



Coastal Erosion: Causes and Impact on Indigenous Communities

(Study From Anchuthengu to Poonthura)

Bring Back Green

Team Members

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About The Organisation

Our Mission

Bring Back Green is an initiative which focuses on rewriting the unsustainable past that we have rode upon till now due to greed and speed. Our core belief is that every young person is a powerhouse of change and if it is well exploited by providing opportunities it can radically revolutionise the entire planet. The team at BBG are very young and socially oriented students starting from the age of 16. We want to inspire action among the youth for the Climate Change Movement by bringing them opportunities as well as awareness about the situation.

Our Past Initiatives (A brief history)

Bring Back Green started working briefly on activities and small initiatives since mid-October, 2019. We started with providing steel straws to students of College of Architecture, Trivandrum to be distributed to nearby shops. This activity was inspirational to our future because, the shopkeepers accepted the straws and practised using it daily which helped in averting thousands of plastic straws from being used. It also established that student community can actively bring about grass-root level change by influencing community level stakeholders.

Since then, Bring Back Green have actively worked in the environmental field and made amazing progress through campaigns, conferences, workshops and now online events.

Some of our notable past events are mentioned below:

1. Climate Education Curriculum Development:

We are trying to implement an amendment to the current educational syllabus in which we add informational sessions and activity-oriented classes to discuss about topics regarding Climate Change, Sustainability (Includes introduction to sustainable practices and sustainable alternatives) and Effective waste management. This projects first draft has been forwarded to the SCERT by the Hon'ble Education Minister of Kerala.

2. Waste management, reduction and auditing activities: We have worked at multiple venues such as '*Karate Times International Cup-2019*', '*Kerala Karate-Do Association's 38th State Championship*', '*Trivandrum Youth Conclave*', '*International Film Festival of Kerala-2019*', and others on various aspects of waste management, experimenting with waste reduction methodologies and waste auditing. One of our achievements was at the '*Karate Times International Cup-2019*' held at Kannur stadium where our team could bring down the total waste generated from the 2-day event to under 12.5kg.

3. Awareness activities at schools and colleges across Kerala regarding topics related to sustainability, effective waste management and sustainable menstruation. Currently piloted across multiple schools and colleges including Kendriya Vidyalaya, Thrissur; Government college, Karyavattom, Government Engineering College Barton Hill, Kozhikode Medical College, UKF College Kollam, CUSAT Kochi, Vaidyaretnam Ayurvedic College Thrissur, and many others.

4. Bring Back Green National Climate Change Conference 2020: Conducted one of the Biggest National Climate Change Conference in Kerala at CUSAT, Kochi on 17th and 18th January 2020. Key resource persons included Indonesian origin, Global climate activist Isabel Wijsen, The 'Waterman of India' Rajendra Singh, Dr Oomen V Oomen, Akshay Jain, Sameer Nair, Nisha Jose, Padma Shri Dr G Shankar, etc.

5. Online webinars, virtual campaigning: We have conducted virtual campaigns on various topics and have conducted nearly 25+ online webinars on various topics of importance with key resource persons including Medha Patkar, Dr Archana Prasad, Dr KG Thara, Sridhar Radhakrishnan, Dr Biju Kumar, Adv Harish Vasudevan, Neha Verma IFS, Dr Meera Baindur and many others.

6. EIA Draft 2020: We had submitted our objections and suggestions report to MoEFCC regarding the EIA Draft Notification 2020 with the assistance of experts such as Dr KG Thara, Sridhar Radhakrishnan, Dr Biju Kumar, Adv Harish Vasudevan and PZ Thomas along with our 11 interns who studied and worked on 10 different regions of India that potentially could get affected by the draft.

In the webinar with Medha Patkar, she stressed on the importance of communities and how EIA Draft Notification 2020 will affect them.

In the discussion with our mentors on this project; Dr Biju Kumar, Adv Harish Vasudevan, PZ Thomas and Sridhar Radhakrishnan, they stressed on the importance of need of a new policy. They also discussed about the problems with the draft and how it will impact different regions of India.

7. Research Study on 'Post-COVID Sustainability of Agriculture, Manufacturing and Service Sectors of Kerala': A futuristic and revolutionary study undertaken by Bring Back Green on how Kerala's sustainability could improve in a Post-COVID era. As part of this study, we conducted 3 webinars with experts such as Dr PS Sreekantan Thampi, Sivadas B Menon, Regive Manuel, Dr Vinoj Abraham, Biju B and Dr Joseph TJ. We presented the report virtually on September 30th, 2020 in the presence of Hon'ble Revenue Minister of Kerala, E Chandrashekar and Hon'ble Speaker P Sreeramakrishnan.

