

The Impact of Recurrent River Bank Erosion and Sea Surge on the Mobility in Coastal Indian Communities: Socio-cultural Dimensions of Climate Change

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KEYWORDS: Climate change. Coastal community. Internal displacement. Vulnerability and cultural attachment. Coastal mobility. Coastal resource management.

ABSTRACT: This study examines the impact of climate change on two ecologically sensitive regions in India: Ghoramara Island in the Sunderbans, West Bengal, and Arattupuzha Village in Kerala. Both regions face recurrent soil erosion, high tides, and sea surges, which have intensified due to climate change. These environmental changes are driving inhabitants toward internal migration as livelihoods become increasingly unsustainable. The study highlights the inadequacy of short-term sheltering and rehabilitation efforts in addressing the long-term needs of these coastal communities, leading to heightened vulnerability and eventually, the emergence of climate migrants. This study was conducted through semi structure interview method and schedule, Key challenges identified include the lack of stable livelihood opportunities, inadequate sanitation, food insecurity, and the influence of middlemen and politically powerful elites in decision-making processes. The research underscores the conceptual gap in organizing effective "Ecological Restoration" activities in climate-sensitive zones and explores the phenomenon of coastal mobility in India. The findings emphasize the need for long-term adaptation strategies that go beyond immediate relief to address the underlying socio-economic and environmental factors contributing to the crisis. The study calls for a systematic approach to rehabilitation that integrates sustainable livelihood options and inclusive governance to mitigate the emerging crisis of climate refugees.

INTRODUCTION

The world has since decades, (1950's onwards) has been attempting to resolve the unconnected pieces of the global jigsaw puzzle of climate science. Many pieces of the jigsaw puzzle are missing, many are wrongly placed but the overall picture is somewhat clear. It is the picture of a world with an uncertain future due to threats of climate change. Life is precious and this is the reason why environment- development balance has become mankind's biggest challenge.

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This challenge can be met successfully by integrating larger discourses of climate change with other environmental concerns such as the developmental planning of vulnerable groups. The present research explores "Life and livelihood in Coastal Community post Tsunami 2004: An Anthropological Case Study of Arattupuzha Village of Kerala" and "Climate induced displacement at Ghoramara Islands in west Bengal" with the aim of looking into the aspects of Climate Mobility across India.

The village of Arattupuzha is located on the western coast of India and the Ghoramara island is

located in southern most point of west Bengal, India. Both are unique in their geographical locations; The village of Arattupuzha is located on the western coast of India in the Allepey district of Kerala. Its unique geographical location, between the backwaters of Kerala and the Arabian Sea provides it the perfect ecological settings for the development of a coastal economy in the region, with almost eighty percent of the inhabitants being traditional fishermen. On 26th December, 2004 this village was totally devastated by the wrath of Tsunami. With the recovery and rehabilitation programs initiated by the Indian government and international agencies in the post disaster situation, this village underwent evident changes in their social organization, lifestyles, economic activities and the livelihood patterns of the maritime community.

The Ghoramara Island is located on the southernmost part of West Bengal, situated near to the estuary of Hooghly River channels. The it is one small island which is shrinking very fastly, and it is in Sundarban delta complex of west Bengal. Ghoramara island having faced the wrath of climate crisis, is somehow recovering. people pointed it toward nearby nearby port and failed engineering, but mostly believes it is due to increasing levels of water and increasing frequency of the devastation by tropical cyclones. Government is taking multiple initiatives to save the islands, but somehow politics of resource utilization and mobilization making it hard on the powerless locals, sometimes by choice and sometimes being victims. High tides and cyclones like Yaas are impacting coastal life at Ghoramara and the islands are gradually submerging at a rapid rate according to available reports, to the extent that within ten years the island has lost kilometers of lands due to sea level rise and extreme erosion events, and the doubling impacts of erosion and cyclones are making the lives of people vulnerable. Year after year, cyclones induced floods continue to disrupt the lives of the islanders, destroying their livelihoods and lands. In both the cases of Tsunami at Arratupuzha and Yaas Cyclone at Ghoramara Island, high tide hit coastal communities, all of their livestock had died, not all but few, mud and brick houses were left in the island only, their livelihood option being destroyed. The people of the island were survived by government aided disaster

response teams and island based flood Centre . It is evident that, chronological effects of cyclones, floods and erosion events together have changed the traditional way of life of the coastal communities and it is evident that, short term and long term effects of climate change acted as a reminder of the fact that the traditional coastal communities of our country constitute a vulnerable group and their development depends upon constant vigilance of their livelihood challenges and management of their resources.

