TOWARDS DISASTER RISK REDUCTION IN KERALA

Experiences, Perspectives and Way Forward

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Edited by

John Samuel & Abraham George

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Plan India is a nationally registered not for profit organisation striving to advance children's rights and equality for girls, thus creating a lasting impact in the lives of vulnerable and excluded children and their communities. Since 1979, Plan India and its partners have improved the lives of millions of children and young people by enabling them access to protection, quality education and healthcare services, a healthy environment, livelihood opportunities and participation in decisions which affect their lives.
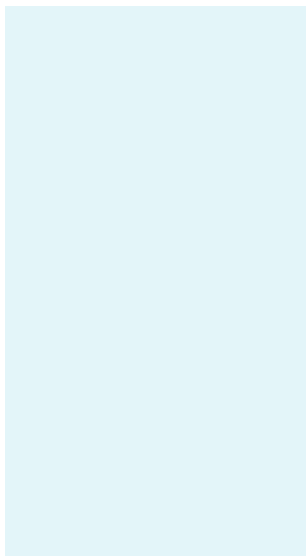
Plan India is a member of the Plan International Federation, an independent development and humanitarian organisation that advances children's rights and equality for girls. Plan International is active in more than 70 countries.

Institute for Sustainable Development & Governance (ISDG), Trivandrum, an initiative of Centre for Communication and Development Studies (CCDS) Pune, is a policy research and advocacy institute committed to the promotion of sustainable development and democratic governance in India.

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PREFACE

We are very happy to bring out this important knowledge product on Disaster Risk Reduction (DRR), bringing together experiences, perspectives and policy analyses. This is a part of our knowledge and evidence-based public policy initiative and advocacy. Kerala faced an unprecedented flood in August 2018. Though the Government of Kerala has an active policy framework on disaster response and mitigation, the incessant rain and flood that affected millions of people of Kerala was indeed a wake-up call for the government as well as the civil society. Because, the flood on the one hand exposed the major gaps between the policy promises and performance while on the other hand the impact of cumulative environmental degradation in the state. Kerala has a long coastal line as well as a significant stretch of the Western Ghats. The State also has a fragile coastal zone with backwater system. All these also place Kerala more vulnerable to climate change.

It is in this context that various responses by the government, non-governmental organisations and civil society to the flood of August 2018 become an important opportunity to learn, to reflect and to understand the experience and lessons to further improve the policy framework and also to ensure effective implementation of a Disaster Risk Reduction policy at every level. The major challenge for Kerala is not the lack of policies, but the need to ensure effective implementation of those policies at the level local governance, with the active participation of the civil society organisations.

Though the Institute for Sustainable Development and Governance (ISDG) is primarily a learning, research and advocacy organisation, we responded actively to the flood in August 2018 due to moral as well as governance responsibility. ISDG, an initiative of Centre for Communications and Development Studies (CCDS), in partnership with Bodhigram and several national organisations such as Plan India, Actionaid and other organisations, effectively responded in terms of relief, recovery and reconstruction. Bodhigram, a sister organization of ISDG, opened its campuses to the people affected by the flood. Community organisations associated with ISDG/Bodhigram also distributed food during the time

John Samuel

of flood. ISDG also worked in partnership with Plan India in a significant way to distribute relief materials in Pathanamthitta and Alappuzha districts. ISDG worked with several organisations including Actionaid to ensure effective participation of civil society organisations in the disaster response. We have organised the first major state-wide civil society consultation on 'Effective Disaster Response' on September 1, 2018, at the Gandhi Bhavan, Trivandrum. Then we organised a series of multi-stakeholders consultations in Pathanmathitta, Idukki, Kozhikode and Wayanad districts. These civil society consultations with representatives of panchayati raj institutions, MLAs, MPs , civil society organisations and the media provided a great learning opportunity to understand the challenges, opportunities and options for an effective DRR strategy in Kerala. The flood of August 2018 evoked discussions at every level of the society, in the Legislative Assembly, in the media and in the Parliament.

There are lots of positive experiences during the 2018 flood in Kerala. Four experiences stand out as a model for other states in India as well as for other countries. The most important aspect was the active involvement of young people in disaster response, recovery and relief operations. There were more than 50,000 young volunteers who got actively involved in rescue, relief and recovery phases. The second aspect was the excellent coordination of the government both at the state level and at the district level. In many cases, the district administration did a stellar job, indicating effective governance in Kerala. And the third important aspect was the active involvement of young people from the fishing community in rescuing thousands of people stranded in their houses during the floods. Apart from these very positive examples, the active involvement of civil society, political parties and other religious/community organisations cutting across various denominations, caste and creed also demonstrated the social solidarity that exists in Kerala. The Malayali community across India and the world contributed liberally to the relief operations as well as to the Chief Minister's Relief Fund. However, there were also major challenges in terms of early warning, lack of timely evacuation and very panic situations in the midst of the rescue operations. The flood had resulted in unprecedented destruction of environment, damage to habitat of tens of thousands of people, destruction of public infrastructure and adverse impact on Kerala's economy.

In the last ten months, the government agencies, district administration, United Nations agencies and non-governmental organisations had played a very important role in disaster response as well as in reconstruction. ISDG was actively involved in repairing community resources such as schools, balavadis and community centres. In partnership with Plan India and the National Stock Exchange and Amway, we have been involved in repairing and constructing toilets, sanitation and other facilities as a part of the WASH initiatives in Idukki and Ernakulum districts. ISDG/CCDS in partnership with Plan India, NDTV and other organisations distributed relief materials , home appliances, schoolbags and books worth more than Rs 10 crore to the most vulnerable families affected by the flood. Our relief and reconstruction work was done with the active support and cooperation of the government. It is also important to mention the active support of the district administration, district educational officers, presidents and members of various panchayats and the Parent Teacher Associations (PTAs) in aiding our efforts to distribute relief and supporting reconstruction.

