

A Stitch in Time

Cyclone Ockhi, which hit southern India late last year, brought out the need to empower communities to manage risks through locally owned and locally appropriate approaches

Historically, the western coast of India has always witnessed fewer cyclones than the eastern coast. While 58 per cent of the cyclones that developed over the Bay of Bengal crossed the east coast, only 25 per cent of the cyclones that developed over the Arabian Sea affected the west coast. A marked deviation from this status quo was observed on 30 November 2017, when Cyclone Ockhi killed 174 fishermen from the state of Kerala and 108 fishermen from the state of Tamil Nadu. The economic loss caused by Ockhi amounted to US\$5.07 bn.

Official sources put the number of missing fishermen as 527—300 from Kerala, and 227 from the Kanyakumari district of Tamil Nadu. However, the

The harbour at Thoothukudi in Tamil Nadu implements a simple token system for fishing boats venturing into the sea. Details like the boat number, name and telephone number of the boatowner, and the number of fishermen on board, as well as the expected date of return are registered online before issuing a token. After reaching the shore, the fishermen return the token. Similar systems have been introduced in the East Godavari District of Andhra Pradesh and in Maharashtra.

At Thoothukudi, Tamil Nadu, the Fisheries Department has also arranged a checkpost to regulate the number of fishing boats venturing into the sea at a given point of time, which helps avoid overcrowding. These are measures that Kerala could have followed.

The Indian Meteorological Department (IMD) is the nodal agency for tracking, monitoring and issuing early warnings to all designated authorities. Notwithstanding the increasing tendency for cyclones in the Arabian sea, the Area Cyclone Warning Centres (ACWCs) and the Cyclone Warning Centres (CWCs) of IMD cover only the eastern coast, leaving a visible gap on the western side. IMD has a detailed procedure for a four-stage warning, including a Pre-Cyclone Watch (issued 72 hours in advance), a Cyclone Alert (48 hours in advance), a Cyclone Warning (24 hours in advance, with high priority of telegrams twice a day) and a Post-Landfall Outlook (12 hrs in advance).

Timely advisories

Bulletins are also issued to the Public Relations Department (PRD) for distribution to the mass media and

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estimates put forward by fishermen's groups and the Catholic Church is double the official number. Failure of both the state and the central governments to even come up with the exact number of fishermen and fishing boats lost at sea, has come under severe criticism. Even two months after Ockhi the disaster-management agencies were groping in the dark about the number of casualties.

Despite stipulations in the Marine Fishing Regulation Act (1980), hundreds of fishing vessels still operate in Kerala waters without any registration or fishing licence. During exigencies such as cyclones or tsunamis, lack of knowledge of the actual numbers can prove fatal.

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for immediate broadcast by the radio and television stations. IMD also has an automatic telephone answering service (No: 1800 180 1717) and a facility for registering one's mobile number for receiving cyclone alerts vis-a-vis short messaging system (SMS) service. The language of such official warnings, however, remains archaic and too technical for the common man to decipher. On the contrary, weather warnings issued by the Hong Kong Observatory, for instance, give separate warnings for the local public, avoiding scientific jargon.

While controversies abound about whether the IMD and the Indian National Centre for Ocean Information Services (INCOIS) had sent out timely advisories, the most important fact remains that even the officials at the State Emergency Operation Centre failed to grasp the gravity of the situation from the 'technical' bulletin.

Emergency Position Indicating Radio Beacons (EPIRBs), also known as Search and Rescue Beacons, developed by the Vikram Sarabhai Space Centre (VSSC) of the Indian Space Research Organisation (ISRO) at Thiruvananthapuram, and manufactured by Keltron at its Karakulam complex, Kerala, have been distributed to fishermen on the Kerala coast over the last few years as a means to safeguard their lives during emergencies at sea. ISRO is also designing and developing the first indigenous, low-cost global positioning system (GPS)-fitted EPIRBs, from which distress signals can be picked up by the search-and-rescue vessels. These will only cost INR3,000, compared to the price of INR50,000-60,000 a piece for those imported from the United States, the United Kingdom or France.

In the aftermath of Ockhi, ISRO has also developed navigational equipment based on India's regional satellite navigation system, called NAVIC, to warn fishermen about adverse weather conditions. Initially, 250 boats will reportedly be fitted with these equipments on a trial basis. The specialty of these equipments is that the information will be transmitted in the local vernacular

language (Malayalam), up to a distance of 1,500 km from the coast.