The present study aims to explore conceptual problems of coastal communities of two very sensitive ecological zones which are affected heavily by climate change. The main objective of the research includes finding out the systemic errors that have set in the different livelihood options for coastal communities since liberalization and have resulted in “coastal mobility as an option and mismanagement of coastal resources thereby risking the future of the ecosystem and the coastal community at large, also inter-relating the same to the rise of ‘climate refugees’ a phenomenon.

Ethnographic study of these two economic zones reveals that fishing seems to be an individual cum a group’s exercise which depends upon the fishermen’s and their community knowledge of the sea, weather and his belief in nature’s bounty. (Dhanuraj, 2004) It was also noticed that, the knowledge of the coastal community about Resource Management and livelihood maintenance in a vulnerable zone, made them take steps to initiate the sustainability of economic growth wherever they moved due to climate induced mobility. In reality, climate induced mobility is a collective enterprise that initiate the phenomenon of “Climate refugees”, (Gulati, 1991) which needs to be strategized and managed by using participatory methods and evaluation techniques by the government. In absence of suitable plans and strategies, the locals of these vulnerable zones look for alternatives of livelihood and migrate to other parts of the countries or state to secure better livelihood options for their future generations, which in turn would create resource scarcity and nation’s economy at crossroads as the phenomenon of climate refugees increasing in India.

So, in the matter of fact, climate change is affecting few countries of the globe in different ways than the

other, as, most of the South Asian developing countries are in red zone of climate change as they are facing events of droughts, floods and erosion regularly, but the scholar communities have recognized the climate sensitive zones of South Asia such as Afghanistan, Nepal, Sri Lanka, Bangladesh, but the condition of Indian are still yet not recorded, which in turn effects the flow of climate finance to the country as well as disrupting the formation of climate sensitive developmental plans for the people living in these zones, we choose to focus on two climate sensitive zones of India on the basis of their similarities and differences, such as, extreme erosion events, recurrent flooding, restructuring of political and social structure, and mitigation and adoption strategies on the basis of livelihood, on one case the people are forced to leave their economic choices permanently and the other case, they choose to stay in their fishing profession by choice.

THEORETICAL ASPECTS

Lifeworld and Political Ecology

Climate change is affecting the already Marginalized communities, which is evident through field work, the main impact of this research is, understanding vulnerability from the effected communities, which were left behind in older climate arguments and debates. The emergence of Political Ecology debates within climate change stemmed from a global radical movement aiming to debunk misconceptions surrounding environmental issues, shedding light on the capitalist underpinnings exacerbating these problems. (Bear and singer, 2014) Political ecology's epistemological lens offers insight into unequal power dynamics, labor division, identity formation, and societal restructuring resulting from environmental, economic, or sociological conflicts. Within the context of climate-induced migration in the Sunderbans, understanding the climate crisis's complexities across political and social structures is crucial for resilience and protection frameworks. Narratives play a pivotal role in comprehending emerging phenomena like climate-induced migration and the rights of marginalized communities, encompassing rights to resources, social solidarity, housing, a secure future, and livelihood opportunities.

Debates on climate refugees, categorized as maximalist or minimalist, underscore the need for compensation and legal protection for those affected directly by climate change. However, these debates often neglect the human subjectivities at the heart of the crisis, emphasizing technological solutions over holistic human-centered approaches.

