Kerala Natural Disasters News Articles

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Kerala: Shattered lives of fishermen left high and dry

https://www.newindianexpress.com/cities/thiruvananthapuram/2022/jun/08/shattered-lives-of-fishermen-left-high-and-dry-2462943.html

"Erratic weather conditions due to climate change, threat of cyclonic storms round the year and advancing sea the fishermen community in Thiruvananthapuram is fighting many odds each day. With their livelihood hampered, these fishers are struggling to support their families. Due to weather disruptions, they rarely get to fish these days. These families are in constant danger of displacement and starvation. Ever since Ockhi hit the shores, cyclonic storms have become a regular affair in the state but Kerala is still not prepared to handle them. In the past three to four years, the coastal areas have been eaten away by sea erosion. The state departments lack the experience to prevent such natural disasters.

The intermittent hike in kerosene price has also crippled the fishing community. Jackson Pollayil of the Kerala Swathanthra Matsya Thozhilali Federation said "Even if the fishers go out in the sea, they are unable to make any profit as they are spending more on the fuel now. The number of days they can fish has also reduced largely," said Jackson. In 2021, the fishers in Kerala lost around 76 working days. "The state government should compensate the fishermen for the days they lost. Precautions being taken as part of disaster management is stifling their livelihood. The government agencies should write off all the loans given to fishermen who are struggling for survival. The agencies like Mathsyafed are offering loans to fishers at 12.5 percent interest with an additional service charge," said Jackson.

Valiyathura, a coastal hamlet in the capital, is the worst hit. Over the last four years, around 1,200 homes were destroyed and swallowed by the sea in Valiyathura alone. The situation is similar at Cheriyathura, Bheemapally, Kochuthoppu, Valiyathopp, Kannanthura and Vettucaud. Xavier Andrews, a traditional fisherman, and his family from Valiyathura are constantly living in the fear of displacement. "Around four rows of houses along the Valiyathura coast have been washed away by the advancing sea. My house, which belonged to my mother, where I have been living for the past 45 years, will be gone this monsoon. The government should take steps to protect us and our property. Every year, hundreds of houses are getting washed away. I have been asked to move to the relief camp," said Xavier.

Lack of profit has plunged Xavier's family into a deep financial crisis. "There is no shore for fishing. We have to go to Vizhinjam to venture into the sea. Local fishermen there often create friction. But this is the only job I know to do," he added. Former Valiyathura ward councillor Tony Oliver said 50 out of the 140 constituencies in Kerala are coastal areas and the changing governments have failed the fishermen community. "They have no clean drinking water or sewage lines. Apart from announcements, no projects were launched to protect the coast from the advancing sea. They just want our votes. There is no opposition to help raise our demands

either," said Tony.

The destruction of the shoreline has adversely affected the livelihood of around 4,500 kambavala (gill nets) fishermen. There are around 87 kambavala units in Poonthura. "Fishing equipment worth lakhs have been damaged and I am in a deep financial crisis. We have to dole out more money for fishing and it's not profitable anymore," said Antony Stancilas, a traditional kambavala fisherman.

"The state randomly issues warnings on days and restricts us from venturing into the sea, even when the weather is normal. This should stop. Weather warnings should be more accurate as our livelihood depends on this. Unscientific fishing activities by industrial units have become rampant. Many countries and other states are curbing trawling activities to improve marine resources. Traditional fishermen are returning empty handed because of all this," said Anto Elias, vice chairman of the Mathsyathozhili Karshaka Samyukta Samara Samiti.

Kerala: Extreme weather events in Kerala linked to climate crisis: Experts

https://www.hindustantimes.com/india-news/extreme-weather-events-in-kerala-linked-to-climate-crisis-experts-101634668375094.html

"The havoc wrought by heavy rain in Kerala last week in which 39 people were killed has a clear imprint of climate change, say weather scientists. In the last three years, the state has seen at least four flash floods of which the 2018 floods were the worst. Scientists link the fast-changing weather pattern to the rise in surface temperature of the Arabian Sea in the last two decades, leading to higher cyclonic circulations. According to the India Meteorology Department, there was a 52% increase in cyclonic movement over the Arabian Sea between 2001 and 2019, and an 8% decrease in the Bay of Bengal during the same period. IMD statistics showed that nine cyclonic or major depressions had formed in 2020, of which four were over the Arabian Sea.

Roxy Mathew, a planet scientist with the Indian Institute of Tropical Meteorology, Pune, said the temperature over the Arabian Sea has increased by 1.2 to 1.4 degrees Celsius in the last two decades. "Usually, the temperature in the Arabian Sea is 1.5 degrees lower than the Bay of Bengal and this is one of the reasons for less cyclonic circulations and low pressure in the Arabian Sea. But of late, the situation is changing. What is disturbing is that warming is seen not only in the top layers of the sea but also in the deeper layers of the ocean," Mathew said. He added, "We all know that more than 90% of the heat on earth is absorbed by oceans. Usually, temperatures in the Indian Ocean and Bay of Bengal are above 28 degrees Celsius and in the Arabian Sea, it is between 26 and 28 degrees Celsius.

But the Arabian Sea is warming up fast. It has been quite visible in the last decade or so." Dr Dr V S Vijayan, a member of the Madhav Gadgil committee on Western Ghats and founding director of Salim Ali Centre for Ornithology, said the state was yet to learn its lessons from the

2018 tragedy in which close to 400 people died. “It is sad that in Kerala, discussions start only after a tragedy, but everyone forgets about it soon. Cloud bursts, flash floods and landslips are here to stay.

The state will have to pay a heavy price if it goes ahead ignoring the climate change signals,” said Dr M G Manoj of the Advanced Centre for Atmospheric Radar Research with the Cochin University of Science and Technology. Vijayan said Kerala can take the lead in implementing the UN General Assembly resolution of 2017 on sustainable development. “Our overdependence on natural resources will be reduced and we can think of a better tomorrow. Whether you take Uttarakhand, Kerala or the Northeast, calamities are leaving untold miseries. But for this, we need a committed political leadership,” he said. The UNGA resolution is a set of suggestions to achieve a better and more sustainable future for all by 2030.