While some of the fishermen, on a personal basis, use mobile phones that can operate up to 50 nautical miles (92.6 km), they complain that the wireless sets provided by the Fisheries Department work only up to 20 nautical miles (37.04 km). The major limitation of NAVIC devices is that they allow only receiving of information, with no provision for sending messages—they are fitted with only a receiver, not a transmitter.

Community radios can be established in cyclone-prone areas with the help of open universities such as the Indira Gandhi National University (IGNOU), NGOs and community-based organizations (CBOs), for timely dissemination of warnings. The first exclusive community radio initiative in India for fisherfolk, named Alakal, was initiated on 1 May 2006 in Thiruvananthapuram district of Kerala.

The problems resulting from corrosion of batteries and non-receipt of signals in transistors can be overcome by using battery-less, low-cost hand radios which can receive warning-broadcasts from All India Radio, the national station. Television and radio stations can also utilize the cell broadcast facility via the

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A HAM Radio used in emergency communications is an immensely useful tool for cost-effective dissemination of information

GSM (Global System for Mobile communication) network operators, to broadcast emergency messages on a real-time basis.

Setting up of Village Information Centres (VICs), under the supervision of the state government, can provide information on cyclone warnings directly to the community and also empower the rural population. Around 50 such VICs are currently operational in the Cuddalore District of Tamil Nadu, where the dissemination is effected through very high frequency (VHF) wireless networks, integrated with a public address system (PAS).

The climate-integrated community-based early warning system implemented by the Adaptation Learning Programme (ALP) of Dakoro, Niger, is one of the best examples of integration of community-based adaptation for disaster risk reduction (DRR). This is a decentralized, participatory programme where volunteers are selected from a cluster of four or five villages for multi-level interventions at village, municipality, local, regional and national levels during different phases of a disaster.

The ham radio is an immensely useful tool for cost-effective dissemination of information, especially in times of natural disasters such as earthquakes, floods, cyclones or tsunamis (HAM is an acronym for Hertz-Armstrong-Marconi, from the first letters from the last names of three radio pioneers: Heinrich Rudolf Hertz, Edwin Armstrong and Guglielmo Marconi). While the conventional communication systems, like mobile and land phones, get destroyed or fail due to overloading, these equipments have stood the test of time by providing uninterrupted flow of information. A network of amateur radio licensees in Kerala can also serve as an alternative system, should the means of conventional communication fail.

Disaster risk reduction is best achieved by forming task forces at the community level. Apart from representatives from women's organizations, these teams should comprise retired personnel, youths from local NGOs, CBOs, residential

organizations, and volunteer organizations such as the Civil Defence, Nehru Yuva Kendra Sangathan, the National Cadet Corps, the National Social Services, the Indian Red Cross Society, Bharat Scouts and Guides, and St. John Ambulance Brigade. They should work towards building up the capacity and resilience of vulnerable communities.

Quick Response Teams for first aid and search-and-rescue at the community level can also play a vital role in disseminating warnings and render help during the relief, rescue, rehabilitation and reconstruction phases. The recently formed Rapid Response and Rescue Force (RRRF) of the Kerala Police, even after rigorous training in various aspects of rescue and casualty management, remains severely underutilized.

A prompt, well-co-ordinated and effective response will not only minimize the casualties and damage to property, but also will facilitate early recovery. Apart from institutional arrangements, a set of procedures (SOP) clearly delineating the roles and responsibilities of each stakeholder agency is also required. Written documents on specific actions to be taken in relation to preparedness, early warning, response, relief and recovery phases, can considerably reduce the risk levels from any disaster. The initial confusion and chaos noticed in the early hours of the management of Cyclone Ockhi show that a SOP, in whatever form, was clearly missing.

Mitigation

As climate change will continue to exacerbate both the impact on, and the number of casualties of, among fishing communities, there is an urgent need to take disaster-mitigation efforts beyond the award of compensation to the victims. Disaster-risk insurance is both a cost-saving and risk-management strategy, to increase the resilience of individuals and communities to external shocks. A comprehensive, indemnity-based (factoring the actual loss) insurance policy for climate-

related disasters, is on the anvil in Kerala. It is proposed that families below the poverty line (BPL) are completely exempted from paying the premiums.

