital early warning system and safety equipment**	35.00
4.11	**Roads and bridges**	650.00
4.12	**Water supply schemes**	28.00
4.13	**Anti- Sea erosion (Seawalls)**	323.00
4.14	**Power sector**	537.00
4.15	**Harbours and fish landing centres**	25.00
4.16	**Debt relief**	230.00
	Total	**7340.45**

Source: KSDMA

Seeking additional assistance from the Centre is a routine process and the approval depends on various reasons, including political ones. Conducting assessment of damage and loss and submitting prepared reports to the Centre for financial aid is portrayed as a great success of State governments. It serves as a good political tool. State governments often give maximum publicity to such reports and try their best to communicate with the public that they have fulfilled all of their responsibilities and that the implementation depends on assistance from Central Government.

The request submitted by Government of Kerala was not fully accepted by the Centre. The Thirivanathauram MP raised this question in the parliament[62] (LOK SABHA UNSTARRED QUESTION NO. 1034 TO BE ANSWERED ON THE 24th JULY, 2018/SHRAVANA 2, 1940 (SAKA)) and the reply categorically stated that the government did not accept the requests. The Minister made it clear that the existing State Disaster Response Fund (SDRF)/ National Disaster Response Fund (NDRF) guidelines do not support projects for long-term economic recovery. They limit the support to immediate response and for which, Rs. 169.63 Crore was already allotted to by the Centre. Central Government also released Rs. 209.50 crore (Rs. 76.50 cr. from SDRF + Rs. 133.00 cr. from NDRF) for Kerala. The entire response and rehabilitation after the cyclone was limited by this amount. The Minister of State for Agriculture and Farmer Welfare made it

[62] Lok sabha, unstarred question no. 1034 to be answered on the 24th july, 2018/shravana 2, 1940 (saka)

clear in Lok sabha that the special package would not be sanctioned[63]. Government of Kerala is not going to raise money for this project either. Hence, comprehensive rehabilitation and development of Ockhi-affected area remain merely on paper. Central Government has almost fully stopped financing development projects; it endorses either full private sector participation or public-private partnership projects. The State government budget of 2018-19 also did not allocate money for the comprehensive Ockhi rehabilitation project since the Centre was requested for it. Now that the State has also experienced another disaster in the form of floods, Ockhi rehabilitation will be limited only to the SDRF and NDRF funds, which are inadequate for any long-term recovery. The risk blaming continues and the fishermen who bore the brunt of the risk now have no door to knock upon.

7.4 Struggle of the 'Victims'

Every disaster is a case study for academics and an experience for administrators to help in dealing with further crises. The lessons learned from this disaster included the ill effects of poor management of early warning systems and absence of special training on cyclone. Both of these factors intensified the crisis. To build up administrative capability to deal with future risks, the government initiated certain projects. The first among them was setting up a committee headed by retired DGP Mr. Ramanshreevasthawa to look into various options to respond to such disasters in future. The report of the committee is awaited in order to begin taking action. Another decision was to open a regional office of SDMA in Ernakulam and establish district-wise emergency operation centres. Government is taking necessary steps to ensure that services such as the police, fire force, Revenue and Fisheries Department to mitigate the risks. Coastal police would seek more recruitment and additional police stations. Apart from that, 500 fishing boats were equipped with GPS-enabled information tracking systems. The facilities will be extended to all fishing boats in the State. This system helps fishermen to track information up to a radius of 1500 kms. A mobile application was developed to trace fishermen's routes and 1,45,788 mobile phone numbers were collected from fishermen for tracing. An automatic boat tracking system was fixed in 215 boats. Safety equipments were distributed to traditional fishermen, and it has been decided that international sea protocols and signs would be displayed on the coast. Establishment of 27 cyclone shelters is being planned in the State with the help of the World Bank, funded by National Cyclone Mitigation Project[64]. The mitigation and response project proposed by the government is primarily focused on strengthening the administration and enhancing State power over risk governance. These measures may reduce the administrative risks in future but not reduce the cumulative vulnerability of the community. These are highly centralized and institutionally driven solutions that ease bureaucratic decision making. The success of these measures depends on their effectiveness in reducing the everyday struggles of fishermen.