Noted ecological scientist Madhav Gadgil, who headed an expert group to study the degradation of the Western Ghats, said people will have to take more proactive roles to protect their place of living, surroundings, and environment. “I agree that lopsided developmental activities have aggravated the intensity of natural disasters. But I still have hope from Kerala — it is the first to take up decentralised planning. Let people take up their bread-and-butter issues along with sustenance,” Gadgil said, adding that states like Maharashtra and Goa also experience similar tragedies year after year but Kerala gets wider publicity and reach. Mathew said a big shift in the rain pattern in Kerala is visible.

“Though monsoon rainfall may decrease, the number of heavy rainfalls will increase, leading to more flash floods and landslides,” Mathew said, adding that Kerala should have been very careful in land use because the state, endowed with many hills and rivers, has a slanting geographical landscape. Apart from global warming, scientists have also found that the dumping of plastic waste in the sea has also led to a rise in surface temperature. According to a study conducted by the Central Marine Fisheries Institute of India in 2018, major oceans will have more plastic than fish by 2050. By then, over 850 metric tonnes of plastic will be found in the sea whereas fish will be 821 metric tonnes. Another study conducted in 2017 by a world body, Alfred Wegener Institute, says the seas near Mumbai, Kerala and Andaman and Nicobar Islands are among the most polluted in the world.

Kerala: How climate change is taking a toll on livelihoods of small-scale fishers

https://india.mongabay.com/2021/08/how-climate-change-is-taking-a-toll-on-livelihoods-of-small-scale-fishers-in-kerala/

"Until recently, Kerala’s coastal population had every reason to rejoice the arrival of the monsoon in the state. Apart from numerous good fishing hauls, the important celebratory moments like weddings came about during the monsoon season which spans from June to August, as they generally attained economic stability during the period. However, over the last

few years, climate change and the ensuing shifts in the marine environment have disrupted the rhythm of their lives. Long gone are the days of big catches and the subsequent rise in seasonal income for the small-scale fishers. “Our age-old custom of planning and celebrating big events during the monsoon season has come to a halt as this period no longer offers us a stable income for the past few years.

Lately, the monsoon is quite erratic in its patterns resulting in a reduction in the number of fishing days, and thus becoming the worst-hit season of the year,” says 55-year old Ponnan K., a traditional fisherman from Alappuzha. - Erratic monsoon patterns and other disruptions by climate change are reducing number of fishing days as well as fishing stock in the waters of coastal Kerala. - There has been a steady decrease, over the past five years, in the availability of oil sardine and this is hitting the economic stability of coastal communities. - The income of small-scale fishers in Kerala, who depend on fishing for daily needs, has drastically reduced in recent years.

People are quitting fishing and looking for other livelihood options to support their families. In addition, the unavailability of commercially important fishes also adds to their woes. “These days we return with empty boats. Going out fishing only adds to our debts,” says Unnikrishnan T.B., another fisherman from Vypin in Ernakulam district. Like Ponnan and Unnikrishnan, as many as 1,37,248 active fishermen in Kerala are passing through a difficult phase in their life, as the impacts of climate change are taking a toll on the livelihoods of the small-scale fishermen who go for fishing primarily to feed their families on daily basis.

A series of environmental phenomena such as rapid warming of the Indian Ocean, sea-level rise, frequent occurrences of cyclones and associated impacts such as the vulnerability of many fish stocks and disruption of fish food like planktons are attributed to climate change by marine scientists. Loss of working days coupled with the depletion of resources has spelled doom for the livelihood of resource-poor fishers in Kerala. A drastic drop in the availability of the Indian oil sardine has further deepened their trouble. Loss of fishing days In a recent research article Changing Status of Tropical Cyclones Over the North Indian Ocean published in the journal Climate Dynamics, a group of scientists observes that the frequency, intensity and duration of cyclonic storms have increased in the Indian Ocean.

According to them, the frequency of cyclones has increased by 52% in the Arabian Sea (during 2001-2019) and that of very severe cyclones has risen by 150%. While the intensity of the cyclones increased in the region by about 20% to 40%, the duration of very severe cyclones is up by 260% in the Arabian Sea, says this study. “The sea surface temperature (SST) has increased by 1.2 degrees to 1.4 degrees for the past century. The surface temperature in the Arabian Sea sometimes rose to 31?C-32? C which is 28?C-29?C normally,” says Roxy Mathew Koll, Climate Scientist with Indian Institute of Tropical Meteorology, Pune and one of the authors of this study. Rapid warming of the sea and associated impacts, including cyclonic storms, adversely

affect the fishing calendar days. With a substantial increase in alerts on cyclones or extreme weather conditions followed by Cyclone Ockhi in 2017, the number of fishing days has drastically come down, impacting the livelihood of fishermen. Annual marine fish landing estimates of the ICAR-Central Marine Fisheries Research Institute (CMFRI), Kochi shows Kerala experienced a fall of 46% in the number of fishing days in 2017 compared to the previous year due to Cyclone Ockhi. Some scientists call the phenomena 'weather shocks' which according to them have adverse effects on marine environment.

"Change in ocean ecosystem following a series of climatic issues directly affect the small pelagic resources such as oil sardine," says Grinson George, marine scientist and Senior Programme Specialist of the SAARC Agriculture Centre, Dhaka, Bangladesh. According to George, who works on climate-related aspects in fisheries and aquaculture in South Asian region, weather shocks and associated developments in the waters influence the distribution pattern, life cycle, behavioural changes, migration pattern and reproduction of the fish stocks. Vulnerability of fish to climate change Another study by Koll signals the reduction of primary productivity such as phytoplankton in the waters owing to rapid warming over the tropical Indian Ocean.

The study, published in the Geophysical Research Letter, finds that "enhanced ocean stratification due to the rapid warming of the waters suppresses nutrient mixing from subsurface layers", which affects fish resources. Rapid warming of the Indian Ocean may potentially turn this biologically productive region into an ecological desert, the study warns. ICAR-CMFRI's vulnerability assessment of Indian marine fishes to climate change also shows that ocean temperature, current speed, direction and chlorophyll have an influence on the biology of fishes. According to this study, 30% of fish species are vulnerable to climate change along the south-west coast (Kerala, Karnataka and Goa). "Large magnitude of changes in ocean temperature is expected by 2055 affecting the highly vulnerable species.