One of the core missions of ISDG is to bridge the gap between micro-level interventions and macro-level knowledge and policy process. We always try to link between practice and theory as an organisation that stresses on praxis. Hence, this compilation of experiences, perspectives and policy discussions are an effort towards bridging the gap between policy process and the policy practice and implementation on the ground. This knowledge product will also serve as an important resource material for further capacity development of civil society, media and panchayati raj institutions. We also hope that

this publication will be an important background learning and discussion material for the National Conclave on Disaster Risk Reduction to be held on 15 -16 June, 2019, in Trivandrum.

I would like to express our deep appreciation and gratitude to all contributors to this publication. I would like to particularly thank my colleague Abraham George, Director of ISDG, Pradeep Panangad, Anil Kumar P. Y , Avinash Thomas, Ankita Negathil, Anugraha, and Sunil Kumar J of ISDG for their roles in bringing together this knowledge product. Our thanks to N.V. Ravindranathan Nair and his team for their editorial support and to Sudheer P.Y. for graphic designing.

We are deeply indebted to Hutokshi Doctor, Executive Director, CCDS for her valuable support. I would also like to express profound gratitude and appreciation to our colleagues Mini John, V. V. Ramachandran, Jobin Thomas, Binu S. Varghese, Sreejith Krishnankutty, K. C. Dwarakanath, Rajalekshmi R .V, Ashish Pawar, Asif Kunnath, Muhammed Amjad P. K, Shini Thankappan, AshaThankappan, Mithun M.G, Shibin K. Shiju, Unais Mohammed, Rani Monachan, Rashid Ahmed, Shanoob Mohammad and many young volunteers who worked with us with dedication and commitment in responding to the flood.

We would like to express our immense gratitude to Mohammed Asif, Tushar Kanti Das, Abhilash K, Sanjat Acharya, Jinu Sam Jacob and all other colleagues of Plan India who worked closely with us with deep commitment and professionalism. It is also an example of fruitful participation. We would also like to thank Jagadanand, our mentor, senior civil society leader of India, and member secretary of CYSD, who reached Kerala in the midst of the flood and provided us important guidance and inspiration with his vast experience of dealing with disasters in Odisha and elsewhere. We would like to express our gratitude to Sandeep Chachra, Executive Director of Actionaid India, Amar Patnaik, International Coordinator of Disaster Risk Reduction, and Esther Maria Selvam, Regional Manager of Actionaid India, for their support. We would like to express our gratitude to P. H. Kurian, former Additional Chief Secretary of Kerala, for his guidance, cooperation and advice. We would like to acknowledge the active support of Sekhar Lukose Kuriakose, Member Secretary, KSDMA, and P.B. Nooh, District Collector of Pathanamthitta.

We hope this knowledge product will enrich the learning process and also will serve as an important resource material for capacity development and policy formulation in Kerala and beyond.

John Samuel
President ISDG /CCDS

LIST OF ACRONYMS

ALNAP- Active Learning Network for Accountability & Performance in Humanitarian Action
ASHA- Accredited Social Health Activists

CAG- Comptroller and Auditor General of India
CCA- Climate Change Adaptation
CCA- Climate Change Adaptation
CD- Capacity Development
CERF- United Nation's Central Emergency Response Fund
CMRDF- Chief Minister's Distress Relief Fund
CSOs- Civil Society Organisations
CWC- Central Water Commission
CWRDM- Centre for Water Resources Development and Management

DDMA- District Disaster Management Authority
DDMP- District Disaster Management Plans
DMP- Disaster Management Plan
DRM- Disaster Risk Management
DRR- Disaster Risk Reduction

FRBM- Fiscal Responsibility and Budget Management Act
FVI- Flood Vulnerability Index

GoK- Government of Kerala
GSI- Geological Survey of India
GST- Goods and Service Taxes

HFA- Hygo Framework for Action

IAG- Inter-Agency Group
IASC- Inter-Agency Standing Committee
IDNDR- International Decade for Natural Disaster Reduction
IFRC- International Federation of Red Cross and Red Crescent Societies
ILO- International Labour Organisation
IMD- India Meteorological Department
INCOIS- Indian National Centre for Ocean Information Services
INSAT- Indian National Satellite System
ISRO- Indian Space Research Organisation

KFRI- Kerala Forest Research Institute
KIIFB- Kerala Infrastructure Investment Fund Board
KSDI - Kerala Spatial Data Infrastructure
KSDMA- Kerala State Disaster Management Authority
KSSP- Kerala Sastra Sahitya Parishad

LSGs- Local Self Governments

MHPSS- Mental Health And Psychosocial Support
MLA- Member of Legislative Assembly
MoEF- Ministry of Environment and Forests
MoEFCC- Ministry of Environment, Forest and Climate Change
MPCE- Monthly Per Capita Consumption Expenditure
MSK- Medvedev–Sponheuer–Karnik scale
MSW- Municipal Solid Waste

NAPCC- National Action Plan for Climate Change
NCESS- National Centre for Earth Science Studies
NDMA- National Disaster Management Authority
NDRF- National Disaster Response Force
NGOs- Non-Governmental Organisations
NHAC- Northern Hemispheric Analysis Centre
NHEC- Northern Hemispheric Exchange Centre
NIMBY- Not in My Backyard
NIMHANS-National Institute of Mental Health and Neuro-Sciences
NRLM- National Rural Livelihood Mission
NSS- National Sample Survey
NULM- National Urban Livelihood Mission