[63] Lok sabha, unstarred question no. 1063 answered on 24th July, 2018.
http://164.100.47.194/Loksabha/Questions/QResult15.aspx?qref=69798&lsno=16

[64] 14th Kerala Niyamasabha, 10th Assembly Meeting. Unstarred question No. 83, dated 26-02-2018

Mr. Bosco, a 36-year-old fisherman, said, '*Sea is always open for us; whenever we need money, we go for a catch. This is the conventional routine of a traditional fisherman. Ockhi has devastated us and we lost many of our fishing equipments'*. Mr. Bosco is one of the thousands of fishermen who face risk every day and whose lives have been made difficult by Ockhi. Fishermen who interviewed for this study informed the researcher that two months after the disaster, there were no fish available in the area where they fish. Those who were identified as affected received Rs. 2000 for three weeks. Life jackets were also provided. However, the group of respondents that the researcher met stated that one household in a unit of 25 got the life jackets. Mr. Bosco said:

We stopped asking for it again and again since we realized that we are losing our self-respect. This attitude is beneficial for the government and bureaucracy as they do not have to face any questions about administrative lacuna. Though government announced that replacement of fishing equipments it was included in the special package request, it was not actualized across the community and every fisherman did not benefit from it. Mr. Ripson, a 30-year-old fisherman who lost his fishing equipments, has not been counted in any beneficiary list and is yet to get compensation. He said:

'I submitted an application in the Coast Guard office with photographic evidence of what equipments I lost in Ockhi. I took pictures of my cracked boat in the sea and submitted everything that the officials required but I haven't received any compensation yet'.

He said that he had no idea how to proceed further with his application. Government and administration claimed that this support was offered to the entire community. The community, however, mentioned that many community members were excluded from it The idea was to be inclusive but the agencies followed an exclusionary practice. No complaints have been registered against such exclusions. They are not extensively bothered by the impact of Ockhi since they have been experiencing fish reduction for the last couple of decades. They have their own reasoning for why it is happening. One of the reasons that they found was extensive use of Light-Emitting Diode (LED) lights in the night to attract fish. This is a recent trend; earlier, they would use flames, petromax light and gas lights. There was another observation that the sea has become more turbulent and the fish have gone to faraway spaces. Sea freezing is also found to be reducing the number of fish. Such existing risks coupled with Ockhi have pushed them into more vulnerable situations.

The visible impact of Ockhi on the income of the fishermen has not been measured in any damage assessment. It could have been a temporary loss; however, it continued for five months after the disaster. The catch that the fishermen used to yield reduced from 100 kg to 25 kg. Fish seasons have changed. They used to get Cuttlefish in the first week of August; it has now shifted to mid-September. Travel distance into the sea for regular fishing has increased from 4 to 5 nautical miles to 70 to 80 nautical miles. Fishermen are back to work, however the loss of income and poor catch still impact their economic prospects.

Finally, Ockhi cyclone rehabilitation is limited to ex-gratia payments and other support systems are also limited in number. It is evident that the Centre will not be offering the comprehensive rehabilitation package requested by the State government. Due to the floods of 2018, the State government will also be unable to find resources for it. Thus, the

community cannot expect anything from the package. It remains in a vulnerable situation, dependent on the supplementary support system. Both Central and State governments have pushed them towards enhanced vulnerability. The State government is now incapable of dening the allegations of the Church organizations of not living up to the expectations of the community.

7.5 Conclusion

This chapter sought to empirically analyze the management of the Ockhi cyclone and its impact on the community. It is evident that no agent was willing to take ownership of what happened. Government overcame the crisis by utilizing the power of the State and its administrative machinery. Every agency got active after the disaster impacted and hence it is too difficult to say that there were good rescue operations. Nobody believe in Kerala that social and economic position of victims determine the state and bureaucratic response toward disaster. Ockhi cyclone and administrative response is a classical example to prove that political democracy not always operates in every sector. The structural issue of social disparity even influences the calamity response in Kerala. The administrative power of the bureaucracy should not be the guiding principle of disaster governance. Human rights and democratic right should be rule at the time of calamity.

There were many contestations among the science of early warnings, interpretations of informants, and ownership of information. It is surprising that the question still exists of whether our institutions were completely incapable of predicting the cyclone and issuing warnings. It is institutional incapability that converted this hazard into a massive disaster.

Chapter VIII

Summary and Findings

This research study followed a mixed approach. It is an academic study with an applied research framework; it engages in theoretical debate as well as practical applications. The study is about three disaster-affected areas and communities in coastal Kerala. It covers both natural and man-made disasters. The three cases taken up in the research are: Coastal Erosion, Tsunami and the Ockhi Cyclone. The communities affected by these disasters share their cultural, social and economic backgrounds. The individual life world and the local economic characteristics are the topic of this research. Resilience of the community is also a focus area. The challenges and constraints on, and the possibilities of building resilience were studied in the applied aspect of this research. Since disaster can be natural or man-made, both structural and non-structural recommendations have been offered in this report.