It is becoming very important to understand that, Ecological discourse plays a fundamental component of ecolinguistics that uses discourse analysis within an ecological paradigm to explore the complex relationship between humans and the ecosystem. Through the application of experiential, interpersonal, and textual lenses to discourse analysis, scholars are able to decipher how language shapes human-environment relationships. Through the recognition of different patterns and themes throughout the narratives, using this analytical approach eco-beneficial discourses can be promoted, eco-destructive narratives can be resisted, and ambivalent narratives can be refined. By using this lens, the ecological significance that is inherent in language can be seen, which supports initiatives to promote environmentally conscious language usage and improve ecological consciousness. (Song and tang, 2020). Political ecology debates tend to overshadow with time and time again. This emphasizes how crucial it is to learn from various relational margins in order to advance the field. Political ecology has benefited greatly from feminist viewpoints and decolonial theories, which provide complex analyses and insights. But they are frequently ignored. In order to address ongoing socioecological crises, I contend that it is imperative to embrace and advance various forms of intersectional, interdisciplinary, and international feminist inquiries. Diverse perspectives on epistemology, methodology, pedagogy, and praxis highlight the importance of representation in our efforts to forge decolonial futures and solidarity. We can promote more inclusive and successful methods for comprehending and resolving complex socioecological issues by elevating marginalized voices and perspectives. (Sultana, 2020). it's now evident from the facts that, political ecology is extremely crucial at this point of time to understand climate mobility or social aspects of climate change, because it could be directly understood through

Marginalization, Justice and Capital dynamics, as for example, the role of middlemen/women became very important with other engaged stakeholders when we understood Climate Change as one social system which is creating intense impacts on coastal communities continuously. It doesn't have any interval, as Erosion events are happening in a very rapid way in the case of Ghoramara island communities and high tides with sea surge are creating ruckus to coastal fishing communities. The impacts can be traced to Livelihood, Social institutions, Economic security, Post disaster trauma and sense belongingness.

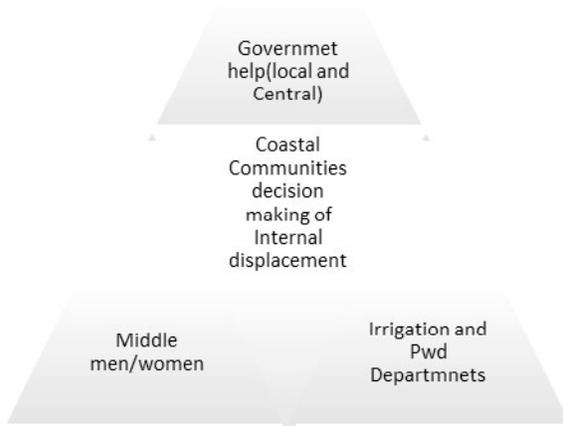


Fig. 1: Factors impacting the decision making of internal displacement communities

It has been understood from the facts that, the decision making if internal displacement of coastal communities can be depends upon many factors, but most importantly, the alienation from available Natural resources and recurrent erosions are the main causes of internal mobility among costal Indian inhabitants which in turn is contributing to other factors of Migration. According to Geertz, there are many push and pull factors behind human Mobility, he recognized the phenomenon as degradable environmental conditions may impacts communities to dissolve and look for better opportunities and stability in nearby highlands. But he failed to recognize environment as one Migration cause, he understood it as extremely complex culturally embedded process of social change. (Geertz, 1978). It is important to know how coastal communities are using their own webs of

meaning to understand this challenges and coping up with the same or getting forced to migrate for safety, security and stability. Unfortunately, the factual data suggests, the Restriction on movement, Resources scarcity, Declining livable lands, Local government interventions are creating havoc on these communities after Rehabilitation.

Habermas and Schutz in their work mentioned that, human communities understood Nature, Society and even their surroundin gs, daily life, through communication. It has different layer of meaning, which they spun around themselves through their everyday experience. is it like one community, taking their mobility decision or perceiving it by other communities actions who lives in their neighborhood as climate change is one continuous process for the vulnerable zones, it has been leaving a prolonged impacts of the communities living inside these zones, some of them might get the opportunity to migrate, some may have to waiting for their fate, its one matter of justice, where people, who are marginalized already, had to opt for different means to sustain through direct impacts of climate change. It has been noticed that, Mobility justice and political ecology offer critical perspectives on the inequalities and power dynamics that shape access to resources, opportunities, and spaces. (Habermas, 1998).