ODF- Open Defecation Free

PDNA- Post-Disaster Need Assessment
PTSD- Post-Traumatic Stress Disorder
PWD- Public Work Departments

QPF- Quantitative Precipitation Forecasts

SDGs- Sustainable Development Goals
SDMA- State Disaster Management Authority
SDMP- State Disaster Management Policy
SDP- State Development Product
SDRF- State Disaster Response Fund
SIDS- Small Island Developing States
SOP- Standard Operating Procedure's
SWM- Sewage Waste Management

TA- Territorial Army
TPD- Tonnes Per Day
TSDF- Treatment Storage and Disposal Facilities

ULB- Urban Local Bodies
UNDP- United Nations Development Programme
UNEP- United Nations Environment Programme
UNISDR- United Nations International Strategy for Disaster Reduction

VTCs- Voluntary Technical Corps

WGEEP- Western Ghats Ecology Expert Panel
WMO- World Meteorological Organization

INTRODUCTION

ABRAHAM GEORGE

CONTEXT

The State of Kerala witnessed an unprecedented disaster in the form of the 2018 floods. The intensity of damage unleashed by the floods was first of its kind for the State ever since its formation in 1956. The calamity took the lives of more than 450 people; destroyed over 2.8 lakh houses partially or fully; displaced over a million people and brought huge losses to the livelihoods of people and the physical infrastructure of the State. The floods wreaked havoc in the agricultural, industrial and service sectors of Kerala's economy. Post Disaster Needs Assessment (PDNA) by UN agencies estimate the total losses to be about Rs.31,000 crores (US$4.4 billion).

The 2018 floods posed huge challenges to the State Government and the civil society. Although the August 2018 deluge was the worst natural calamity to hit the state in nine decades (after the floods of 1924), it brought out the best of the Kerala society. Forgetting all socio- economic differences, people supported each other voluntarily during the calamity. The overwhelming involvement of the Kerala civil society in rescue and relief operations has already caught attention the world over. The spirited participation of youth and students deserves special mention and this augurs well for the future of the State in the matter of Disaster Risk Reduction (DRR) as well. Due to collective effort, the first two stages of rescue and flood relief could be accomplished by the State rather successfully. Now Kerala needs to focus its attention on rehabilitation, rebuilding and redevelopment of the State together with developing well-thought out plans and policies for DRR in future.

SIGNIFICANCE OF DRR STRATEGY FOR KERALA

The 2018 floods have exposed not only the disaster vulnerability of Kerala, but also the lack of sufficient disaster preparedness, timely response and risk reduction measures. Considering the high probability of natural disasters occurring

in future due to climate change, the authorities need to develop a detailed and scientifically validated Disaster Risk Reduction (DRR) strategy for Kerala. However, such a DRR strategy need to be based on the experiences and perspectives of different stakeholders not only from Kerala, but also from India and abroad. Such a shared understanding of experiences would enable us to build feasible strategies for DRR in the State. Kerala also needs to take lessons from the failures and challenges it encountered while dealing with 2017 Ockhi cyclone. Further, we have to learn from the disaster management strategies evolved by other Indian states like Odisha and also from other countries across the globe. Based on such collective wisdom, authorities should come out with clear cut DRR policies to help the State mitigate the impacts of future disasters in a better manner.

OBJECTIVES OF THIS PUBLICATION

The main objective of this knowledge product is to help policy makers in developing broad guidelines to ensure effective Disaster Risk Reduction by drawing lessons from the experiences of disaster response in India and abroad. For that, we have brought together the perspectives of experts with domain knowledge and those with direct experience in disaster management. Further, this publication attempts to help develop a set of DRR policy guidelines for the state government, local governments and the civil society in Kerala and elsewhere. It is also expected to serve as a valuable resource material for capacity development in DRR by providing reliable knowledge resources for policy makers, media, academic institutions and civil society organizations.

AN OVERVIEW OF THE ARTICLES

This edited volume attempts to give an overall picture of the important issues related to disaster risk reduction in Kerala, particularly in the light of the 2018 floods and to put forward policy suggestions for strengthening disaster preparedness and management in the state. It includes twenty eight articles including the perspectives, analyses and policy suggestions of academic experts, policy makers, practitioners, media persons, researchers, civil society activists and the like. They have presented their perceptions on various aspects of disaster risk mitigation from their experiences at the local, national or international levels. The articles also reveal to us the areas where Kerala has failed to act and showed negligence in its development process. While raising various issues, challenges and opportunities, the writers have put forward practical suggestions to evolve disaster management policies to be pursued during these times of climate change, thereby rebuilding Kerala on a sustainable growth path.

The opening article, 'Disaster-Resilient Kerala: Way Forward' is written jointly by three internationally renowned experts, N. Vinod Chandra Menon, S. Parasuraman and P.V. Unni Krishnan. Besides providing a global perspective regarding disasters and humanitarian action, they have put forward significant policy suggestions stressing the need for incorporating humanitarian values, principles and standards in community-based disaster preparedness and risk reduction policy measures in order to rebuild a disaster-resilient Kerala. UN expert Muralee Thummarukudy, in his article, 'Disaster Risk Reduction: Some Lessons from the World to Kerala', provides a few DRR lessons learnt from international experiences and explains the need for Kerala to invest a lot more in DRR in order to prepare the community for disaster reduction and effective response to disasters in the future. Former Union Minister Shashi Tharoor, in the interview he gave to ISDG ('Towards Building a Stronger and Safer Kerala'), expresses his view that 2018 floods should be taken as an opportunity to develop an environment-centric and sustainability-centric development model for Kerala in order to offset the repercussions of future calamities. Sekhar Lukose Kuriakose's article 'Rebuilding Kerala – A Disaster Risk Man-

agement Perspective', describes the need for strengthening the institutional mechanism for disaster risk management in order to build a resilient Kerala and highlights the importance of incorporating disaster-resilient measures in development planning and future investments across sectors. Economist M.A. Oommen, in his article 'Rebuilding Kerala, Policy Choices and the Way Forward: Developing an Approach', describes the disaster vulnerability of Kerala and its poor capability and preparedness for responding to such calamities and disasters. He stresses the need for developing an approach to rebuild a more inclusive and green Kerala by giving special emphasis to land-use patterns.