Coastal disasters and coastal economy is closely related to each other. A close examination of Kerala's fisheries economy exposes the fact that there has not been any considerable improvement in the economic conditions of the fishermen. The focus of the fisheries sector is moved to coastal resources rather than well being of fishermen. Fish production is not improved over decades, and latest focus of highly capital-intensive fishing invariably invites environmental risks in the coastal regions. The traditional fishing practices are increasingly disappearing and fishermen are depending on motorized boats and fishing boats. Incomes of the fishermen are not subject to any considerable upward change over decades.

Government prefers major infrastructure development in the coastal area. New harbors are promoted at faster rate. These investments are exclusively for deep sea fishing and not for traditional and independent local fishermen. Tapping the deep sea resource through private participation is the policy of government. Such massive infrastructure development is one of the causes of coastal erosion in Kerala coasts. The latest Sagarmala project by the Central Government proposes huge money for ports, harbors and other infrastructure on the coast, and a very negligible amount is proposed for the community development on the coasts. The increasing coastal erosion in Kerala is being discussed in this specific economic context.

8.1 Coastal Erosion and community exclusion

The current nature of coastal erosions is largely a man-made disaster in which the local fishermen do not contribute to the cause.

The area covered for this research was the coastal villages from Mukkam Mayanad to Thangassery. From the literature review, it is apparent that erosion is not a recent phenomenon in the area. The community experienced temporary erosions for decades, but it never posed any permanent risk in terms of displacement. However, it has become permanent and recurring from the last two-and-a-half decades. After the construction of Thagassery harbor and breakwater, the effect of erosion worsened beyond the coping capacity of the community. The government still proposes hard solution for erosion such

as groins and sea walls, which according to the experts are not effective in preventing the erosion. Also massive constructions of groins have created further erosions; however, the local community is left with no option except demand for groins and sea walls as solution. There is no alternative available; and hence, has to depend on hard solutions.

Erosion has become a massive displacement project of Government of Kerala. Government has to find resources to relocate people living within 50 HTL of Kerala coast. Also such relocation projects displace the fishing community from livelihood practices. Coastal erosion has become a recurring disaster in the area; however, the responses of fisheries department and harbor engineering are not enough to reduce the risk and vulnerability among the community. Building community resilience is not included in any government support project in the area. Relocation of families from the coast have also resulted into vulnerability and social exclusion. The larger public, political parties and government have not recognized the long term impact of coastal erosion in the area. The local fishermen are losing their income and independent livelihood practices due to erosion, and are depending on centralized fishing. Such dependency leads to alienation from coastal resources and environment. The local fishing practices have almost stopped in the eroded area, and the community has lost its collective practices and social mobility. It also stops any thinking on community based or participatory coastal area conservation practices. Nobody seems to have any idea or any collective mobilization towards conservation practice. It may not be possible; however, the alienation from coast forces the community to pay little attention to search for any alternatives. Everybody opts for hard solutions, and community collectives are also formed to push for it. Such collectives are promoting it and supporting the economic interest of hard solutions. The remedial measures should, therefore, emphasize on reducing the impact, and building resilience and coping capacity of the community. The present study also believes in this approach.

8.2 Tsunami and its Secondary Impacts

The second case discussed in this research is Tsunami rehabilitation and recovery. A close examination of rehabilitation projects proves that the basic human right and idea of justice are not practiced in the project of rehabilitation. It was technically efficient, yet excludes the survivors from social life. Surprisingly, no government agencies recognize and accept the exclusionary nature of Tsunami rehabilitation. It was a project of ensuring bare minimum support to the affected community rather than an economic support for upward mobility.

In the words of the community, it was a *re-plantation* rather than rehabilitation. The quality of life is still deteriorating even after 14 years of the disaster. Tsunami rehabilitation cannot be proposed as a model for Kerala in terms of disaster rehabilitation and recovery. The data reveals that the general public of Kerala does not grasp the idea of rehabilitation. Public perception towards the rehabilitated community is that they are under their mercy and have no other rights. No proper needs assessment has been carried out in order to frame the rehabilitation policy. Many agencies were active in rehabilitation and recovery projects, and all of them acted independently and never done any consultation with the community.