Report Prepared By:

1. Anagh: He is a passionate volunteer and researcher who has worked on a multitude of projects with many prestigious organisations across India. He is currently the Vice-President of Dhisha and is pursuing his PhD. in Political Science from MG University.
2. Akhilesh AnilKumar: Co-founder and Director of Bring Back Green is a social entrepreneur and educator hailing from Pathanamthitta. He was also the co-founder of SwapTheStraw movement and many other campaigns. Currently pursuing Bachelors in Computer Science.
3. Fahad Razzi: Co-founder and Director of Bring Back Green is a Change-maker, Social entrepreneur, Educator-Learner, Facilitator, Environmentalist and Minimalist hailing from Wayanad, Kerala. He was also the co-founder of SwapTheStraw movement across Kerala and many other campaigns. He is currently pursuing his graduation in International Relations from Central University of Kerala.
4. Asif Vahab: He is an avid volunteer who has been working with many organisations for campaigns and activities. He is currently pursuing his management graduation from Trivandrum.

1. Introduction

The nature of coastal erosion along Thiruvananthapuram, which is part of the southwest coast of India, has been studied by many researchers (Thomas et al. 1986; Kurian 1987; Baba et al. 1987; Kurian and Baba 1987; Thomas 1988; Sreekala et al. 1998; Shamji et al. 2010; Shaji 2014; Noujas and Thomas 2015). Earlier studies using Survey of India toposheets, satellite imageries and aerial photographs have provided a baseline understanding on shoreline change and associated erosion and accretion along this coast (Sreekala et al. 1998). Recent study conducted by National Centre for Sustainable Coastal Management (NCSCM 2011) reported locations of erosion occurrence along Kerala coast with maximum occurrence of erosion zones along Thiruvananthapuram (NCSCM 2011). Shoreline change, other than the normal seasonal dynamics of shoreline, was analysed with respect to the specific morphologies along this high energy coast. The study analyses long-term and short-term shoreline changes using field mapping and geospatial techniques. The role of natural morphologies and artificial coastal protection and other structures in coastal erosion is examined.

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2. Methodology

Coastal morphologic features and artificial structures in the study region were delineated from a survey with a detailed questionnaire. Interactions with experts and scientists helped us to understand the present situations. A community oriented study helped us to connect the environment and indigenous community and the issue of climate change and the community issue. The entire coast was surveyed during the year 2020 for delineating the artificial structures and other coastal morphologies. Coastal scientists use shoreline indicators such as vegetation line, high water line, low water line, land–water boundary, still water line or similar indicators for delineating shoreline from different data sources. When shorelines are extracted from different data sources for comparison like in the present study, appropriate signature or indicator for shoreline has to be used for making the extracted shorelines comparable. In a micro-tidal high energy coast like the south-west coast of India, the spatial difference between different shoreline indicators may not be significant. On a perusal of different data sets, it was observed that the Low Water Line (LWL) given in the toposheet is close to the Still Water Line (SWL) mapped during field observations in fair season which was again comparable with the Land–Water Boundary (LWB). The entire Thiruvananthapuram coast was visited, and detailed photographs has been prepared to understand the role of natural morphologies and artificial structures in causing or accelerating coastal erosion. Shoreline modifications and erosion-accretion due to breakwaters and groynes were also obtained . The shoreline prior to the construction of breakwaters and groynes was obtained from Survey of India toposheets.

3. Major Issues

The problems of the coastal zone are unique due to the high density of population, loss of land due to coastal erosion, mining of beach sand for industrial purposes, drastic morphological and shoreline changes due to shore structures

