Ecosystem-based Recovery: The Case of the 2018 Kerala Floods

Introduction

In August 2018, the state of Kerala, in India, faced a severe flood, which is considered a once in a century event. As per the Post-Disaster Needs Assessment (PDNA) Report conducted in the aftermath of the disaster, the state received cumulative rainfall that was 42% in excess of the normal average, with the heaviest spell of rain during 10-16 August. The torrential rains flooded all 44 rivers in the state and 37 dams had to be opened, which further aggravated the flood situation. In addition to the floods, there were over 4000 landslides in the high ranges, which also caused death and destruction.

483 people lost their lives and over 18000 houses were fully damaged. Over one million people had to be moved to temporary shelters and more than 5.5 million people were affected. The PDNA estimated the total recovery needs at INR 31,000 crore (USD 4.4 billion).

Background

Kerala is a comparatively narrow strip of land sandwiched between the Arabian sea and the Western Ghats. It has a 580-kilometer coastline with a maximum width of 120 kilometers. Consequently, it is highly vulnerable to natural disasters and the changing climatic dynamics given its location along the sea coast and with a steep gradient along the slopes of the Western Ghats. Being one of the most densely populated Indian states (860 persons/km^2), Kerala is more vulnerable to damages and losses on account of disasters.

The Kerala State Disaster Management Plan states that floods are the most common natural hazard in the state. Nearly 14.5% of the state's land area is prone to floods, and the proportion is as high as 50% for certain districts. Landslides are a major hazard along the Western Ghats in Wayanad, Kozhikode, Idukki, and Kottayam districts. Dry rivers and lowering water tables in summer have led to water scarcity both in urban and rural areas. Other major natural hazards are lightning, forest fires, soil piping, coastal erosion, and high wind speed. The state also lies in seismic zone III.

Kerala anticipates the effects of global climate change to bring an increase in extreme rainfall during the tropical monsoons and with it the probability of urban flooding during the northeast monsoon period, a water shortage during peak summer months along with a subsequent increase in urban temperature, and a potential increase in coastal erosion along the highly populated coastline due to rising sea-levels. The impacts of climate change are aggravated by lack of adaptive capacity of the state to floods and droughts. Mudflows are also expected to increase in both frequency and severity because of climate change. Another impact being witnessed is progressive coastal erosion affecting nearly 63%2 of the state's 580 kms coastline.

Kerala is also seen a success story in terms of its social and economic development. With infant mortality rate less than 10 and longevity above 70, Kerala often top the country in most human development indices. With universal education and high-quality public health systems, the youth in the state usually obtain higher education and skill training which give them employment opportunities around the world, particularly in the middle east. Remittances from them act both as an engine of economic growth and as a cushion against local economic slumps. The diaspora was fully active to support the state during the time of crisis with money, materials and expertise.

The reconstruction of the state of Kerala has to be seen within this context.

Issues related to the Topic

While the events that wreaked havoc in Kerala has come to be commonly referred to as the Floods of August 2018, it was the composite of three distinct disasters that unfolded between early July 2018 and late August 2018:

1. The flooding of all the rivers in Kerala
2. The large number of landslides and debris flows in the high ranges
3. The flooding of the Kuttanad wetland area in Alleppey

These three disasters, though all caused by excessive rains, do have different underlaying causes and need to be dealt with differently during reconstruction phase. Some of the issues related to Ecosystem based Recovery and Inclusion for Resilient Recovery identified in the aftermath of the 2018 Disaster include:

<u>Risk Informed Land use Planning- Fundamental to Sustainable Reconstruction</u>

The floods that impacted Kerala in 2018 were more or less identical to the one which the area faced in 1924. However, the material impact, in terms of buildings damaged, property damaged and people impacted were many times higher. This is due to two reasons. One, not only has the population increased five-fold, there has also been a huge rise in the economic prosperity of people since 1924. Second, more and more people are living and investing in infrastructure in areas which are vulnerable to hazards, thus accumulating risks. In the past, due to frequent floods, people did not live next to rivers. However once dams were constructed, the annual flooding ceased and people felt confident to build not only houses but also factories, supermarkets and even airports in flood plains. Sam is the case for other risks such as tsunamis, landslides and manmade hazards. Unless the land use plan in the state is better controlled, the overall risk of disasters cannot be minimized.