These would influence changes in distribution and species composition. Our study finds that fishes which lead complex lifecycle, high exploitation and low adaptive capacity are prone to climate change," remarks P. U. Zacharia, Principal Investigator of this study. Drop in sardine catch deepens trouble The very familiar common name "kudumbam pularthi" (family provider or family caretaker) of oil sardine among the fishing community, implies the economic significance of the species in Kerala. The decrease in the availability of oil sardine is hitting the economic stability of coastal communities. In a recent study, the ICAR-CMFRI points out that oil sardine resource in Kerala waters is severely affected by climate change related disruptions. After a record harvest of nearly 4 lakh (400,000) tonnes in 2012, catch of oil sardine is on a declining trend in Kerala every year. For the last five years, there has been a sharp decline of oil sardine along the coast of the state.

The fish registered a slight increase in 2017, but continued to slide during the following years. In 2019, the catch of sardine was just 44,320 tonnes and the yield again dropped to one-third the

following year. E. M. Abdussamad, Principal Scientist at CMFRI who works on oil sardine says, "The unfavourable conditions in the ocean ecosystem following El Nino seriously influence the growth and reproduction of oil sardine resources in Kerala." The fish landing data throws light on the disquieting condition of Kerala's active fishermen, out of which 68% fall under BPL (Below Poverty Line) category, according to the latest census report. Normally, sardine harvest fetches good income to the traditional fishers during the monsoon period and a decline of this reousrce alone can trouble their economic safety.

Substantiating this view, another CMFRI study reveal that following the reduction in oil sardine landings, the average net returns of Kerala's outboard fishermen using ring seine experienced a sharp decline from Rs. 12,000 per fishing trip to Rs. 2500 during the period from 2014 to 2018. The period saw a drop of the sardine catch from 2.5 lakh (250,000) tonnes to 77,000 tonnes. Fishermen in this category lost 50% of fishing efforts due to lesser availability of sardine, according to the study. Social and economic catastrophe Charles George, an activist and the president of the Malsyathozhilali Aikya Vedi (Fishermen Unity Forum) calls the situation a "social and economic catastrophe," adding that the traditional fishing community in Kerala that is already marginalised socially and economically, is reeling under the impact of the climate-induced crisis.

"Income of fishermen in the state, who depend on fishing for their daily needs, has drastically reduced over the past three years. People are forced to flee from fishing and find some other livelihood options to support their families," he says. He further demands that a fish famine package be allowed to compensate their economic loss due to climate change and "fish drought". Responding to a query on awareness of climate change, Basheer T.K. a fisherman from Tanur in Kerala's Malappuram district says that climate change is a reality. "We are aware of this through our continuous interaction with the sea.

According to our indigenous traditional knowledge we can see the sea has changed a lot. We could feel warming of the waters upon our venture into the sea. There have been drastic changes in ocean current and we could sense changes in the fish habitats," he says. We used to venture into the sea by picking up certain signs from the sea, wind, clouds, etc. But climate change has disrupted this way of fishing too, he adds. Coastal lives in peril Storm surge, high waves, sea erosion and extreme weather conditions have put the lives of Kerala's coastal people in danger. Many coastal villages like Chellanam in Ernakulam district, Vizhinjam and Poonthura in Thiruvananthapuram district are increasingly becoming vulnerable to sea erosion which leaves many fisher families homeless more often. In May this year, hundreds of people residing in the coastal village of Chellanam were impacted when Cyclone Tauktae struck.

Houses collapsed and a vast area along the coast, which extends to about 15 km, was flooded following storm waves. According to Sebastian D.S., a fisherman residing at Chellanam, the sea is encroaching into their land each year. "This year the sea erosion is severe after the Cyclone

Tauktae", he says. Livelihood issues apart, such incidents are posing threat to their life and coastal assets, putting their lives at peril.

At the same time, marine experts are of the view that storm surge will occur more frequently in the coming years. According to them, alarming winds by the cyclones help form storm surge in the waters which results in high waves, sea erosion and flooding in the coastal hamlet. Safety issues Another lurking issue faced by the fishers is the lack of proper 'social safety nets' such as insurance coverage in the sector. A 2017 study carried out by Shinoj Parappurathu, Senior Scientist at CMFRI, Kochi shows that though accident risks of fishermen are covered, other risks such as vessel loss or damage and loss of other coastal assets due to natural disasters are covered only at a limited scale in India.

"If suitable insurance schemes were available, the lives of the coastal people would not have become this pathetic. Their only livelihood option is at stake owing to climate change and related fallouts", says Parappurathu. He further states that the fishermen need to be equipped with on-board safety equipment to ensure disaster-proofing. Lack of advance warning system and means for two-way communication exacerbate the risk involved. Fishermen are pushed to bear the brunt of the natural calamity in the light that only 4.25% of fisher families have GPS and 0.67% use wireless communication.

"ICAR-CMFRI is working for assessing the vulnerability of the marine fisheries sector in the future," says A. Gopalakrishnan, Director of ICAR-CMFRI. "The institute has come up with a slew of adaptation strategies that include adoption of climate-friendly technologies or green practices, assurance of capacity building to make fishers climate-smart, development of knowledge base for climate change and marine fisheries and promotion of coastal aquaculture or cage fish farming. This is an outcome of a recent research project Impacts, Vulnerabilities and Adaptation Strategies for Marine Fisheries in India with the support of the Ministry of Environment, Forest and Climate Change. The predicted scenarios in different radiative changes will help the policy planners to go ahead with suitable plans to tide over the uncertainties," he remarks.

Kerala: Infrastructure Projects amplified Cyclone Tauktae's impact

https://science.thewire.in/environment/in-kerala-infrastructure-projects-amplified-cyclone-tauktaes-impact/

"An eerie silence is still prevailing over Chellanam, a coastal village panchayat located between Ernakulam and Alappuzha in Kerala, where cyclone Tauktae barrelled dangerously into the tiny houses of COVID-battered fish workers a few days ago. Over 500 houses of the village were inundated in the worst-ever sea attack since Cyclone Ockhi of 2017. The primary health centre at Kandakkadavu in the middle of the panchayat was seen fully submerged in waist-high water due to Tauktae.

With the help of fire and rescue workers, health department officials were able to retrieve medicines and equipment stored there, especially those required for COVID-19 treatment. According to panchayat president K.D. Prasad, Chellanam witnessed a spike in COVID-19 cases when the cyclone Tauktae wreaked havoc in all 21 wards. There were 601 active COVID-19 cases in the panchayat area, and even the facilities where the patients got accommodated were destroyed in surging waves. He said high waves continue to hit the coastal settlements despite cyclone moving away. A local resident Louis Abraham said that seawater intrusion into houses is continuing and most houses are under knee-deep water.