like harbour breakwaters. Destruction and reclamation of wetland including mangroves, saline intrusion into the water table, decreasing fish catch, development related degradation of the environment. Violation of the provisions of CRZ. The coastal community is the only sector that periodically loses dwelling places due to erosion. The destruction of natural habitats in the form of reclamation of wetlands, cutting of mangroves and dumping of industrial and urban wastes worsens the plight of the coastal communities. Sand Mining India has the world's third-largest construction business, after China and the United States, accounting for 9 percent of its \$2 trillion economy. Over the next five years, India plans to invest \$500 billion in its woefully inadequate infrastructure, of which \$500 million is earmarked for the construction industry alone. It is predicted that we are going to build four Indias in the next twenty years, in terms of infrastructure, without thinking about the building materials. The unprecedented scale of the mining of sand needed to build offices, factories, malls, high-rise apartments, schools and highways is beginning to take a toll on river systems and the environment. The greatest single factor that has contributed to the destruction of river ecology in Kerala is indiscriminate unscientific sand mining from rivers. All the 44 rivers in Kerala are facing a big crisis because of sand mining. The construction boom, fueled by the inflow of remittances from non-resident Indians and the inherent nature of people to construct ostentatious residential buildings, lead to high demand of sand and river basins of Kerala are the only source for it. This has pushed the water table down, reduced the water holding capacity and adversely affected the biodiversity status in the riverine eco system. The sand holds water and fills the nearby ponds and lakes by raising the water level. When the sand is removed from the river bed, it reduces the availability of water in the wells and canals near the river. Removal of sand has resulted in lowering or sinking of riverbeds resulting in the intrusion of saline water into fresh water, causing serious threats to drinking water source and irrigation. Other staggering ill-effects of uncontrolled sand mining in Kerala are, damages the ecosystems by adversely

affecting fish breeding and migration, Increases saline water intrusion, spells disaster for the conservation of many bird species such as storks, sandpipers and egrets that depend on the riverbeds for food. About 370 Km of Kerala coast is subject to coastal erosion of various magnitudes due to one or more or combination of several factors like early onslaught of monsoon and subsequent high and steep waves and geological factors, sea level rise, turbulent zones near Lakshadweep, laterite cliff erosion. The erosion tendencies may increase with human activities such as urbanization, construction of dams, prevention of soil erosion in the midland and high land belts, development of harbours etc. (Baba 1979). No actual research study has been done on the extent of the impact of such activities. Areas of sea - erosion in Kerala Sea - erosion now exists all along Kerala coast in different intensity. One common feature is that everywhere it is in the monsoon. Kerala Irrigation Department who are associated with Anti - sea - erosion works have prepared a list of places which are prone to and likely to cause sea - erosion.

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4. Observations and Results

(I) Anchuthengu

It is since past 8-10 years since the coastal areas have been experiencing heavy losses. The location called Anchuthengu is near to Muthalakuzhi Harbour. The village named Perumathura is situated very close to the Muthalakuzhi Harbour. The coastal area related to the west of the Muthalakuzhi Harbour has been increasing hither and hither and it is on the decreasing trend as been moved towards the northern side of the Muthalakuzhi Harbour. Several houses are on the path of destruction owing to this coastal erosion. Around 10-20 families are residing in camps at present. Owing to the decreasing trend of coastal area, the fishermen of Anchuthengu are not in a position to save their boats in the concerned coastal area. This has forced them to go three kilometres ahead for saving their boats and for fishing which forms a major part of their livelihood. The damage has occurred to in coastal area of Anchuthengu has proved a threat to their households as well as their daily means of livelihoods which is for eke out a living is now at state.

(II) Kochuthoppu

Kochuthoppu village is under the threat of destruction coastal arena consequent upon adaptation of unscientific and primitive methods of construction. This decrease in coastal area is pausing a serious problem since the last 5 years. The Kochuthoppu village has been facing this drastic situation of loss of coastal arena ever since the commencement of the construction work of the Vizhinjam Port. As mentioned earlier in Anchutheng, several households have been damaged in Kochuthoppu village too consequent upon the factors cited therein. 30 households have already been completely damaged. When a group of houses in a particular line were delitated , the authorities posted a sign post, which was just a mere identification. The same happened when the second line of houses were lost.

(III) Poonthura

In Poonthura has been under the threat of the loss of coastal area. Around 6ft sediments have been washed away from Poonthura coastal area since the last five years. The fishermen of Poonthura face the threat of damage their boats on account of the lack of adequate area to save their boats. Coastal area and the sudden outbreak of Coastal Erosion has made the fishermen devoid of jobs the reason being that the inability to face the coastal outbreak. This coastal area was the hitherto commensurate of saving 300 boats. But it is a sad plight that the same space has now being occupied by the Vizhinjam Harbour. At present the fishermen are save their boats at Thiruvallam Lake.



Fig. 1 '*Kattadikayam*' almost completely destroyed



Fig. 2



Fig.3 Houses damaged in Poonthura

(IV) Vettukadu

The rate of coastal erosion in Vettucaud has increased significantly over the last 3 years.