MATERIALS & METHODS

The question of internal displacement and climate change is very complex and interdisciplinary. so, The Research Methodology for this study integrates both primary and secondary data to provide a comprehensive analysis of the targeted communities. Ethnographic fieldwork was conducted in two distinct locations: Arattupuzha in Kerala and Kakdwip at the Ghoramara Islands in West Bengal. The fieldwork aimed to establish a deep understanding of the lives and livelihoods of traditional fishermen and displaced inhabitants of these islands, the sample size was 60 impacted families from west Bengal and 30 families from Kerala. To facilitate effective participant observation and data collection, significant efforts were made to build rapport with the local communities using snow ball sampling technique. Engaging with traditional fishermen and displaced Ghoramara inhabitants was very challenging yet essential to

create a conducive environment for open dialogue and authentic observation. This rapport-building process was critical to gain the trust of the participants, allowing for more in-depth and honest insights during interviews and observations. A semi-structured questionnaire schedule were employed qualitative data. The study targeted one key group: which are Displaced inhabitants of Arattupuzha and Ghoramara Island. Given the bio diversity of the research sites as well as connecting the area of internal displacement question to south Asia, this article will explore more the social-cultural dimensions of Internal displacement and climate change at local level. The collected data were analyzed using qualitative method. The qualitative data from interviews and participant observations were thematically analyzed to identify key patterns and narratives, this methodology provided a multifaceted understanding of the complex interplay between environmental challenges and community livelihoods in the study areas.

Conflict of Interest: The authors declare that there is no conflict of interest involved between the authors regarding publication, as first author 1 had performed fieldwork in Bay of Bengal, and the second author had her fieldwork in coastal Kerala, both the issues are interrelated in their cause and impact over the coast.

FINDINGS

Tsunami Impact and Delayed Rehabilitation in Arattupuzha A Witness Account

As per an eye witness of Tsunami when high tides of Tsunami flooded the village of Arattupuzha. The villagers had no quick means to escape. The waves were 10 to 12 feet high and they lasted for almost eight minutes and took almost 15 minutes to recede. Some areas of the Arattupuzha panchayat like the Valiyazeeckhal ward were just 50 metres away from the Arabian coast and were badly hit by sea waves. In the first few minutes when Tsunami was about to bring about maximum damage only a few lives could be saved. As per witness the governments help came quite late. As per some even the warning which the local police gave them came quite late. The local habitat deteriorated animals like the cows, buffaloes, dogs, etc., died and decayed. Dead bodies of children were

recovered from under the coconut trees. The single road that connected Arattupuzha to Allepey had been washed away and no other road or bridge was there to connect Arattupuzha to any other major place from where some immediate help could be sort the situation worsened. It was only after few years from Tsunami 2004 that a bridge was built for Arattupuzha's connectivity to its nearest town Kayamkulam. The bridge gave an assurance to the villagers that if some Tsunami like incidence happens in future the villagers at least have a way to escape or arrange for some immediate help from nearby town. Though government and non-government organizations volunteered to provide help to the Arattupuzha, the rehabilitation process prolonged

The victims of Tsunami were shifted to recovery camps for few months. In the meantime, houses were constructed for few of the victims but many remained homeless. Charitable organizations constructed many more houses than the government organizations and therefore rehabilitation was achieved at a quicker pace. Today as one goes in Arattupuzha one can easily locate bulk of pink coloured houses which are those houses which were constructed during relief programmes for the victims of the Tsunami hit villages. The pictures of the dead victims can be still seen painted on the sea walls in memory of the deceased souls. There were certain steps which the government took for the fishermen rehabilitation but according to the fishermen these were conflicting to their interests. For example, the imbursement of relief funds did not reach to all and equally due to the Middlemen involvement. Another example of governments and victims conflicting interests was that—the government strengthened sea walls via big stones 'kadalbhithhi'. The government constructed them in the hope of safeguarding the coast from high tides but for the fishermen this was problematic because it was a kind of obstacle for their direct venturing in the sea. Many organizations like the National Thermal Power Corporation are taking lead in making a difference in Arattupuzha people's life by carrying developmental works for the fishermen communality at Arattupuzha and adopting the village and looking after infrastructural needs of the village such as building of road activities, bridge building, sponsoring of boats, installation of street light providing free electricity, etc.