Notwithstanding the long-term benefits of non-engineered measures such as planting of mangroves along the coast, risk-reduction measures have traditionally leaned more on structural interventions such as construction of sea walls, cyclone shelters, cyclone-resistant buildings, road links, culverts, bridges, and so on. The creation of green-belt buffer zones, also known as shelter belts or bio-shields, can significantly reduce the loss of coastal habitats, and protect human lives and property from cyclones and tsunamis.

However, the mangrove forest area in Kerala has been reduced to 1,750 ha from a historically high level of 70,000 ha. An awareness drive on the ecological significance of conservation of mangrove forests will help reduce disaster risks along the coastline.

Climate change and consequent warming of the oceans pose multiple threats to the fisheries sector, the most glaring impact being the decline in the availability of marine resources. Kerala's annual catch of mackerel, for example, was 399,000 tonnes in 2012, which drastically dipped to 45,000 tonnes in 2016. The concept of 'alternative livelihoods' or alternative income generating (AIG) activities has emerged from similar unsustainable exploitation of other marine resources and the increasing pressure on them by a burgeoning population.

While promoting both environment and natural resource (ENR)-based livelihood activities, such as agriculture and livestock, aquaculture, and bee-keeping, and non-ENR-based livelihood activities such as handicrafts, and carpentry, care should be taken not to confine women to gender-specific activities such as garment-making and cooking.

Despite significant advances in meteorology, hundreds of fishermen in Kerala still rely on the traditional wisdom handed down over generations for predicting weather

and sea currents. During Cyclone Ockhi, Marianad village reported zero casualty, thanks to the premonition of some of the traditional fishermen. Documentation of such traditional wisdom will augment mitigation measures to help face future challenges. Various Bureau of India Standard (BIS) codes have been developed for the construction of cyclone-resistant structures, such as shelters, roads, bridges, canals and transmission towers, which are seldom followed. Strict compliance should be ensured.

Realizing the need for empowering the younger generation, the Government of India had introduced disaster management in the school curriculum, but it is confined to Central Board of Secondary Education (CBSE) schools. Since educating a student is a sure way to build up community resilience, the State Education Boards should also be encouraged to follow suit. Empowering the communities to manage their risks through locally owned and locally appropriate approaches was the most important theme which emerged in the 2017 Global Platform for Disaster Risk Reduction, at Cancun, Mexico, in May 2017. The rationale behind promoting community-based disaster risk management is that communities are the first responders to a disaster, and hence they should be given necessary training to mitigate and manage their risks.

During cyclones fishermen have often drowned for want of timely help, especially since rescue agencies took a long time to spot those affected, as the precise whereabouts of the victims were not known. Recruitment of educated people from the fishing community to the Coastal Police and Marine Enforcement Wing can address this issue and ensure better co-ordination during such rescue operations. Proper representation and inclusion of local community members in various disaster-management bodies is also needed.

New initiatives

Lack of proper training and inept handling of specialized rescue devices



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had often led to false alarms being sent out to rescue agencies, leading to wastage of time and resources. Sensitisation and awareness of fishermen about rescue operations should, therefore, become an integral part of any disaster risk reduction initiative.

According to the Global Climate Risk Index (2018) released at the 23rd Conference of the Parties (COP23) of the United Nations Framework Convention on Climate Change (UNFCCC), the Indian subcontinent is one of the most vulnerable countries to climate-related risks of rising sea levels, storms, floods, drought, heavy rainfall, landslides and heat waves. Kerala occupies a special place in the vulnerability atlas of India, owing to its geographical and geomorphological peculiarities. The coastal plains of Kerala have also earned the status of being among the most populated areas in the world, with a very high

population density of 2,168 persons per sq km. (In 2012 the state's total population was 34.8 mn.) The most significant vulnerability factor of the state, apart from the dense settlements, is the low altitude of the coastal plains, rising just 3-6 m above the mean sea level, making the communities extremely vulnerable to the vagaries of sea-level rise and other disasters.

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For more

<http://www.tn.gov.in/tsunami/index.html>

Tamil Nadu State Disaster Management Agency (TNSDMA)

<http://sdma.kerala.gov.in>

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