Keshav Mohan, in his paper 'Capacity Development for Disaster Risk Reduction' discusses the need for working out strategies and action plans for disaster risk reduction and management in the State by drawing from different international action plans like the Sendai framework of Actions and highlights the importance of capacity development of local people, organizations and society. In the paper, 'A Disaster Preparedness Programme for Kerala', B. Ekbal expresses his firm conviction that for developing any successful disaster management programme, it should have to be people-centric and should have disaster preparedness built into the process of local-level development planning and implementation. In N. Vinod Chandra Menon's paper, 'Towards Disaster Risk Reduction in Kerala: The Way Ahead', the author not only analyses the causes and impact of the 2018 floods, but also delineates Kerala's reconstruction challenges and gives suggestions for mainstreaming DRR in the development planning at all levels for rebuilding a better, safer and disaster-resilient Kerala. G. Vijayaraghavan, in his article, 'Lessons Learnt for Disaster Risk Reduction in Future', discusses the pro-active role of youth volunteers and NGOs/CSOs during the floods and highlights the need for developing well-trained volunteer groups in every district and exhorts the State Government to act with greater speed and transparency in the rebuilding of the flood-ravaged state.

Mathew T. Thomas MLA, in his article 'Rebuilding a Better Kerala' recounts his personal experiences as a Minister of the Government of Kerala during the floods and argues that the real reason for the 2018 floods was excessive rains. He also discusses different challenges in rebuilding a better Kerala. V. D. Satheesan MLA in his paper 'An Insider's Account of Flood Relief Operations' narrates his direct involvement in the relief and rescue operations in his badly flood-hit constituency of Paravur and explains how the local community not only had carried out rescue and relief operations effectively, but also could initiate systematic post-flood rehabilitation and rebuilding works with people's participation. In the paper, 'Disaster Preparedness – Need of the Hour', P.T. Thomas MLA points out the lack of preparedness on the part of the State Government in ensuring effective rescue and relief machinery during natural disasters in recent times and offers a few suggestions to improve disaster preparedness in Kerala.

Tushar Kanti Das in his article, 'Mitigating Disaster – Learning from Grassroots' describes his own experiences and challenges in the post-flood relief operations in which his organisation Plan India could provide relief and rebuilding assistance to thousands of flood victims and several public institutions in five worst-affected districts of Kerala and explains why people's involvement is crucial for the success of emergency relief and response action.

While highlighting the positive role of social media and CSOs in disaster risk management, M. G. Radhakrishnan in his article, 'Role of Media in Disaster Risk Minimisation', presents a blueprint for effective disaster management and preparedness in Kerala. In the write up, 'A Journalist's Perspective on Disaster Mitigation', news reporter Sneha Koshy recollects her experiences while covering the floods and calls for building up an efficient communication system in the State to meet the challenges during disasters in future.

Architect G. Shankar argues in his paper, 'Need for Disaster-Resilient and Eco-Sensitive Habitats' that the damage to houses during the 2018 floods could have been greatly reduced if we had strictly followed the existing land use policies, and he stresses the need for identifying and adopting local and alternative building technologies for rebuilding a green and eco-sensitive Kerala. S.M. Vijayanand, in his paper 'Accountability Challenge' explains that, since social accountability is the best test of good governance, Kerala government should declare an accountability challenge related to 2018 floods and suggests certain specific measures of social accountability to the government. T.P. Kunhikannan in his paper, 'Rebuilding Kerala - Need for Disaster Risk Reduction Strategies', explains that the State would be able to rebuild a better and resilient Kerala only through evolving efficient DRR strategies and its collective implementation by the government and the people. E. Aravind Raj, Bino Thomas and P.V. Unni Krishnan, in their paper 'Resilient Kerala: Matters of the Mind is Key' deals with the impact of floods and disasters on human minds based on lessons from post-disaster experiences in India and abroad and suggest policy measures and global standards regarding mental health and psychosocial issues to be included in the DRR strategies of the State.

George Chackacherry and Pratheesh C Mammen in their article, 'Significance of Waste Management in Kerala's Disaster Risk Reduction Strategies' provide suggestions for a long-term vision and clear cut strategies for the State government and the concerned departments for including waste management as an integral part of DRR policies. C.T. Aravindakumar, through his paper, 'Waste Disposal: Challenges and Viable Solutions', reminds us of the urgent need to work out practical methods of waste disposal through people's participation for mitigating disaster risks and gives suggestions for evolving clear guidelines for the disposal of waste after floods or other natural disasters.

In his article, 'In the Aftermath of Cyclone Ockhi', Eugene H. Pereira focuses on the persisting indifference and inadequacies in disaster preparedness and management during natural calamities like cyclones and makes practical suggestions for governmental interventions for DRR along the coastal areas of the state. G. Placid's paper, 'Role of Civil Society Organisations in Kerala's Disaster Risk Reduction – A Case Study' narrates the case study of a CSO in the rehabilitation of the victims of the 2004 Tsunami and provides suggestions for improving disaster preparedness and mitigation. In her article, 'Empowering Coastal Fisherfolk in Kerala for Better Disaster Management', Maglin Philomina narrates the plight of Kerala's coastal fishing community in the backdrop of the Ockhi Cyclone of 2017 and puts forward measures for improving disaster preparedness and management.