*The Devastating Impact of Cyclone 'Yaas' on
Ghoramara Islanders*

YAAS, this cyclone bleeds the heart of many Ghoramara islanders, as it has snatched away everything from the islanders, as according to one of them, "we had nothing left to eat or to take shelter, so, we escaped with the government aid to one nearby island, it was our fate that the cyclone hit us at afternoon but not at night, if it would hit the island at night, you would get only dead bodies everywhere. The height of the tide was 15 feet, it came to us like one big water fall, we were stand in at the dam to check on any damage, we made it very strong this time to fight with the tide, but you can't believe the way the tides were overflowing the dams and flooding the island from every side, the current was tremendous and havoc, no houses were left to take shelter, except the flood centre, even if the government made concrete/Pakka houses were all swept away, we lost our livestock's, betel leaves, stored rice and many things, as you know, we were already suffering due to erosion, but that cyclone with the accompanying flood made us beggar by one night, we lost everything". the main problem was the water did not receded throughout 3-4 days, as well as the dead bodies of animals, made living vulnerable at the island for the inhabitants, so, most of them left to build temporary houses and living means in nearby island. Local government took immediate precautions and awareness for the villagers, but most of them stayed back at their houses with their youngest sons, in a wish to protect their belongings, which failed and made their lives at risk. It was evident that people were never prepared about these sudden incidents, they only fought with the coming situations abruptly and sustained, while they should have knowledge and preparedness about these effects on their island. Some people still believes the island could be saved if not provoked by politically corrupted decisions, and connected by a bridge to the main land, for better connectivity and development, according to one of the local Panchayet member, "Our island is not profitable for the government, as yet, he does many things to save it, and safeguarding its inhabitants by initiating self-migration awareness campaigns, many Non-governmental agencies also helping them to sustain this fate, but our people are not yet ready to

leave Ghoramara forever, it's their birth place, we feel like we are vagabonds now, nothing left to us which we calls as ours, everything is now more profession-profit oriented only. it is believed by the islanders that, the increased frequency of cyclones are directly related to changing climate, as it has increased the incidents of boat accidents and resource scarcity.

CULTURAL ATTACHMENT AND CLIMATE
CHANGE

*The Divergent Responses of Arattupuzha
Fisherman and Ghoramara Migrants*

The reason behind the traditional fishermen of Arattupuzha community choosing to stay at Arattupuzha is the fishermen's dependency on fishing as a means of livelihood and their sense of belongingness to the village. Their deep attachment to their identity as 'fishermen of Arattupuzha' and their love for the coastal life of Arattupuzha also form reasons to stay at the village. The fishermen of Arattupuzha are culturally and behaviorally attached to the coast life. They wake up in the morning by the alarm of the sea waves, venture into the sea fearlessly as if it is in their command, drink and spend time with friends at the sea shore and watch the sea and its changes. For the fishermen of Arattupuzha fishing is not just an economic activity but a social-cultural event which derives its strength from the fishermen's belief in nature's bounty and their knowledge of the sea. The fishermen of Arattupuzha regard the Sea as "Kadamma" meaning mother and the boats as temples.

In the case of Migrants of Ghoramara island, the reality of their daily lives get shattered by the continuous effects of climate change, they choose to migrate from one place to other, just to secure better livelihood opportunities for their future generations, they were basically betel leaf farmers, as due to increased salinity of the island, it was the only means which were sustainable and profitable for them to sustain, but the reluctance of fishing emerged from some unfortunate incidents happened during recent years, according to the people, probably due to increased height of the tides and decreasing depth of the sea bed could be a reason for the frequent accidents. There are many disruptions due to climate

events on the lives of the islanders, so most of them flew out of the island but few of them couldn't, as they believe, the soil of the island is special to them and profitable. The deep attachment of the people to their lands making the social, economic, political lives unstable and initiating traumas about social cohesion and community security.