<u>Promoting Construction of Eco-safe Roads as a Means of Increased Resilience against Landslides</u>

There were reports that up to 4000 landslides, landslips or debris flow had happened during June to August 2018. This has not only been the main cause of deaths in the recent disaster but has also caused significant loss to those who lost their houses and even land to landslides. However, both anecdotal observations and satellite image analyses show that a vast majority of these landslides

and landslips happened very close to areas of human intervention, be it by the construction of houses or roads. There is significant international evidence that unscientific construction of roads creates landslide risks which are realized during heavy rainfall events or earthquakes.

Low-cost and environmentally friendly soil bio-engineering along roadsides or "eco-safe roads" using local resources (e.g. locally available deep-rooted grasses and low-cost civil engineering structures) can significantly reduce economic losses and environmental degradation. The construction of eco-safe roads using vetiver grass has been successfully piloted in Nepal to address the risk of frequent landslides caused by poor construction of roads. The use of local women's groups in the construction of these roads adds a livelihood enhancing component to the practice. For instance, the use of the grass for fodder and sale of brooms made from it can be a source of income generation.

Introduction of the 'Making Space for Water' Approach to the Kuttanad Area

It is now an accepted fact that the construction and operation of the key hydraulic structures in Kuttanad was done without adequate scientific and engineering consideration. The recent floods demonstrated that these structures act as a flood hazard leading to significant loss of life, property and livelihoods of the people. The climate projection of the IPCC predicts a 1.8-2 mm sea level rise by 2030. Studies have revealed that about 169 sq.km. would be inundated due to 1m increase sea level at in and around Kochi region. This implies that agriculture and related activities in Kuttanad region will be severely affected. In the light of changing climate, the future of Kuttanad needs to be carefully studied as one will not be able to defend such structures against rising sea water levels on one side and increased frequency of floods on the other.

Instead, modern approaches to flood management, such as "room for the river" and "making space for water" need to be introduced into water resources management practices in Kerala. These approaches presume that flooding events are inevitable in the light of climate change and populations need to ensure that the rivers have rooms to expand whenever the peak flow arrives. This could be by zoning the immediate riverbanks to activities which no longer needs full time presence of people and/or identifying large wetlands along the river channels where the water will have spaced to expand and thus provide buffer to the peak floods.

The constraining hydraulic structures should be modified so that the interconnection between the rivers and the sea is re-established. That will have huge positive impacts on the ecology as well as the disaster risks. These structures need to be opened once again to restore the ecological balance in the region and to avoid the siltation of the water bodies.

Differentiated Vulnerabilities to Disaster

As mentioned above, Kerala has a unique model of development with high level of human development, despite low economic growth.[1] It has made impressive achievements in human development over the last century, owing to its distinct socio-political history.[2]The PDNA, however, notes that women and girls, transgender persons, persons living with disabilities (PWDs), the elderly, female-headed households (FHHs), migrant workers, fisherfolk, as well as Scheduled Caste (SC) and Scheduled Tribe (ST) populations have been disproportionally affected by disasters. Each of these populations play a unique and critical role to play in resilience building, disaster response and recovery.

Despite its high performance on some gender indices, the women in Kerala continue to carry the burden of care giving and own fewer assets than the men. The inequality in ownership over resources have exacerbated their financial insecurity and exclusion. A direct consequence of this disenfranchisement is that government aid given for relief and recovery, which is often focused on destroyed assets, do not reach these women. Women are often the custodians of their immediate natural resources. They can be trained in skills useful for redeveloping affected parts of their environment in an ecologically sound manner. The women in Kerala have already been at the forefront of recovery and rehabilitation efforts, tending to the needs of their communities and families while coping with the adverse impact on their own livelihood and possessions. However, women have continued to bear the excessive burden of the disaster.