Sonia George, in her article 'Emerging Kerala' – Women should have key role' discusses the resilience shown by Kerala women in tiding over the challenges thrown up by the 2018 floods and strongly advocates the need for addressing their problems, especially of the women engaged in the unorganised sector, in order to rebuild a better Kerala. George Thomas, in the article, 'Significance of Meteorological Forecasts and Warnings in Disaster Risk Reduction' describes the importance of meteorological forecasts and warnings in the country and emphasises the need for taking weather forecasts and warnings more seriously by the authorities as well as the general public. Based on the experiences during the 2018 floods, R. Nandalal in his article, 'Disaster Risk Reduction: Lessons from a Deluge', provides broad guidelines for disaster relief, rehabilitation and rebuilding and emphasises the need for revamping National Disaster Management Authority (NDMA) and State Disaster Management Authority (SDMA) for building a better DRR governance system.

LOOKING AHEAD

Rebuilding of the State needs to be done in a well-thought out manner with a long-term perspective based on a master plan. Apart from the enormous financial challenges involved, the authorities need to also ensure the availability of other resources including scientific and technological inputs and efficient and time-bound implementation mechanisms. DRR efforts will not be successful with governmental action alone. The attitude of the people and the policy makers should also be such that the economic development of the state and the conservation of its environment would go hand in hand. If we do not prepare ourselves to meet unanticipated disasters in future, the devastation that could befall on a fragile territory like Kerala would be catastrophic. We have to realize that climate change is a reality. Only through effective DRR measures will we be able to effectively reduce the intensity and impact of natural disasters like floods, droughts, earthquakes, landslides or cyclones. The articles in this volume reveal that adequate disaster preparedness and effective DRR strategies should be in place. If Kerala society continues to maintain the large-heartedness of collective responsibility shown during the 2018 floods, the DRR efforts of the State are bound to succeed. Let us hope that the Rebuild Kerala Initiative of the State Government would be able to utilise post-flood reconstruction of the State as an opportunity to create a 'New Kerala' and enable the State to move forward in the path of sustainable development and growth.

DISASTER-RESILIENT KERALA: WAY FORWARD

N. VINOD CHANDRA MENON, S. PARASURAMAN, P.V. UNNI KRISHNAN

A paradigm shift is needed to make Kerala resilient to disasters.

N. Vinod Chandra Menon

S. Parasuraman

P.V. Unni Krishnan

INTRODUCTION

Unusually high rainfall during the 2018 monsoon season triggered unprecedented floods in Kerala. This worst flood in nearly a century left 483 people died and 14 missing[1]. About a million people were evacuated. During the peak of the monsoon, 1.45 million people were in relief camps[2]. One-sixth of the total population of Kerala were directly affected by the floods and related incidents. The Government of India had declared it a Level 3 Calamity, or "calamity of a severe nature". The total recovery needs are estimated at Rs. 31,000 crore (USD 4.4 billion)[3] according to an assessment done by the Government of Kerala, United Nations, World Bank, Asian Development Bank and the European Union Civil Protection and Humanitarian Aid across social, productive, infrastructure and other sectors, counting both private and public loss.

Timely rescue work by the local people, fisherfolk community, young people and the State Government was complemented by the Indian Armed Forces and the National Disaster Response Force of the Indian Government. The support from the Kerala and Indian diaspora community and friends of Kerala from different parts of the world also provided real time support over the internet to ensure timely and appropriate rescue and relief efforts. UN and local self-government units, local, national and international aid agencies working in coordination with the government contributed to scale up humanitarian assistance.

The State Government has launched a high-level 'Rebuild Kerala Initiative'. The Chief Minister launched a public appeal for funds. The appeal generated over Rs. 3410 crore as of 2019 March first week[4]. The floods of August 2018 are a wake-up call to strengthen disaster preparedness and risk-

reduction measures in the state. With climate-triggered disasters on the rise worldwide, it is not a question of "whether" but "when" the next floods or another disaster may strike. A paradigm shift is needed to make Kerala resilient to disasters -- by strengthening disaster preparedness and adopting risk reduction measures (such as setting up functioning early warning systems, evidence-based water and dam management, strengthening community resilience and improving disaster readiness amongst district administrators) and principled humanitarian action.

DISASTERS AND HUMANITARIAN ACTION - A GLOBAL PERSPECTIVE

Armed conflicts, wars, violence, increasing frequency and ferocity of climate events, bad development policies an unregulated urbanisation are increasing the number of people who are caught up in disasters and who need humanitarian assistance. Poverty amplifies disaster vulnerabilities and human suffering. There is a serious concern that poor people and several vulnerable groups (such as children, women and transgender people) are often left out of humanitarian assistance in crisis settings.

During the ten-year period between 2008 and 2017, over 3751 natural hazards have been recorded worldwide[5] (based on information from 198 countries). That is more than one every day[6]. A total of 84.2 per cent of these are weather-related natural disasters (floods 40.5 per cent, storms 26.7 per cent and other weather related 16.9 per cent).

During the same ten-year period, two billion people were affected by natural hazards[7]. Ninety Five per cent of them were affected by weather-related hazards (floods 36.7 per cent, storms 17 per cent, other weather-related 41.8 per cent). The losses in 141 countries over the same ten-year period is estimated at US $1,658 billion.