Climate Induced Mobility

It is evident that the phenomenon of climate change is initiating the phenomenon of "climate refugees" at a rapid rate, even though the legal status of climate refugees is not yet established due to lack of direct evidences, but now the gaps are filled, all the evidences and facts are well recorded to establish the fact that 'climate refugees' are a reality, in the case of Ghoramara island migrants, Erosion made the lives of the people vulnerable, it took away everything in its course and made the people choose another livelihood options as well as shelter, most of the people near river banks claimed that, they have self-helped their extended families to survive the ill fate and made temporary shelters inside the island for survival, when their house touched the territory of earthen dam, it means, according to one of them, "I ran away just with my children's and identity cards, as no time left for my house to erode into the river, we knew the fate, as we were doing this for years now, as the river is coming toward us, we just made temporary mud houses and live there till the river reached us, we saw a crack at the backyard, and ran out of the house, just before it all go into the river." so, people are shifting internally for their life due to erosion and tidal events regularly on this island, and it's just not for the island only, the Coastal Bengal is facing erosion events tremendously in some areas which could be directly linked to the rise of water level and climate change, which also created internal migration routes for better and stable future. It is just another fact that some among the present generation of men of fishermen community at Arattupuzha are migrating to different areas in search of better livelihood options as they strongly feel that there are no adequate insurance and safeguard policies for their coastal life and moreover they believe that their education may give them better job opportunities and fetch them more money if they go abroad. Arattupuzha fishermen have started going to

gulf countries to earn more money. This drain of human resources is a danger to the development of a traditional can be prevented if fishing is made safer, secure, economic and channelized into a lucrative profession for. As per some youth of Arattupuzha the daily economic remuneration for traditional fishermen should be fixed at a particular rate irrespective of the business of that day and seasons. To accomplish this goal it is perhaps important to have knowledge of what constitutes coastal resource for the fishing community of Arattupuzha and how the coastal resource can be managed to yield a sustainable fishing business.

It is noted from various research on displacement and resettlement that, it has disrupted that social equilibrium of any society under the threat of climate change and they had to change their cultural practices according to new settlement and communities, "The displacement and resettlement processes have exacerbated the risks of landlessness, increased morbidity and mortality, marginalization and social disarticulation" (Price, 2009). This displacement research is situated in the ethnographic context of coastal Bengal, It contributes to global environmental knowledge production for the purpose of informing policy-making efforts. The study addresses the critical need for research on climate migration, seeking to bridge the existing knowledge gap between climate refugees and migrants. In light of climate change's prominence as a discourse of paramount importance in contemporary times, it is an issue confronting every nation. Local actors, in particular, play a pivotal role in ascribing new meanings to climate change through their adaptive actions. (Gauld, 2011) Displacements was a consequence of the encroaching sea, attributed to a sudden increase in sea levels and coastal erosion. It culminated in an examination of the adaptive strategies employed by these displaced individuals, who can be understood as "permanent climate-induced refugees." It is imperative to note that the process of erosion persists, necessitating the continuous migration of these individuals in search of a viable habitat.

The island serving as refuge for climate refugees is also facing rapid degradation, posing a dire situation for its inhabitants. Climate events are categorized into temporary and permanent types, with the latter,

including sea-level rise and coastal erosion, presenting enduring challenges. Narratives within the study focus on a community relocated due to erosion, highlighting the ongoing environmental struggles along the Bay of Bengal coast. It is evident that numerous coastal cities, towns, and islands are grappling with the profound challenges posed by sea-level rise and erosion. According to available reports, a 5-meter increase in sea levels worldwide could render many low-lying areas and islands uninhabitable. (Kelman, 2009).

The study explores narratives of yearlong erosion events in the Bay of Bengal region, focusing on the lack of formal records post-displacement. In-depth interviews serve as the primary research method, delving into the experiences of climate-induced forced displacement. A semi-structured guide facilitates discussion on various perspectives, including those of the affected islanders, government authorities aiding adaptation efforts, and neighboring communities hosting refugees. Through these narratives, the study sheds light on the multifaceted impacts of climate change on coastal populations and their efforts to navigate environmental challenges.

‘We have never ever imagined that small erosion events of the coastal areas would lead us to become “Homeless” forever, we have not only lost our houses, and we have lost our livelihood together. Few of us also couldn’t afford the mental abrupt stress so, a few committed suicide, one day when there was a heavy storm at our island, all of the corners of our island got drowned, even no higher space was there for us to survive, till the officials came and rescued us, we were all in shock and trauma, the officials gave us temporary places to sustain until they sanctioned two acres of land to each family and livelihood options for us, climate change was very real for all of us, we did not know any terms like these before, but we faced it as “change” In weather pattern, we also wants to know more about these issues in future for safe escape, the increased severity will disappear the remaining island within habitants as it seems, but you know, till, our island sinks these island will be also drowned together’.