Fig.4 Steps damaged near Vettukadu Church

(V) Valiyathura

It is observed that the Sea Wall is not a permanent solution. Once the waves are more powerful and huge, then the stones layed are being washed away and the shoreline is being decreased again. Since last three years, the three lines of houses were washed away. It is said to be two lines during 2019 and one line of houses destroyed during 2018. It is also observed that there has been an increase in erosion rates at this region with approximately 20m increase this year.



Fig.5 Houses damaged recently



Fig.6 Houses damaged recently

(VI) Pozhiyoor

Pozhiyoor has been victims of Coastal Erosion since several years. Pozhiyoor area was poignant with around 150-200km of Coastal Area. The last 4-5 years have depicted major changes in the decrease in sea shore. The destruction is caused due to the Thengapattannam Harbour, which is 12km away from the village. The shoreline is almost deteriorating in the village. The household settlements were 100m away from the settlement 5 years back. The shore is now 10m away from the household settlements. The fishermen now save the boat in front of their houses.

5. Observation

In many places frontal beaches seaward of seawalls have disappeared bringing wave breakers closer to seawalls. Scouring at the base of seawalls accelerates slumping. Wave overtopping and flooding of the coastal zone landward of seawalls are also the resultant of high waves breaking very close to seawalls during southwest monsoon. Seawalls have to abruptly end at some locations alongshore which cause 'end erosion hotspots'. Seawall along Poonthura to Valiathura (3 Km stretch) often gets damaged and slumps leading to emergency repair and strengthening. Wave overtopping and severe wave attack occurs along this sector. Houses and coastal road were damaged during severe wave attacks. This is again noticed at Kannanthura of the district and affected around 2 Km stretch. Seawalls are damaged or slumped along Shankhumugham sector (6 Km stretch) and hence wave overtopping is observed throughout the sector. Being an open spot in a seawall stretch, fishing gaps and elsewhere experiences a pressure gradient towards the gap which causes pushing of wave/swash into the gap accelerating erosion. Accelerated erosion and slumping of seawalls and hence severe erosion is observed (Fig.). Erosion at Valiathura (north of breakwater) is due to the downdrift effect (Figs). Severe erosion observed at beach and it affected about 1 Km area. Coastal road and some houses were also damaged along this sector.

The north of ongoing harbour breakwaters also severely affected by storm waves and its severity extends around 2 Km further north. Sea walls also have been ineffective in these regions where the waves have eroded the ground layer sand of the wall and stones have decreased in height. The sea wall is seen as only a temporary solution in many regions and the damage to houses near sea walls has been more due to the waves rising over the walls with more energy.

Altered sediment transport processes can disrupt sand movement that can lead to increased erosion downdrift from the structure. The sea wall can be only seen as temporary as mentioned above because, once the height increases, new stones are currently being used again which does not help with the problem.

6. Unscientific Construction

The coastal erosion in such a large amount is a recent phenomenon that started occurring ever since the construction of the Vizhinjam International Port began. The entire coastal region and the lives of the fisherfolk are now under threat. People in the city are only worried about the lack of connectivity to the domestic airport, and are least concerned about the Adimalathura-Poovar Road, the lifeline of the fishing community, vanishing. In places such as Vettukad, Kannamthura, Kochuthoppu and Cheriya Thura coastal erosion has destroyed houses, schools, dispensaries, community halls and centres of worship. We are in a do or die situation. Once the 3,000-metre breakwater reef is completed, the Thiruvananthapuram airport and the Indian Space Research Organisation (ISRO) units located on the coast would feel the repercussions. When dredging started adversely affecting the marine life here, fishermen began switching over to other jobs. What we require is a long-term solution. The construction of the breakwater reef for the port has had repercussions on the lives and livelihood of the fishing community in Thiruvananthapuram district.

The breakwater reef, when completed, would be 3,000 metres long.

Already the sea has been responding in a ferocious manner, causing huge tides. Government of Kerala's Vizhinjam International Seaport Ltd. Is a need and we scuttling the port project is also not practical. In all probability, the problem will get worse when the construction of the breakwater reef is completed.

The crucial issue of coastal erosion has not been sufficiently addressed in the environmental impact assessment of the project.