"As COVID-related lockdown was strict in our area, rescue and rehabilitation work faced enormous hurdles. We had even to organise online protests to attract relief works and government intervention," said Louis. The situation is almost similar in the Thiruvananthapuram district's fish worker settlements such as Beemapalli, Vizhinjam, Anchuthengu, Muthalapozhi, Paruthiyur, and Kochuthoppu. The road linking Thiruvananthapuram city with the domestic terminal of the local airport via the famous Shanghumukham beach was washed off. Though the cyclone killed only two people in Kerala, its intensity across the coastal region was heavy. The worst affected districts include Ernakulam, Kollam, Alappuzha, Kozhikode and Kasargod.

"The nature and severity of cyclone Tauktae indicate that the Arabian Sea will witness more such severe storms in the coming days, especially during late monsoon season, due to climate change. Until 2014 when Cyclone Nilofar occurred, there were no cyclones in the entire Arabian seacoasts. Global warming, climate variability, and weather changes are increasing the risk. As far as the Kerala coast is concerned, many human interventions make the cyclones severe. They include land reclamation, port developments, shrimp farming, river diversion, dredging, and sand mining," points out S. Abhilash, a scientist with the Department of Atmospheric Sciences at Cochin University of Science and Technology (CUSAT).

"Places like Chellanam have witnessed severe destruction because of the human activities which turned supporting factors for the natural forces. The cyclones have intensified the ongoing coastal erosion," he observed. Abhilash stated that the cyclone frequency over the Bay of Bengal is on the decrease in the recent years, but they are increasing over the Arabian Sea around the onset phase of the monsoon. He noted that cyclone Tauktae is the fourth cyclone in recent years to have developed in the Arabian Sea and in the pre-monsoon period of April to June. All these cyclones since 2018 have been categorised as either 'severe cyclone' or above. After Cyclone Mekanu, which struck Oman in 2018, the Arabian sea witnessed Cyclone Vayu in 2019, and it struck Gujarat. Cyclone Nisarga followed it in 2020 and struck Maharashtra.

"All tropical cyclones require large amounts of energy to remain alive. Normally, this energy is obtained from the warm water and humid air over the tropical seas. At present, seawater up to depths of 50 metres is hot in the Arabian Sea, and so the possibilities of more cyclones are in the cards," he observed. While Thushar Nirmal Saradhi, a social activist who works with the climate

change victims of Chellanam, emphasised that "for people outside Chellanam, sea erosion may be a new phenomenon propelled by the climate change-induced cyclones but for us, it has been happening for over six decades." "It all began when a shipping route was dredged to Cochin shipyard through the sea close to our villages.

The construction of the coastal highway connecting Kochi with Aapuzha has further intensified sea erosion. Now, the cyclones have turned into a regular phenomenon posing a severe threat to our people. In the previous years, the authorities have promised to construct sea walls using geosynthetic tubes. Still, synthetic geo constructions that began last year were washed away in the cyclone," said Saradhi. Impact of infrastructure projects The unscientific and rapid development of big infrastructural projects is being pointed out as one of the reasons for the intense impact of the cyclone. Max Martin, a researcher working with coastal communities in Southern Kerala, said: "The impact of the cyclone (Tauktae) was heavy on the northern parts of all major constructions in the sea in Kerala, mainly ports and breakwaters.

Rampant coastal zone violations and destruction of adjoining wetlands have contributed immensely to the destruction. The coastal region of Kerala is now under high risk, and it is high time that ways are found to minimise the impacts of climate change." A similar concern is being highlighted by those working with fishermen. "Every year, the sea is drawing closer to us. The wide beaches are getting smaller. Cyclone Tauktae is not an isolated phenomenon. It is an extension of the disasters happening in the coastal region for a long time. The human factors related to sea erosion are often ignored conveniently," said Joseph Jude, a rights activist working with Kerala fish workers. Albert Thomas, a fish worker of Arthunkal in Alappuzha observed that climate change has been affecting the character of the Arabian sea for a long time.

"The sea started turning turbulent ever since the Tsunami of 2004. Ockhi further worsened the situation. Now we rarely see the sea calm. The height and force of the waves have increased in recent years. They are times, not just during the monsoon months of June to September but all through the year. It's difficult to predict how the sea will behave," said Thomas. Fish workers also alleged that there is an alarming depletion in fish wealth in the Arabian Sea in the last three years. They state that because of the loss of beaches, they find it difficult to dry their nets and small fish under the sun. In Vizhinjam-Shanghumukham regions, fish workers accuse the Vizhinjam International Seaport, which is under construction, of inciting natural disasters.

A news report said that Cyclone Tauktae severely damaged the breakwater of the under-construction seaport, and washed away vast amounts of stones and concrete pillars. "The seaport has played a significant role in destroying houses in Valiyathura, Beemapalli, and Shanghumukham areas. Because of the constructions in the sea, the waves have become rougher. The breakwater has prompted the waves to hit the shores harder," observes Joseph Vijayan, an expert on coastal communities in Thiruvananthapuram. Do seawalls work? In 2017, the international journal Natural Hazards published a paper 'Impact of sea-level rise and coastal

slope on shoreline change along the Indian coast,' which said that the highest level of coastal erosion was occurring in West Bengal and identified Kerala as a close second.

Other studies have also observed that the western coast of India was primarily stable except for Kerala's coastline of 590 km. They estimate that about 63 percent of the state's coastal region faces sea erosion. Earlier this month, the Kerala Coastal Zone Management Authority (KCZMA) distributed a draft coastal zone management plan among concerned local bodies in all coastal districts for discussion. In Kerala, nine districts are affected by sea erosion. During each incident of sea turbulence, coastal communities seek solutions, and the government soon starts the construction of seawalls. As per data available from the KCZMA, seawalls have been erected in almost 60% of the Kerala coast, spread in 310 km.

"Seawalls are not a solution to sea erosion. Fortifications of this kind are increasing the flow of the currents around the shore. That results in the intensification of waves to the north of the breakwater and subsequent further erosion of that shoreline. But the local people insist that fortifications are the only way they can save their homes," observed Abhilash of the CUSAT. Joyce Mary, a 52-year-old resident of Kannamaly, said seawalls were a big failure in preventing the raging sea from entering households. Even huge stones and concrete pillars used for the walls have been washed away. Losing home, Joyce moved to a relative's house where 15 people of three families now live.