Understanding the complexities of the life of a climate refugee is crucial for advocating their rights and protection. Without recognizing the

interconnected issues they face, it’s impossible to address their needs effectively. Policymakers, advisors, researchers, and media must give proper attention to the impacts of climate-induced displacement to ensure adequate preparation and participation in forming area-specific disaster management plans. While similarities exist with other migration criteria, this article focuses solely on the unique challenges posed by climate-induced displacement.

Challenges and Strategies for Sustainable Coastal Resource Management in Arattupuzha and Ghoramara Islands

The term coastal refers to an area of transition where terrestrial and marine environments interact to form unique environmental conditions. In the present study the coastal resource is considered in both environmentally and socially applicable contexts so, that one may have a holistic and integral understanding of it. For the fishermen of Arattupuzha the resource ranges from the Arabian Sea, Kayamkulam lake, the coastal land of Arattupuzha, local labor or local manpower of fishermen, fishing tools and technologies, fishermen’s indigenous knowledge of the sea and their belief in nature’s bounty. The government and the banking system also constitute as substantive resources. In the case of Ghoramara migrants, they are well versed with their knowledge of coastal resources and the ways they could utilize it at its most for survival, but due to extreme weather events they are failing to sustain with it, they have created their own self-help groups to sustain these climate crisis events as well as government are trying to support them by making different committees to look upon them or initiating new short term developmental plants on them for their livelihood, both the scenarios are pointing toward the fact that to create sustainable development for the coastal people, government has to take consideration of the act that climate change is effecting people of the coastal India in each and every ways, which could be sustained only by initiating long term survival goals at regional level.

The dynamics and complexities involved in the sustainable development of the coastal resources of Arattupuzha and Ghoramara Island are strongly

related to the management of all above mentioned resources (Hasannudin, 2013). A proper management strategy would perhaps involve ensuring the availability of coastal resources to the fishermen community in organized and locally-structured forms. This may include multiple inter-related factors such as,

- (i) Increase Water quality of the Lakes/ponds which is being degraded day by day by dumping of domestic and industrial wastes as well as increased salinity at coastal localities thereby affecting the quality and volume of fish catch.
- (ii) Prevention of territorial encroachment of the lake by many local people and business groups. It was found that resort owners in Kerala, also utilize significant stretches of the water bodies. At places the bottom of the lake is deeply dug at many places to make passage of big vessels in the sea easier but this alteration of natural topography of the lake disturbs the fish habitat in the lake water ecosystem.
- iii) Building awareness and educational campaigns about environmental sensitivity and preparedness for extreme weather events at school level as this would create acceptance of the situation and made the youth prepared for any events at their community level
- (iv) Reduce the ship transportation activities across the island of Ghoramara; and making the river banks concretized where it is effecting much as it creates havoc erosion and high tides at the river banks.

The coastal land is also a major resource for the inhabitants. As it is evident from both the case studies of two different ecological zones, the village lands are shrinking day by day bringing the villages closer to the sea. The locals and the governmental agencies have constructed earthen embankments, concrete walls with boulders somewhere along the coast to prevent dangers from high tides of sea but it is more of a large boulder dumping in haphazard way or destruction of earthen embankments across the river banks leaving behind the most disaster-prone

sensitive areas unsafe. Moreover, the big boulders sea wall just in front of their houses block their direct passage to the sea and therefore in order to venture into the sea the vessels have to first cross through the lake first, pass through the lake sea corridor and then enter the sea. The land near the lake has high valuation for the purpose of tourist spot constructions and sand mining. Many a times business groups have tried to approach the authorities of the villages so that they can use their land for the purpose of sand mining and constructing resorts for tourism etc but many ecological groups are revolting against it.

As far the Sea is concerned it is a huge resource on which the coastal inhabitants are mostly dependent but this resource is too risky to be exploited at times due to uncertainties of weather and high tides. Moreover there always lies many risks like the risk of the identity of the Indian fishermen being mistaken by national or international army as pirates and the fear of they being shot for this reason or catching of small prohibited lead them to unnecessary legal matters. The recent efforts of the government to give colour coding to Kerala state boats is a welcoming step in this direction. The fishermen venture into sea for a number of days at stretch but they are not really in touch with satellite updates of the weather or exact fishing spots which they have to target and also they leaves the small fishes at the sea, Their ships routes are also not under proper monitoring. Back home their wives and children are waiting for their safe returns from the sea. A good thing is that a lot of unity exists amongst this community and therefore in the absence of the guardian of the households the community people stand for each other's need.