Any recovery plan must consider the distinct needs of the aging population of the state, including a higher degree of rehabilitation and recovery support. It is notable that a higher proportion of the working elderly belong to the SC, ST and economically vulnerable groups. Kerala also has 748,000 persons with disabilities, of whom 48% are women. Disable friendly environments must be encouraged in all post disaster initiatives and constructions, including publication of essential documents relating to awareness generation or recovery support in Braille. Early warning systems should be adapted to their needs as well.

Kerala has a considerable population of transgender persons as well. They should be provided better visibility and included in all stages of the recovery process. The out of state Migrant workers in Kerala suffered significant losses as well. To include this group, more effort must be made to help them overcome language barriers and all alert messages must be sent out in multiple languages. Proper representation from the Scheduled Tribes must also be included in all stages of the recovery process to foster inclusive disaster risk management.

Questions and Challenges to be Discussed

1. How can ecosystem-based disaster risk reduction can be promoted in the state?

[1] Adam. H.N (2018). Floods in Kerala – a wake-up call, Opinion Piece,Institute of Development Studies, available at https://www.ids.ac.uk/opinions/floods-in-kerala-a-wake-up-call/

[2] Sreeraj A. P & Vamsi Vakulabharanam (2015): High growth and rising inequality in Kerala since the 1980s, Oxford Development Studies, DOI:10.1080/13600818.2015.1111320.

Kerala is highly vulnerable to disasters and at the same time have a fragile environment. Much environmental degradation, including deforestation and mangrove destruction, has happened in the last 100 years. What are the various approaches whereby ecosystem-based approaches can be introduced and, if possible, hardwired into the reconstruction process in Kerala? What are some of the international best practices? Conscious effort will also need to be made to minimize the environmental footprint of post-disaster reconstruction.

2. How can we introduce risk informed land use planning in a state which has high population density, more than 50 % urbanization and the highest rate of urbanization in the country?

While the need to de-risk the state by risk informed land use planning is not disputed, how exactly can it be achieved when there is not a lot of empty space to plan? What are some international best practices for risk informed land use planning? What technical, legal and market instruments are available to changes people's behavior so that the more hazardous areas will have less population density? Does the reconstruction phase offer a unique opportunity to have comprehensive land use planning of the state? Is post disaster situation a good time to shift people's attitude towards land use planning?

3. How can the lessons of inclusive response and recovery be promoted in other parts of the world?

The events of 2018 were more than a natural catastrophe that shook an entire state. It was also one of reckoning for the state where all classes of the people came together and self-organized to undertake the rescue and relief operation even in the absence of any operational guidelines. This impromptu mass effort seen in Kerala can be taken as a lesson to be emulated into practice. It has shown the power of an inclusive response system. Just as important is the recovery process which the state is currently in the process of undergoing. This stage too must be made as inclusive as possible, providing opportunity for meaningful consultation with all stakeholders, the public and private. Such participation will not only drive the process forward in an accountable manner but also create a sense of ownership among the public.

4. How can the role of youth and social media be institutionalized in disaster planning and response?

One of the major reasons for the effectiveness of the rescue and relief activities was the initiative of a youth that was both traditionally and technologically literate. Students created an App that helped track and coordinate all the rescue and relief calls. The web-based application keralarescue.in and social media platforms were used to mobilise thousands of volunteers for one-time cleaning operations, and the Rebuild Kerala App was used to assess damages to houses and buildings. The Youth Commission in Kerala has already undertaken to utilise this momentum by starting the 'Green Army' comprised of volunteers who report on the environmental needs of their own localities.

More initiatives such as this must be used to institutionalise the power of the Youth and better optimise the attributes of social media to effectively mobilise and coordinate all personnel, volunteers and officials, in case of future disasters.

Conclusions

Kerala is urbanizing fast and so is its economic wealth growing. Natural hazards impacting the state is not going to abate and on the contrary climate change will exacerbate it. The rebuilding of Kerala after the disaster offers a once in generation opportunity for the state to shift to a more risk informed approach to development. The role of ecosystems in such an approach is fundamental and there are many international best practices to learn from.

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