If you add to this the number of people impacted by disease outbreaks (such as cholera and Ebola) and the 68.5 million people[8] forcibly displaced worldwide (40 million internally displaced people, 25.4 million refugees and 3.1 million asylum seekers), we get a staggering figure of people affected by disasters and conflict. The world is urbanizing rapidly, triggered by both migration as well as more people being born in cities. By 2050, 68 per cent of the world's population will live in urban areas[9]. Rapid and unplanned urbanization is a major development concern. There has been a massive increase in the number of people living in cities who are vulnerable to violence, conflict and disasters. Urbanisation presents a significant and real challenge for governments and humanitarian actors. Experts associated with ALNAP[10] believe that urban contexts are not only difficult to define, they are difficult to understand and put forward the concepts of 'density', 'diversity' and 'dynamics' to analyse urbanisation.

Box : 1

FIVE REASONS WHY DISASTER-AFFECTED PEOPLE MAY NOT RECEIVE THE ASSISTANCE THEY NEED.

Out of sight: The people we fail to see
Out of reach: The people we can't get to
Out of the loop: The people we unintentionally exclude
Out of money: The people we don't prioritize
Out of scope: The people who 'aren't our problem'

Source: The World Disasters Report 2018[11]

In 2017, US $ 27.3 billion was the total money spend on humanitarian assistance world-wide[12]. This includes $ 20.7 million from governments and European Union institutions. However, this is only a fraction of what is needed to lift people out of disaster misery and risks.

At the global level, humanitarian sector is "stretched to its limits."[13] There is an urgent need to strengthen disaster preparedness and risk- reduction measures as well to ensure principled humanitarian action in crisis settings.

Box : 2

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POVERTY MULTIPLIES DISASTER IMPACT AND HUMAN SUFFERING.

Comparative analysis[14] of the devastating earthquakes in China (on 12 May 2008), Italy (on 6 April 2009) and Haiti (on 12 Jan 2010) concludes that human cost is much higher in poor settings.
In China (7.9 on the Richter scale), one in every 595 persons died. In Italy (6.3 on the Richter scale) one in every 190 affected people died. In Haiti (7.0 on the Richter scale) one every 15 affected person died. In China one in every 690 affected was rescued. In Italy one in every 373 affected was rescued. In Haiti, one in every 16,588 affected was rescued. Poor people often get left out in humanitarian response and rebuilding efforts.

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Source: BBC

HUMANITARIAN VALUES, PRINCIPLES AND STANDARDS

Humanitarian action should be built on strong foundations of values, principles and standards. It needs to be driven by quality and accountability. This is possible only if we treat disaster-affected people as dignified human beings and not as hapless victims. Local people are the first (and sometimes the only) responders in crisis settings. The overall objective should be to ensure the active involvement and ownership of people living in disaster-prone and affected areas as the key actors in planning, rescue, humanitarian response and rebuilding efforts. The long-term goal should be to strengthen their resilience. World Humanitarian Summit[15] recommends to make humanitarian action 'as local as possible and as international as necessary'.

There were news reports and complaints from various sections of the community during the Kerala floods that they were ignored, discriminated or excluded in relief and recovery efforts. While this paper is not able to verify (either way) any such reports or allegations, we strongly recommend all humanitarian actors to adhere to and promote humanitarian values, principles and standards. Compassion, collaboration and an evidence-based approach are necessary to promote principled humanitarian action and to leave no one behind.

Box : 3

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HUMANITARIAN PRINCIPLES, HUMANITARIAN CHARTER AND SPHERE STANDARDS

Four humanitarian principles[16]:

Humanity: Human suffering must be addressed wherever it is found. The purpose of humanitarian action is to protect life and health and ensure respect for human beings.

Neutrality: Humanitarian actors must not take sides in hostilities or engage in controversies of a political, racial, religious or ideological nature. Impartiality: Humanitarian action must be carried out on the basis of need alone, giving priority to the most urgent cases of distress and making no distinctions on the basis of nationality, race, gender, religious belief, class or political opinions.

Independence: Humanitarian action must be autonomous from the political, economic, military or other objectives that any actor may hold with regard to areas where humanitarian action is being implemented.

Humanitarian Charter[17] : Calls for dignified humanitarian assistance

Sphere Standards[18] and other related standards (such as minimum standards on education) should find a central place in relief and recovery efforts.

These standards are universal and based on science and evidence.

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SUSTAINABLE DEVELOPMENT GOALS AND OTHER OPPORTUNITIES

Disaster risk reduction and preparedness cuts across different aspects of development discourse. There are various United Nations (UN) and international initiatives to advance disaster risk reduction, disaster preparedness and principled humanitarian action, such as the Sendai Framework[19]. Sustainable Development Goals (SDGs) also present new opportunities. A total of 25 targets related to disaster risk reduction in 10 of the 17 SDGs firmly establishes the role of disaster risk reduction as a core development strategy. They help to examine SDGs through the lens of building resilience and reducing disaster risk and draws attention to measures that can contribute to the implementation.

EVOLUTION OF DISASTER MANAGEMENT IN INDIA AND KEY LESSONS

The Indian Ocean Tsunami of December 26, 2004, was a wake-up call at the global level to strengthen multi-hazard preparedness. Governments, multilateral agencies and civil society organisations initiated measures to put in place early warning systems, greater investment in disaster risk reduction, preparedness and emergency response capacities. The tsunami and various disasters around that period drew the global attention to extreme climatic events, climate-triggered disasters and the need for investments to build resilient communities as a priority.

The Hyogo Framework for Action 2005-2015 ('Building the Resilience of Nations and Communities to Disasters') (HFA) became the defining moment and brought a paradigm shift in disaster discourse. While the need to provide post-disaster relief and adherence to the humanitarian imperative[20] is non-negotiable, HFA stressed the need to strengthen preparedness measures, disaster risk reduction as well as improved emergency response capacities by national governments, multilateral and bilateral donors, regional inter-governmental platforms and international, national and local Non-Governmental Organisations.