CONCLUSION

The findings indicates that, the vulnerable occupational groups of coastal India are facing doubling impacts climate change, as they are having impacts of economic and climate crisis together on their life, but still, extreme erosion events are not recognized as one event caused by climate change, although ,it impacting our Indian coastal cities and islands, in both the case studies we could understand that, instead of different social-economic structure of

two different coastal zones, people are tend to migrate internally in search of better livelihood opportunities or to take shelter. most of the people of Ghoramara island migrate to Kerala for livelihood as well as most people from Kerala fishing community migrate to middle east countries for livelihood., so the outreach of these people made them migrate internally or internationally, just because the cause being their migration is still yet not recognized, their community and professional security became compromised.

Herein, the coastal people are extremely vulnerable with respect to their exposure to perils of the sea and they lack of long term adaptive strategy towards climate change. It is believed that coastal life has great resilient capacity but recent human interventions and climate changes are challenging this resilience capacity. This challenge can be successfully met if coastal ecosystem is managed, a proper long term climate change management system is built, good infrastructure is established, capacity building is done and with a holistic understanding of life and livelihood of a coastal communities. The present research study may be regarded a piece of work dealing with erosion as main criterion of climate change which can serve to enlighten the Indian government regarding the needs and aspirations of the traditional coastal communities elsewhere in the country. The outcomes and learning of research study may be effectively implicated in the policy planning for the development and maintenance of other coastal communities and islands of South Asia.

ACKNOWLEDGEMENT

The first author expresses her gratitude to UGC, New Delhi for financial support for this research and acknowledged the help and co-operation of the local governing authorities, field participants of the study, for their consent and constant support during the data collection.

REFERENCE CITED

- Chatterjee, D. 2011. "Understanding the linkages between climate change and migration between Bangladesh and India". *Jadavpur Journal of International Relations*, 15: 169-171.
- Chatterjee, M. 2020. "Impacts of climate change on Sundarban delta complex". *World focus*, 231:1-6
- Das, G. 2022. "Coastal zone management of West Bengal -A Review", *Indian Science Cruiser*, 36(1):28-38.
- Dhanuraj, D. 2004. Traditional fishermen folk in Kerala and livelihood issues, centre for civil society research internship papers, Centre for Civil Society, New Delhi
- Ghosh, T., G. Bhandari, & S. Hazra 2003. "Application of a 'bio-engineering' technique to protect Ghoramara Island (Bay of Bengal) from severe erosion". *Journal of Coastal Conservation*, 9:171-178. Retrieved February 23, 2019
- Ghosh, T. Hazra, and A. R. Bhattacharya. 2014. Island erosion and afflicted population: Crisis and policies to handle climate change, international perspectives on climate change (pp.217-225). DOI:10.1007/978-3-319-04489-7_15
- Gulati, L. 1991. Fisherwomen on the kerala coast: demographic and social economic impact of fisheries development project no.8, Geneva, Geneva International Labour office women work and Development.
- Heslin, A., D. Deckard, R. Oakes, and A. Montero-Colbert 2018. "Displacement and resettlement: understanding the role of climate change in contemporary migration". In: Mechler R, Bouwer L, Schinko T, Surminski S, Linnerooth-Bayer J (eds) Loss and damage from climate change. Concepts, methods and policy framework, Springer, Cham:237-258
- Kerala State Action Plan on Climate Change. Government of Kerala (2014).
- Hasanuddin, N. L., N. Novesty, and S. R. Happy 2013. Is it possible to eradicate poverty in the Fishermen Village? *International Journal of Environment Sciences* 4(2):123-130.
- The Guardian, May 2017, "The three-degree world: the cities that will be drowned by global warming". Retrieves form, <https://www.theguardian.com/cities/ng-interactive/2017/nov/03/three-degree-world-cities-drowned-global-warming>
- United Nations Rio Declaration on Environment and Development (1992), 31 ILM 874 (13 June 1992)



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