According to Joseph Vijayan, seawalls and breakwaters are interruptions of sediments across the coast preventing the coastal areas from getting replenished. While Max Martin said: "We need to plant trees and plants in the coastal areas that protect our beaches. Only natural remedies can solve the issue, not human-made constructions. Coastal vegetation, as well as mangrove plantations, can hold the sand in the shore." Activists want the state government to formulate a policy in this regard. "A state like Kerala with its long shoreline needed to have a clear policy outlook to protect coastal areas," said Charles George, a leader of the Kerala fish workers forum.

Kerala: How infrastructure projects intensified cyclone Tauktae's impacts

https://www.moneycontrol.com/news/environment/how-infrastructure-projects-intensified-cyclone-tauktaes-impacts-in-kerala-6933501.html

"An eerie silence is still prevailing over Chellanam, a coastal village panchayat located between Ernakulam and Alappuzha in Kerala, where cyclone Tauktae barrelled dangerously into the tiny houses of covid- battered fish workers a few days ago. Over 500 houses of the village were inundated in the worst-ever sea attack since Cyclone Ockhi of 2017. The primary health centre at Kandakkadavu in the middle of the panchayat was seen fully submerged in waist-high water due to Tauktae.

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According to panchayat president K.D. Prasad, Chellanam witnessed a spike in Covid-19 cases when the cyclone Tauktae wreaked havoc in all 21 wards. There were 601 active Covid cases in the panchayat area, and even the facilities where the patients got accommodated were destroyed in surging waves. He said high waves continue to hit the coastal settlements despite cyclone moving away. A local resident Louis Abraham said that seawater intrusion into houses is continuing and most houses are under knee-deep water. "As covid related lockdown was strict in our area, rescue and rehabilitation work faced enormous hurdles. We had even to organise online protests to attract relief works and government intervention," said Louis.

The situation is almost similar in the Thiruvananthapuram district's fish worker settlements such as Beemapalli, Vizhinjam, Anchuthengu, Muthalapozhi, Paruthiyur, and Kochuthoppu. The road linking Thiruvananthapuram city with the domestic terminal of the local airport via the famous Shanghumukham beach was washed off. Though the cyclone killed only two people in Kerala, its intensity across the coastal region was heavy. The worst affected districts include Ernakulam, Kollam, Alappuzha, Kozhikode, and Kasargod. "The nature and severity of cyclone Tauktae indicate that the Arabian Sea will witness more such severe storms in the coming days, especially during late monsoon season, due to climate change. Until 2014 when Cyclone Nilofar occurred, there were no cyclones in the entire Arabian seacoasts. Global warming, climate variability, and weather changes are increasing the risk.

As far as the Kerala coast is concerned, many human interventions make the cyclones severe. They include land reclamation, port developments, shrimp farming, river diversion, dredging, and sand mining," points out S. Abhilash, a scientist with the Department of Atmospheric Sciences at Cochin University of Science and Technology (CUSAT). "Places like Chellanam have witnessed severe destruction because of the human activities which turned supporting factors for the natural forces. The cyclones have intensified the ongoing coastal erosion," he observed. Abhilash stated that the cyclone frequency over the Bay of Bengal is on the decrease in the recent years, but they are increasing over the Arabian Sea around the onset phase of the monsoon. He noted that cyclone Tauktae is the fourth cyclone in recent years to have developed in the Arabian Sea and in the pre-monsoon period of April to June.

All these cyclones since 2018 have been categorised as either 'severe cyclone' or above. After Cyclone Mekanu, which struck Oman in 2018, the Arabian sea witnessed Cyclone Vayu in 2019, and it struck Gujarat. Cyclone Nisarga followed it in 2020 and struck Maharashtra. "All tropical cyclones require large amounts of energy to remain alive. Normally, this energy is obtained from the warm water and humid air over the tropical seas. At present, seawater up to depths of 50 metres is hot in the Arabian Sea, and so the possibilities of more cyclones are in the cards," he observed. While Thushar Nirmal Saradhi, a social activist who works with the climate change victims of Chellanam, emphasised that "for people outside Chellanam, sea erosion may be a new phenomenon propelled by the climate change-induced cyclones but for us, it has been happening for over six decades."

“It all began when a shipping route was dredged to Cochin shipyard through the sea close to our villages. The construction of the coastal highway connecting Kochi with Aapuzha has further intensified sea erosion. Now, the cyclones have turned into a regular phenomenon posing a severe threat to our people. In the previous years, the authorities have promised to construct sea walls using geosynthetic tubes. Still, synthetic geo constructions that began last year were washed away in the cyclone,” said Saradhi. Impact of infrastructure projects on Kerala’s coastline The unscientific and rapid development of big infrastructural projects is being pointed out as one of the reasons for the intense impact of the cyclone. Max Martin, a researcher working with coastal communities in Southern Kerala, said: “The impact of the cyclone (Tauktae) was heavy on the northern parts of all major constructions in the sea in Kerala, mainly ports and breakwaters.

Rampant coastal zone violations and destruction of adjoining wetlands have contributed immensely to the destruction. The coastal region of Kerala is now under high risk, and it is high time that ways are found to minimise the impacts of climate change.” A similar concern is being highlighted by those working with fishermen. “Every year, the sea is drawing closer to us. The wide beaches are getting smaller. Cyclone Tauktae is not an isolated phenomenon. It is an extension of the disasters happening in the coastal region for a long time. The human factors related to sea erosion are often ignored conveniently,” said Joseph Jude, a rights activist working with Kerala fish workers. Albert Thomas, a fish worker of Arthunkal in Alappuzha observed that climate change has been affecting the character of the Arabian sea for a long time.

“The sea started turning turbulent ever since the Tsunami of 2004. Ockhi further worsened the situation. Now we rarely see the sea calm. The height and force of the waves have increased in recent years. They are times, not just during the monsoon months of June to September but all through the year. It’s difficult to predict how the sea will behave,” said Thomas. Fish workers also alleged that there is an alarming depletion in fish wealth in the Arabian Sea in the last three years. They state that because of the loss of beaches, they find it difficult to dry their nets and small fish under the sun. In Vizhinjam-Shanghumukham regions, fish workers accuse the Vizhinjam International Seaport, which is under construction, of inciting natural disasters.