As far as Vizhinjam is concerned, neither the changes that human intervention could bring about have been analysed, nor have the effects of the erosion and shoreline build up been seriously discussed. The terms of reference for environmental clearance specify that the project should not be implemented in high erosion zones. The construction of breakwater reef along with the dredging of underwater rock and sand-mining would further undermine the security of the coastal villages adjacent to Vizhinjam. an ecologically sensitive area known as Wadge Bank, where abundant varieties of fish breed, is not far from the Vizhinjam coast, and constant movement of ships through this pocket could severely affect fishes' sustenance.

With the construction of the breakwater reef the situation seems to be getting out of control.

Erosion is affecting the sand movement in the ecosystem. The beaches most eroded are on the northern side of Vizhinjam, areas that include Panathura and Poonthura, while there is sand accretion in the villages on the southern side. During monsoons, sand and sediments move from the south to the north. Breakwater reefs obstruct this natural movement, and as a result, sand and sediments tend to stay on the southern side of the structure, resulting in accretion in the south and erosion in the north.

7. Erosion due to Mudbanks

Mudbanks are patches of calm, turbid water with high load of suspended sediments appearing close to the shore along the southwest coast during south west monsoon season (Kurup,

1977; CMFRI, 1984). Accretion observed along mudbank locations and its updrift side.

8. Seasonal erosion

Monsoon storm waves are the major causative force inducing seasonal erosion. Seasonal erosion is observed throughout the sandy coasts along the southwest coast during southwest monsoon (Fig). Beach again starts to rebuild when long period swell waves approaches from southern ocean. Only temporary measures are required to address this.

9. Climate Change and Coastal Erosion

There is now ample evidence of the impacts of global climate change on marine environments. Regional changes are more relevant in this context. The existing evidence shows that the influence of climate changes on local fishery communities can be very high. The key drivers of climate change that have an impact upon the lives and livelihoods of fishers include: Sea level changing Uncertainty about upwelling Changes in sea-surface temperature and salinity Local rainfall and monsoonal variability Hazardous algal bloom Increased illnesses The complexity of the coastal environment is difficult to understand. Since human activity encircle the coast as well as the hinterland, impact of coastal activity can be felt at considerable distance in time and space. For example, discharging pollutants into the sea has impact on fish resources; export of wood from the port has an impact on deforestation; and even impact on movement of sea currents, which in turn affect the air currents and rain bearing clouds and temperatures. The interdependence of the various factors is apparent but needs greater study to establish the linkages. The demands on the coast are governed by a conflict of interests, which are within groups and between them. For example CONFLICTS occur between the following uses and users:

- Small, medium and large fishermen have conflicts over the areas in which fishing can be done and the quantity, which should be allowed.

- The exploitation of the various resources of the sea, viz. gas, oil, minerals and prawns cause conflict over space.
- The belief in unexplored resources of the coastal sea bed, has added a new dimension in defining the EEZ through the law of the Sea. .
- The possibility of future potential which may be discovered though yet not known has escalated territorial conflicts in many countries e.g. Spratly islands, yet unexplored Arctic and Antarctic Circles. .
- "Traditional" culture conflicts with the "development" culture among people residing in coastal areas. E.g. The fate of the Tribes in Andaman and Nicobar Islands and the settlement of settlers from the mainland to "develop" the potential; of the Islands.
- The controversial North-South Highway that was meant to bring the fruits of development to the local tribals became a major source of conflict between the local tribals and the encroachment of their habitat by the settlers.
- The diversity of the coastal environment conflicts with attempts at imposing a single "model" of growth as seen in the exploitation of the commercial potential of the coastal areas. .
- Needs of a consumerist society for new goods and services conflicts with the increasing inability to accept the pollutants caused by the very system of production, which meets these needs.
- Coastal areas will see greater conflict of interests due to the fact that they are located at the confluence point of the land and the sea.
- With water scarcity on land becoming more intense, the need to exploit water resources of the sea will bring the conflicts top the shores of the nations. This conflict of interest raises a number of issues: The need for Management of the coastal region has to be comprehensive.

The policy must be transparent and based on data. There is need to have conflict resolution mechanisms to ensure that "might" is not always "right". The claim must be established based on the criterion which acknowledges the diversity of the coastal

environment. The recognition of diversity of the coastal environment would preclude a single "model" management plan to fit all types of cases.