In 2000, India Disasters Report – Towards a Policy Initiative[21] published by the Oxford University Press galvanised the collective experiences and interest of policy makers and practitioners in India. It was a collective effort of 100 people from various walks of life like academics, development and disaster management experts, government officials, legal and human rights activists, Members of Parliament and journalists. While providing a complete and up-to-date picture of the disaster profile of the Indian subcontinent, the report made a collective call to develop a policy for disaster management in India and a scientific approach to disaster management.

HFA was a catalyst to develop disaster management policy measures across nations. The Government of India was one of the front-runners and enacted the Disaster Management Act 2005 (Act 53 of 2005). This Bill was passed unanimously in both houses of Parliament. The National Disaster Management Authority (NDMA), State Disaster Management Authorities (SDMAs) and District Disaster Management Authorities (DDMAs) were established in India under the Chairmanship of the Prime Minister of India, Chief Ministers and District Collectors respectively at the national, state and district levels in India. A first responder force called National Disaster Response Force (NDRF) was constituted in 2006 by deputing trained, able-bodied personnel from para-military forces as a dedicated emergency response force in India.

The resources for risk reduction, preparedness and emergency response were earmarked in the National Disaster Response Fund and the State Disaster Response Funds. In a few states, State Disaster Response Force was also established. Twelve battalions of the NDRF now operate in India and they are pro-actively deployed. A Disaster Mitigation Fund was also created as envisaged in the Disaster Management Act 2005.

The Kerala State Disaster Management Authority (KSDMA) was established on 4th May 2007[22]. The present composition of KSDMA with ten members was notified vide 17th July 2013[23]. KSDMA has formulated the Kerala State Disaster Management Policy in 2010 and has also prepared the first State Disaster Management Plan in 2016. The district administration officials of all the 14 districts of the state have prepared District Disaster Management Plans (DDMPs). Most of them prioritise arrangements for emergency response in the event of a disaster. Since the floods in 2018, KSDMA has initiated the review, revision and updating of the DDMPs starting with the seven worst flood-affected districts with the support of Sphere India[24] and civil society organisations. Sphere India is a coalition of government and non-government agencies involved in humanitarian initiatives.

Kerala has diverse risks. In April 2017, fire at the Paravur Pootingal temple[25] in Kollam district triggered by festival-related fire crackers resulted in the death of 111 people and injured more than 350 people. in November 2017, Cyclone Ockhi resulted in the death of 84 fish workers and 141 fish workers missing. In June 2018, a deadly outbreak of Nipah virus in Kozhikode and Malappuram districts claimed the lives of 17 people. In August 2018 unprecedented floods and landslides resulted in the death of 483 people.

KERALA FLOODS: WHAT WORKED WELL?

During the floods in 2018, the people of Kerala showed their resolve by reaching out to those who were trapped in flood waters and landslides. Ordinary people worked in close collaboration with local elected representatives, government officials, young people and fisherfolk community to rescue people and bring them to the safety and to the relief camps. More than 14.5 million people were provided accommodation in over 12,000 relief camps in the flood-affected districts. Cadre of community-based palliative care volunteers, Accredited Social Health Activists (ASHA) Anganwadi workers, para-medical staff and government staff from all departments contributed to minimise the loss of lives.

During the early days of the floods, the media played an important role to give an objective analysis of the impact, spread, needs and positive stories of ordinary people as first responders. This acted as a catalyst to galvanise volunteers, resources and social capital and attract the attention of the authorities on pressing matters.

The floods also exposed the vulnerable underbelly of the society. Fake news and false propaganda on social media platforms influenced people negatively resulting in loss of cohesion and compassion within communities. Political controversies and certain events (such as the political controversy triggered by State Government's move to implement a Supreme Court order to allow women to the Sabarimala temple) resulted in creating a perception that there has been a shift in government's focus and priorities. There was not much done to address this perception.

Several controversies also resulted in shifting the attention from the acute needs of flood survivors and issues related to rebuilding the state. Some such examples are:
1. Politics around the Central Government's decision to stop direct aid (US $ 100 million) from the UAE government to the Government of Kerala
2. The refusal of permission by the Central Government for the visit of Ministers of Kerala Government to foreign countries to collect financial contributions from the Kerala diaspora to the Chief Minister's Distress Relief Fund (CMDRF)
3. The need for transparency and accountability in the management of CMDRF funds
4. The controversy following the Supreme Court judgment upholding the right of women in the age group 10 to 50 years to enter the Sabarimala temple.

However, spontaneous positive reactions from various sections of the community will remain as the highlight and key identity of the floods that hit Kerala after 94 years. Spectacular search and rescue efforts of 4,357 fishermen who rescued 65,000 people marooned in flood waters, heroic work of young people, inspiring stories of hundreds of thousands of women members and volunteers of Kudumbashree[26] who extended their support to clean slush and debris from flood damaged houses and public institutions and to decontaminate wells, the model role played by young Indian Administrative Service and Indian Police Service officers and their team stand out as sterling examples of the rich and progressive social capital of Kerala.

RECOMMENDATIONS

The big idea should be generating momentum by articulating a compelling vision of a resilient Kerala. The best way to pay homage to the lives lost during such a disaster is to stop it from happening again. Here we recommend priority actions to help the people of Kerala and the government to prepare for, respond to and recover from disasters. Preparing for one disaster (e.g. floods) goes a long way to prepare for other disasters (e.g. conflicts/ violence and disease outbreaks) and strengthen the resilience of communities.