A news report said that Cyclone Tauktae severely damaged the breakwater of the under-construction seaport severely, and vast amounts of stones and concrete pillars were washed away. “The seaport has played a significant role in destroying houses in Valiyathura, Beemapalli, and Shanghumukham areas. Because of the constructions in the sea, the waves have become rougher. The breakwater has prompted the waves to hit the shores harder,” observes Joseph Vijayan, an expert on coastal communities in Thiruvananthapuram. Are seawalls successful in tackling sea erosion? In 2017, the international journal Natural Hazards published a paper ‘Impact of sea-level rise and coastal slope on shoreline change along the Indian coast,’ which said that the highest level of coastal erosion was occurring in West Bengal and identified Kerala

as a close second. Other studies have also observed that the western coast of India was primarily stable except for Kerala's coastline of 590 kilometres.

They estimate that about 63 percent of the state's coastal region faces sea erosion. Earlier this month, the Kerala Coastal Zone Management Authority (KCZMA) distributed a draft coastal zone management plan among concerned local bodies in all coastal districts for discussion. In Kerala, nine districts are affected by sea erosion. During each incident of sea turbulence, coastal communities seek solutions, and the government soon starts the construction of seawalls. As per data available from the KCZMA, seawalls have been erected in almost 60 percent of the Kerala coast, spread in 310 kilometres. "Seawalls are not a solution to sea erosion. Fortifications of this kind are increasing the flow of the currents around the shore.

That results in the intensification of waves to the north of the breakwater and subsequent further erosion of that shoreline. But the local people insist that fortifications are the only way they can save their homes," observed Abhilash of the CUSAT. Joyce Mary, a 52-year-old resident of Kannamaly, said seawalls were a big failure in preventing the raging sea from entering households. Even huge stones and concrete pillars used for the walls have been washed away. Losing home, Joyce moved to a relative's house where 15 people of three families now live. According to Joseph Vijayan, seawalls and breakwaters are interruptions of sediments across the coast preventing the coastal areas from getting replenished. While Max Martin said: "We need to plant trees and plants in the coastal areas that protect our beaches.

Only natural remedies can solve the issue, not human-made constructions. Coastal vegetation, as well as mangrove plantations, can hold the sand in the shore." Activists want the state government to formulate a policy in this regard. "A state like Kerala with its long shoreline needed to have a clear policy outlook to protect coastal areas," said Charles George, a leader of the Kerala fish workers forum.

Kerala: After Ockhi, every cyclone alert disrupts livelihood for residents in Kerala's Poonthura

https://www.thenewsminute.com/article/after-ockhi-every-cyclone-alert-disrupts-livelihood-residents-kerala-s-poonthura-139023

"The small busy market, children playing in the streets, shops open, some men taking an afternoon siesta on the St Thomas Church premises…from the outside, it's just any other day in Poonthura, a coastal village located nine kilometers from Kerala's capital city of Thiruvananthapuram. But life has not been normal for the village ever since Cyclone Ockhi hit it in November 2017, in which 35 fishermen lost their lives. Even a minor adverse weather condition leaves the residents sleepless. " It's a like a panic attack, mounting tension and fear, with no way to stay calm, says Alex Mary. Her house is 50 meters from the church and a stone's throw from the sea. Whenever there is any weather warning, there is an alert sent from the local

police station and through the church. This in turn disrupts the villagers' lives as it means loss of work and the coastal region becomes more vulnerable. “ We never used to fear the weather changes as we are the children of the sea, we always felt that we'd seen much. But after Ockhi, life has changed forever, says Andrews, a fisherman.

Kerala was bracing for Cyclone Burevi as the state was predicted to be on its landfall track path. The coastal people have had sleepless nights again for the past many days. “ While leaving for fishing, my husband now tells me that we might not meet again and it could be his last meal with me, such is his fear. It has been a complete change since Ockhi, Mini, wife of fisherman Rapson, says. Mini's sister Selvi's husband Edward went missing during Ockhi and was never found. Selvi and Edward have four daughters.

Their youngest, Nimisha, was 1.5 years old when Edward went missing. “ Because of the Burevi alert, it's been a week since my husband has gone to work. After Ockhi, the fishermen are scared to go fishing. Any alert for a natural disaster that keeps our men from work means starvation for us coastal people, Mini says. “ For anything that requires a fair amount of money, we need to take loans from private banks which charge high interest rates. Not having work for a week affects the loan repayment too. Once the bank people came and sat here when we defaulted for a month. I had to pledge my gold earrings to repay the money. So every cyclone warning is a blow to our livelihood, apart from the worry of losing our lives itself, Mini says. Saroja, Mini's sister-in-law, nods in agreement.

Her 55-year-old husband battles fear every time he goes to sea ever since Ockhi hit the village. “ He began fishing when he was 18 and was never afraid. Now he says ‘ let God take care of me' when he leaves for work, Saroja says. While the men abstain from fishing during adverse weather conditions, it's a loss of income for the women too, many of who work as fish vendors. Saroja is also a fish vendor. She buys fish from the fishing boats and sells door to door and in markets in the city areas. If there is a cyclone alert, Saroja is jobless for a week. Another major concern of the fishing community is the sharp decline in the availability of fish. “ Outsiders say that when the fishing community gets a good catch of fish, they'll be able to manage for a month or more with that. How is that even possible? Getting a good catch at times and having no work at all often like this? How many days are we supposed to live with the money we earned from a good catch?

We have lived here since our birth, we'll not be able to survive anywhere else, she says. Thresite, a 60-year-old fish vendor, has also been jobless since the alert. “ It's been a week since we got the alert through the church. Opposite our house is a river and on the other side is the sea. Any cyclone alert means fear for our lives, Thresite's neighbour Vasantha says. Their houses are only 10 meters apart, while some are built adjacent to each other. The state government had announced Rs 10 lakh as compensation, Rs 6 lakh for buying land and the rest for building a house, for the families of Ockhi victims. “ The amount is for buying three cents of land…where

will we get three cents of land for Rs 6 lakh when the land prices are soaring? asks Mini, who along with her sister Selvi has been trying to buy some land with the compensation amount.

We live each day with the money we earn that day. We don't have any savings, none of us are government employees or have family members working abroad, Dennisya, another of Thresite's neighbours, says. Ever since Ockhi, parents don't allow their young sons to go fishing, which was natural for men above 18 to do in the past. " My husband Yohannan still goes for work, but we don't allow our 22-year-old son Aabin to go into the sea. My husband would say – let me die in a cyclone or in rough seas, but let my son be alive, Alex Mary says. Alex Mary's family of five lives in a small house while Mini's family of 10, including Selvi and her four kids, lives in a two-bedroom house.