Rehabilitation was a project of legitimizing the limitations of the agency and accepting the existing vulnerability of the survivors as deciding factor. Tsunami rehabilitation was not a financial burden on the Government of Kerala. Also, the State remained a facilitator throughout the rehabilitation programme rather than an agent of rehabilitation. This negligence on part of the government forced the survivors to seek help from non-State actors who later dictated the rehabilitation programmes. Tsunami rehabilitation created secondary disasters in the form of deprivation, social isolation and poor socio-economic mobility. There are neither public discussions nor any active government involvements in addressing these critical challenges of Tsunami rehabilitation. As discussed in the case of coastal erosion, Tsunami rehabilitation excluded the community from the common pool resources. The common property rights of the community were neglected in rehabilitation. The area is known for black sand mining and mining has already made the coast vulnerable to risks. Tsunami, in fact, helped the mining companies since the relocation made huge area available for mining. The proposed expansion of mining into the evacuated area underlines the importance of such rights. In fact, Tsunami rehabilitation has created three power centres: i) The government, ii) NGOs supporting the government, and iii) Appropriators of mining. Social and economic backwardness of the survivors is the main impediment in their way to progress and it has continued after rehabilitation. There must be a proper assessment of the invisible impact of Tsunami rehabilitation.

8.3 Ockhi Cyclone and 'State Action'

The third case studied in this research was management of the Ockhi cyclone. It is evident that the impact of Ockhi could have been avoided had our institutions managed the warning system properly. The poor initial response, in fact, worsened the crisis and the local fishermen had to pay for it. The community perceived the poor response by government as casual and did not recognize the crisis. According to the community, the government considered them as less worthy to respond to them as they are poor fishermen. The local non-State agencies had to put pressure on the State to reconsider the usual administrative response to disaster in terms of accepting the number of deaths and active rescue operations. It was perhaps first in Kerala that the local agencies conducted protest march amidst rescue operation. Every government action was subjected to multiple levels of criticism and still government managed to implement its projects. In this case, it was difficult to consult with the officials of IMD and other concerned departments. The 'Action Taken' report of Government of Kerala focuses merely on strengthening the internal capacity of institutions and not on the fishermen affected. One of the objectives of this research was to examine how Tsunami rehabilitation has influenced or continues to influence the Ockhi rehabilitation. A common feature of these two cases is that the government did not take a lot of responsibilities in the rehabilitation of the affected community. At present, there is a rehabilitation package available for the Ockhi victims. Central Government has rejected the extended rehabilitation proposal of the Kerala government. The State government does not want to make this issue into a public debate and no Minister has made any public comment on it. This silence needs to be revoked. Human rights of the survivors were questioned many times; however, the community overcame the crisis with their internal capability.

There are many contestations among the science of early warnings, interpretations of informants, and ownership of information. It is too difficult to believe that State institutions were incapable of predicting the cyclone and issuing warnings. These institutions exist because the science of prediction exits; and hence, inability of the institutions directly challenges the science of predications. This science needs to be popularized and it's 'knowledge' should be accessible to vulnerable/risk community. Like Tsunami rehabilitation, Ockhi also put no heavy financial burden on the government. Also the government seems to have taken no efforts to reduce the vulnerability of the affected community. Replacement of livelihood equipments is still not completed; hence, the government is also benefitted by the internal capability of the community.

The three cases in this study are closely associated with the daily struggles of the fishing community, which is missing in all responses and rehabilitation projects. It is a valid and substantial argument to state that disaster rehabilitation in these three cases did not help in building the resilience and coping capacity of the community. Neglecting community coping widens the income inequality between the affected and non-affected communities in the long run. This is evident from the case of rehabilitation colonies vis-à-vis others in the Perinad colony, QSS colony in Thanni, and the Tsunami colony in Azheekal. It leads to a secondary disaster in terms of secondary vulnerability and risks.

The economic mobility of the affected communities has been totally neglected in all of the cases. There needs to be protection to the income source of the community along with assurance of a supplementary income. The income-generating rehabilitation project implemented on the coasts also needs to be monitored and scaled. Disaster affects the household income and economy; and hence, economic reform of local fisheries needs to be stressed upon.

Chapter IX

Conclusion and Recommendations for building community resilience and coping capacity

The risk and uncertainty among the fishermen community is the critical focus of this research and also the risk is mounting in the coastal area. The fishermen are exposed to risks on every day basis; the economic policy of the government also invites environmental risk in the coastal areas. Kerala's fisheries economy is reeling under stagnation for decades and the fishermen's income is also not improved over decades. The focus of fisheries economy in Kerala is not the fishermen and their livelihood security. Income diversification and multiple options to sustain livelihood practices are essential for the economic mobility of the fishermen. Coastal areas in Kerala have become a hub of capital investments including public and private capital. Government prefers to spend for coastal infrastructure including harbor and groins. The livelihood of the community is not the priority of new coastal investments; and hence, the fishermen are exposed to environmental risks.