10. Suggestions

Erosion hotspots along southwest coast of India are identified from extensive field work carried out during the southwest monsoon season in 2013 and 2014. Direct field investigations and morphological interpretations have addressed distinctly different coastal segments with distinguishable morphological signatures and different types of anthropogenic interventions. The erosion hotspots are mostly dependent on the morphology and coastal structures. Identified hotspots are down drift side of mudbanks, fishing gaps, down drift sides of coastal structures including harbor breakwaters, locations of slumping seawalls, mining and adjoining sites, wave over topping sites and sites of haphazard maintenance of seawalls. Tidal inlets and adjoining areas are also locations of coastal erosion. Among the erosion hot spots a majority is the result of induced erosion by coastal protective structures or harbour breakwaters. This indicates lack of proper Morphological Impact Assessment studies preceding construction of coastal structures. The normal procedure is to design coastal structures with insufficient data base due to reluctance to collect site specific morphological and hydrodynamic data. This is done to save time and reduce cost at the expense of coast and beach. The haphazard way in which maintenance of damaged seawalls is undertaken as emergency measure causes vulnerable spots along the seawall lines.

The construction of the breakwater reef for the port has had repercussions on the lives and livelihood of the fishing community in Thiruvananthapuram district. A technical committee should be formed by the Government to study the same so as to avoid further destruction and to move ahead with the work of the Government of Kerala's Vizhinjam International Seaport Ltd. The focus now should be on alternatives and solutions that can minimise coastal erosion.

The region requires an expert study on how to protect lives and livelihood of the fisherfolk in villages in and around Vizhinjam, which has a long history of beach erosion.

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Appendix-I

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Survey on Coastal Erosion and Community

1. കടക്കയറ്റം എത്ര വർഷമായി അനുഭവിക്കുന്നു?
2. നിങ്ങളുടെ കാഴ്ചപ്പാടിൽ എന്താണ് കടകയറ്റത്തിന് കാരണം?
3. സമകാലിക കടകയറ്റത്തിന് കാരണം ഹാർബർ നിർമ്മാണം ആണെന്ന് തോന്നുന്നുണ്ടോ?
4. കടൽ ഭിത്തിയുടെ നിർമ്മാണം എത്രതോളം ശാശ്വത പരിഹാരം ആണ്?
5. കടകയറ്റത്തിന് മേൽ പറഞ്ഞതല്ലാതെ വേറെ എന്ത് കാരണങ്ങൾ ഉണ്ട്?
6. ഔദ്യോഗിക വ്യത്യാസങ്ങളിൽ നിന്നുള്ള നിലപാട് എന്താണ്?

- A. LSGD
- B. Corporation
- C. State Government

7. ഫിഷറീസ് വകുപ്പിൽ നിന്ന് എന്ത് പരിഹാരമാണ് കിട്ടിയിട്ടുള്ളത്?
8. കടകയറ്റത്തിന്റെ തോത് വർഷാവർഷം എത്രത്തോളം കൂടുതൽ ആണ്?
9. കടലോര നിർമ്മാണം ഇനിയും കൂടുന്നതിനെ കുറിച്ച് എന്താണ് അഭിപ്രായം?
10. മതസ്ഥാപനങ്ങൾ കടൽക്ഷോഭ വിഷയത്തിലും ഹാർബർ നിർമ്മാണത്തിലും ഉള്ള ഇടപെടലിനെ നിങ്ങൾ എങ്ങനെ കാണുന്നു?
11. Directorate of Environment and Climate Change ഈ വിഷയത്തിൽ ഇടപെടുന്നുണ്ടോ?
12. പ്രകൃതിസംരക്ഷണത്തിലും കടൽക്ഷോഭത്തിലും നിങ്ങൾ എന്ത് പരിഹാരമാണ് നിർദ്ദേശിക്കുന്നത്?
13. സമുദ്രമലിനീകരണം നിങ്ങൾ കടൽക്ഷോഭവും കടകയറ്റത്തിനും ഒരു കാരണം ആയി കാണുന്നുണ്ടോ? ഉണ്ടെങ്കിൽ എന്താണ് പരിഹാരം?
14. കടലോരനിവാസികളെ മാറ്റിപാർപ്പിക്കുന്നതിൽ എന്താണ് അഭിപ്രായം?
15. എന്താണ് സർക്കാരിൽ നിന്ന് ഹാർബർ നിർമ്മാണത്തിൽ പ്രതീക്ഷിക്കുന്നത്?

Appendix-II



Near Shangumugham Beach During Late September 2020



Near Beemapally



Highly Damaged Houses Near Valiyathura