We don't want to lose our children, we would rather starve, says Saroja. Many of the families that wanted to educate their children so they don't become fishermen or fish vendors had to take education loans. This in turn has also added to their financial burden as not all children could get a job after finishing their studies. People like Elisha and her husband Selvan run a petty shop in the small living room of their home while some men and women began working as daily wage labourers and domestic workers in the city. My husband was part of the fishermen's rescue team during the 2018 floods. But these cyclone alerts keep him also at home at regular intervals. We had to find an alternate income to keep life moving, Elisha says.

Kerala: In the eye of the storm

https://timesofindia.indiatimes.com/blogs/tracking-indian-communities/in-the-eye-of-the-storm/

"Two years after they were celebrated as superheroes for saving flood victims, the coastal communities, mostly fishermen, are now being blamed for the sudden surge in Covid-19 cases in coastal areas. For a population that has been wrestling a living from the sea, it is difficult to understand the concept of staying cooped up inside homes over safety concerns, say social experts working and interacting with these communities. They spent their lives under the shadow of constant fear knowing that waves can wreck their boats or wash away their shacks anytime. " They face risk all the time.

When they hear of an accident they rush with their rescue boats. They are instinctively bold and for them calamity is not something to run away from. It is something you stand up to and face, says K S Purushan, an expert on coastal communities and fisheries sector. " You are trying to enforce social distancing in areas where population density is around 10-20,000 per square km, be it Poonthura in Thiruvananthapuram or Chellanam in Ernakulam. Their lives are socially much more connected. They live in houses next to each other, and when men set out to the seas and disappear for days, the women depend on each other and maintain a support system, he says. Community leaders say while planning Covid prevention and control measures, the authorities

will have to consider the fact that they have been facing uncertainties all through their lives and have been struggling for their share of growth benefits.

The primary health centres in coastal areas are closed by afternoon. For any emergency, people have to rush to cities. Awareness programmes have to be scheduled in such a way that local populace can attend them. Our work hours are different. For days, we are away from the shore. Half the time, we are completely disconnected with what's happening around us, until we are informed specifically, says T Peter, secretary, national fish workers' union. “ Unlike in the other places, Covid rules were not strictly implemented in fishing harbours and landing centres. It should have been managed by fisheries department, police, healthcare and administration. Purushan, who has travelled across coastal areas in the state, mentions an incident narrated to him by a teacher who used to teach at a school in Puthiyappa in Kozhikode some years ago.

The class was going on when suddenly we heard people shouting about a fishing boat approaching the shore. All the children in the class rushed out to welcome the boat. Later, they came back after the catch was hauled in. She said the students didn't mean any disrespect. It is their natural reaction! Fisheries officials say it is very difficult to enforce social distancing in landing centres. “ Once a boat arrives, hordes of people just rush in. They don't care about anything else at the time. And it will all get over in a few hours, said a senior official with the fisheries. But Peter points out that in some places authorities were able to impose social distancing after making people aware of the dangers.

We implemented it in Thangassery fishing harbour and it was very successfully managed by community members themselves, he says. Things have been taking a turn for the worse for the community for the past couple of years. “ You have to understand that in the past one year, there has been severe sea surges, unusual rainfalls, and cyclones. Our fishing days have been reduced and livelihoods have taken a hit. On top of the that, lockdown kicked in. Fish is our food and livelihood. We don't have both. So, when the landing centres opened, everybody wanted to be a part of it, says Charles George, state president, Kerala Matsya Thozhilali Union. There is a lot of unrest among the coastal communities over income loss, huge debts and fear of collapsing catches.

There are protests and strikes going on in several places. We are ready to follow government's rules, but when there is no income, people will try to go out. We have been seeking a monthly income till the on-going crisis continues, says Charles. There is no denying that this community is one of the biggest unorganized ‘ security group' guarding the state's entire stretch of coastline. If you go to the coastal area, the first time, people will just look at you and go about their business. The second time, a few will come and make enquiries. But if you are seen again in the area, they will surround and ask all your details. They will alert the authorities too. The Corona pandemic is a new phenomenon, the dangers of which have not really penetrated this community

that is resilient to rise every time a natural disaster strikes them. If they are to be kept safe, it can only be done through participatory management.

The eroding shorelines of Thiruvananthapuram, Kerala

https://www.thehindubusinessline.com/blink/cover/coastline-erosion-in-keralas-capital/article30818347.ece

"Thiruvananthapuram's Shanghumugham Beach is shrinking by the day, as the sea is continually pressed inland by a combination of climate-related and man-made causes. On weekends, there is hardly any elbow room on Shanghumugham Beach in Kerala's capital, Thiruvananthapuram. The smell of roasted corn hangs in the air, vendors mill around the walkway that leads to the beach, families lounge around a 35m-long sculpture of a reclining naked woman ‘ Jalakanyaka' by Kanaayi Kunhiraman that seems to strain against Kerala's conservative ethos yet has come to be one of the most recognised landmarks in the city.

It is a familiar beach scene. The only problem is there isn't much beach left. Every year, I feel the sea is drawing closer, says Indu, a 44-year-old Thiruvananthapuram resident who has been coming to Shanghumugham since her childhood. “ The beach is so much smaller than it used to be. We would come here to get away from the congestion in the city, and now look how congested the beach has become. She points to a row of fishing boats lined up along a part of the shore usually reserved for people. The boats were moved after vast tracts of the Shangumugham shoreline were eroded following Cyclone Ockhi, which hit the Kerala coast in December 2017. A nearby road, which runs parallel to the beach, bears testimony to Ockhi's fury rope and traffic cones cordon off the traffic from long sections of the road that were washed away by the waves. Even now, the waves are visibly rough but they do not deter visitors.

Beach-goers play a game of racing back to the shore before the water reaches their ankles, laughing aloud when the wave beats them to it. Others try to venture into the water, holding hands with their friends but lose balance when the wave pulls back into the sea. The whistles of coastguards pierce the air, instructing the crowds to move away from the water. Families with toddlers are turned away from the water. Standing under a wide umbrella, Shishupal, a coast guard, watches his colleague admonish youngsters taking selfies with their backs to the waves. “ Earlier, we would merely look on as people played and swam since the sea is quieter at this time of the year, but now we must strictly prevent them from going into the water, he says. “ We can't trust the waves anymore.