Focus of disaster rehabilitation in Kerala is still based on the idea of expanding bureaucracy in the affected areas. Such interventions are necessary for governing the crisis; however, these interventions are not appropriate to build social and economic resilience among the community. Disaster response is not resilience centric in Kerala. Rehabilitation should not result into social exclusion, and it is the responsibility of the rehabilitation agency to implement an inclusive rehabilitation project. Focus should be the life and life world of the people rather than exercising power of State and non-State actors.

Based on the field interactions, FGD, meeting with experts, and review of literatures, this study recommends the following solutions to reduce the environmental risks and build community resilience among fishermen:

Hard solutions such as seawalls and groins are considered to be permanent solutions to coastal erosion on Kollam coasts. Government projects and policy has never considered any soft solutions. Three domain experts were consulted to suggest remedial measures for coastal erosions: Dr. Sheela Nair, scientist of National Centre for Earth Science Studies and Dr. Shahl Hamid, retired scientist of the same institute and Prof. Anith Joseph of TKM College of Engineering. They agreed in their observations that hard solutions are ineffective. The recommendations were as follows:

1. Regulate the construction of harbors and other breakwater projects.
2. Conduct a proper scientific assessment to examine the length of the groins constructed.
3. Conduct a scientific assessment of the impact of groins in preventing erosion and the impact of huge accretion of beaches. Accretions benefit certain communities and there must be a proper record of its ecological and social impacts.
4. Conduct a capacity utilization assessment of harbors to see whether the proposed harbors are required.

5. Consider the facts of climate change while developing coastal projects. Meena Kumari commission report and Sagarmala project also have neglected the coastal climate change issues.
6. Update the policies regarding economic use of coastal resources.
7. Revamp the Costal Regulation Zone Management (CRZM) Act to empower community involvement in decisions about coastal resource and investments.
8. Update the list of people affected by erosion and ensure protection to their entitlements and rights.
9. Extend support through Matsyafed and Fisheries Department to the people who have been displaced and relocated from the coasts. Treat them as victims and ensure proper compensation.
10. Form local coordination committees as registered collectives to monitor and evaluate implementation of measures for erosion mitigation.
11. Conduct a proper assessment of the impact of coastal erosion on the livelihoods of fishermen and compensate them accordingly.
12. Declare the beach created due to groins a common property resource for livelihood promotion activities of the community across the coasts.
13. Form separate wings under Fisheries Department to implement soft solutions to coastal erosion. It can be in partnership with the local community.

The recommendations mentioned above have been derived from meetings with the experts, focus group discussions and analysis of gathered data. An environmentally-proactive political and administrative structure needs to evolve in Kerala to act on them. It may take time, but the recommendations are relevant.

The following recommendations were discussed in the meeting:

1. Conduct a proper impact assessment of the rehabilitation project to study the scope for improving the quality of amenities.
2. Establish a water supply and sanitation mission within Matsyafed and Fisheries Department to coordinate with the water authority and other governmental departments to ensure proper sanitation and water supply in the coastal area and in the colonies.
3. Revamp the idea of disaster rehabilitation, which is currently restricted to minimum support.
4. Conduct a proper scientific study on the impact of mining in the coastal area and study the possibilities of regulating it within the provisions of CRZM or suggest measures to amend the provisions of CRZM to accommodate community participation.
5. Initiate livelihood rehabilitation of relocated families with diversification with the help of special package.
6. Draft a mining policy specific to Kerala with focus on coastal areas.

Recommendations to be considered for manage further cyclone risks:

1. Develop a cyclone warning centre within Kerala and ensure that information is reaching the community.
2. Keep records of fishing boats within the disaster management system to avoid last-minute confusion over numbers.
3. Accept the detailed damage assessment conducted by the Church organization and change the government method of including beneficiaries.
4. Set up an active civil defense force at the local level with proper guidance.
5. Develop protocols and guidelines for involving local fishermen in the search and rescue operations.
6. Conduct hazard mapping and dissemination workshops for local communities.
7. Impart training for climate-resilient fishing practices.

For long term sustainable solutions, Coastal Regulation Zone Management should have legal binding similar to Forest Right Act. There must be policy to ensure fishermen community's rights over resources and make their consent mandatory for developmental intervention.

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