After the [2004] tsunami and Ockhi, we rarely see the sea calm. Shishupal has been working as a coast guard since the early '90s and remembers how he would have to walk for about a kilometre to reach the sea in Shanghumugham. Since then, he notes that both the height and force of the waves have increased, not just during the monsoon months of June to September, when the sea is usually rough, but all through the year. It's getting harder to predict how the sea will behave, he

says. Part of the notion of Kerala being god's own country' is drawn from the abundance of its water resources.

Bordered by the Arabian Sea on the west, Kerala has 44 rivers, 34 lakes, scenic lagoons, mangroves and estuarine wetlands, and also receives heavy rain during the monsoons. But having been battered by severe floods in 2018 and 2019, the state's relationship with water is fast changing. An article titled ‘ Impact of sea level rise and coastal slope on shoreline change along the Indian coast', published in 2017 in the international journal Natural Hazards, noted that the highest level of coastal erosion was observed in West Bengal. Kerala was a close second. Other studies have observed that the western coast of India was mostly stable, except for Kerala's coastline. Of Kerala's 590-km coastline, 63 per cent faces sea erosion.

The enforcement of the Coastal Regulation Zone Notification is lax. Among nine districts observed to be affected by sea erosion in Kerala, the maximum (23 per cent) has been reported in Thiruvananthapuram. The state capital has a 35-km coastline, and is one of the densest districts in terms of population factors that exacerbate the vulnerability of its people at the time of a natural disaster. Cyclone Ockhi, for instance, threw into sharp relief the dangers faced by populous settlements along the coast. Houses and other buildings were washed away in areas such as Valiyathura and Shanghumugham, and families identified as vulnerable were offered ?10 lakh by the state to relocate to safer areas. But many are loath to leave the coast.

What kind of land will you get these days with ?10 lakh in this city? Will it cover the cost of building a house? Who will pay for my transport back and forth from the shore? asks Gilbert (59), a grizzled fisherman who lives further up the coast in Shanghumugham. His house faces the sea, separated from the beach by a narrow road. Why are you coming now, when the sea is safe? Come in June and see what we have to live with. His neighbour comes out of her house on hearing Gilbert's raised voice. She squints and points to a boat in the distance. “ That's where the sea would begin, she says. You'd have to walk that far to get to the sea. Gilbert also remembers the beach being a vaster expanse. During the '80s, there would be swathes of anchovies, sardines and other small fish drying under the sun. We would have dinner and lie down to sleep on the shore, he recalls.

Now there are hardly any fish to catch, let alone to dry. And the sea is knocking at our doors. He attributes the recent disturbances in the sea to the Vizhinjam International Seaport, which is currently under construction. The port is located about 18km further south from Shanghumugham beach. “ Ever since the harbour came up, the waves have become rougher. Because of the breakwater in the harbour, the waves have nowhere to go and are hitting us harder. A nearly 310km stretch (close to 60 per cent) of Kerala's coastline has been protected by seawalls, groynes and offshore breakwaters. Experts have long maintained that fortifications of this kind affect the flow of the currents around the shore, resulting in the intensification of waves to the north of the breakwater and subsequent erosion of that shoreline. But the residents insist

that fortifications are the only way they can save their homes. Gilbert points to a mark on the wall of his house, about a metre from the ground.

Last monsoon, the waters rose and came into my house till here. We told the government to put in seawalls but they said they didn't have money. Sacks of absorbent clay are lined up along the road in front of his house. “ We have to make do with this instead of a seawall, but the only thing protecting us are our prayers. On the Observatory Hills opposite the Kanakakunnu Palace, where the office of the Kerala State Disaster Management Authority is located, Sekhar L Kuriakose, member secretary, clarifies that what is happening in Shanghumugham is not representative of what is occurring elsewhere along Kerala's coastline which is beset by issues of rampant coastal regulation violations, destruction of adjoining wetlands and sea surges. The erosion and accretion process is a cyclical one. Shanghumugham's shore will erode as well as build up eventually. I wouldn't call it a classic example of climatic variation, he says. Shanghumugham is an interplay between whatever is happening in terms of changes in the Arabian Sea, in terms of temperature regimes, wind patterns and the different anthropogenic factors such as the Vizhinjam harbour, increased built-up area along the coastline, and so on, he notes.

The average temperature in the Arabian Sea seems to be rising, he adds. Recent studies have attributed the rise in temperature to the rapid warming of the Indian Ocean, among other climate change signals, but the root cause of the rapid warming remains unclear. “ If the temperature is increasing, it means the air will have more moisture and the sea will have more wind, and this manifests as rough waves, he says. Recent studies also note an increase in wind velocity and wind-related disasters across the coast. Our construction practices are not wind-resilient, so we've been getting a lot of cases of rooftops being blown away and electric poles and trees falling on houses, he says. He also adds that fish stocks have been dropping because of overfishing, degradation of marine environment, ocean warming and so on.

As a result, fishermen are forced to go into deeper seas, adding another layer of vulnerability to a population at risk. Even during Cyclone Ockhi, what began as a depression in the Arabian Sea quickly changed course and became a cyclonic storm, hitting the Kerala coast without warning. Fishermen who had already set out for the sea couldn't be notified in advance. Even now, families in Valiyathura wait for news from their kin who went missing at sea back then. Other experts have pointed out that seawalls and breakwaters interrupt the accretion of sediments along the coast, thereby preventing the coast from being replenished. Moreover, the intensive quarrying for rocks needed for such structures contributed to the denudation of hillsides in the Western Ghats, leading to an unprecedented number of landslides in Kerala's hilly districts such as Wayanad and Idukki during the floods of 2018.

Furthermore, the dams in Kerala's rivers that drain into the Arabian Sea have been faulted with preventing the flow of sediments to the coast. The picture that emerges of Kerala's many-layered vulnerabilities is dire. Studies suggest that the sea level may rise by 15-38cm in Kerala by mid-

21st century. “ From a disaster manager's perspective, it's more like a cautionary note on a cigarette packet, Kuriakose reflects. “ We're aware of the dangers. And we now know yet another cause for the danger. Back on the shore, Gilbert leans against a sack of clay and shrugs. This beach is my home. The sea is my livelihood, he says. “ I'm not going anywhere.