To rebuild Kerala and to strengthen the resilience to withstand future shocks, the communities must be at the centre. A community-led, owned and managed planning, design, development, implementation and monitoring eco-friendly development pathways is the only way forward.

The 'Rebuilding Kerala' Initiative must build on the success of the Kerala's development model characterised by strong development indicators and rich social capital.
The rebuilding model should be built on the foundations of eco-friendly sustainable approach, organic agricultural practices, protection and preservation of bio-diversity in the Western Ghats.

Strict enforcement of building bye-laws and Development Control Regulations regarding river banks and coastal areas should be made non-negotiable. Earthquakes don't kill people, badly-constructed buildings do.

Disaster Risk Reduction (DRR), Climate Change Adaptation (CCA) and Sustainable Development Goals (SDGs) must drive development planning at the local level.

Special and compassionate attention needs to be given to the marginalised and weaker sections such as children, elderly, differently-abled people, transgender people, people who are terminally ill and need end of life and palliative care and support.

Strengthen scientific rigour and pay greater attention to monitoring weather patterns and disseminating alert and early warning messages to people in disaster-prone areas.

Develop tools, platforms and techniques to communicate with people with special needs. Strengthen inter-institutional coordination mechanisms to ensure greater synergy before, during and after disasters.

Management plans must be prepared for all dams in the state. Monitoring of management plans and rule curves for releasing water from the dams must be enforced meticulously through effective inter-institutional coordination of all agencies mandated with the tasks of power generation, dam safety, water management and disaster management.

The 'Rebuilding Kerala' Initiative must recognise the collective power and compassion of ordinary people, social capital of Kerala and the collective capability of community-based organisations, tech-savvy youth, private sector, educated and experienced senior citizens, elected local representatives and democratic institutions, frontline workers and cadres of political parties, fish worker community, ex-servicemen, media, multi-disciplinary professionals, faith-based organisations, spiritual leaders and their disciples.

The application of technology should guide water management in dams through the use of tools and techniques for monitoring reservoir levels, inflow into the reservoirs from rivers, water levels in rivers and rainfall forecasts and "nowcasts" to permit micro level weather forecasting.

Mechanisms for improving coordination among Central Water Commission (CWC), Indian Meteorological Department (IMD), Kerala State Electricity Board (KSEB), Kerala State Disaster Management Authority (KSDMA), Kerala Dam Safety Authority and Kerala Coastal Zone Management Authority and other relevant Central and State government agencies must be developed through multi-stakeholder engagement.

Measures should be adopted for improved surveillance and monitoring using sensors, models and satellite imagery and remote sensing; the application of Scenario Analysis,

Expert Systems and Artificial Intelligence and Virtual Reality and the use of drones for risk assessment and vulnerability analysis in the river-banks and coastal areas prone to coastal erosion, soil piping, subsidence, etc.

Media has a role to play through informing and sensitising people through well-researched scientific programmes.

Establish rapid response mechanisms to conduct damage assessments through vibrant mobile platforms and applications, information technology tools and inter-operable early warning dissemination mechanisms.

Create platforms for self-organised civic initiatives to assist the government officials, etc.

Recognise and prioritise invisible needs such as Mental Health and Psychosocial Support.

Arrange peer-to-peer exchange visits to locations and communities (inside the country and outside) which have developed strong community-based disaster preparedness and response work (e.g. Orissa, Bangladesh, Cuba). This will help in 'immersive and experiential learning'.

The following pragmatic actions should be initiated in Kerala before the next monsoon season:
1. Teach all children swimming. The fish workers' support and collaboration with private and other swimming pool-owners is needed.
2. Teach children, teachers, taxi drivers and fish workers life-saving first aid and flood-related preventive public health.
3. Leadership in disaster settings are different when compared to leadership in other contexts. Conduct a one-day-long experiential learning simulation session for different constituencies through exercises that takes them through a real-life setting. This is key to improving readiness amongst the leadership and decision-makers including key Ministers / Politicians from all parties; District Collectors and other key officials; and Media, journalists and social media influencers.

It is critical to have strong components of humanitarian principles, practice sessions and minimum standards as part of any learning exercise.

At the global level, there is a vacuum in the area of palliative care and pain relief for the terminally-ill people and those who need end-of-life care. Kerala with its excellent and unique cadre of palliative care workers and community networks provide a great platform to develop a global model for the provision of palliative care, pain relief and end-of-life care in humanitarian settings. This innovation could be the legacy of Kerala's contribution to the humanitarian sector worldwide.

The real test of disaster preparedness is not just about how prepared the government is, but how prepared the government and the people are. Simple measures and pragmatic actions can go a long way to stop disasters from becoming humanitarian crisis.

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DISASTER RISK REDUCTION: SOME LESSONS FROM THE WORLD TO KERALA

MURALEE THUMMARUKUDY

Kerala should consider preserving its ecosystems, including unique features of Kuttanad, our wetlands, forests in high ranges and the coastal areas as a way to act as a first line of defence against disaster risks.

BACKGROUND

The series of disasters in 2018 which Kerala experienced has focused the attention of both people and policy-makers alike on the issue of disaster management. Kerala was typically not known to be a place of major disasters though many vulnerabilities were there. Analyses of statistics between 1971 to 2011 shows that on average less than 200 people die every year in Kerala in natural disasters, the single biggest cause being lightning. Most of the big disasters, which killed more than 100 people, except the tsunami of 2004, since the formation of Kerala, were anthropogenic from fire cracker explosion to temple stampedes to train accidents. Over the same period, the number of people who died in road accidents rose to more than 4000 per year, with another 1000 people dying in drowning and more than 500 people dying every year falling from heights. So human-generated accidents and multitude of small-scale accidents dominated the disaster scenario in Kerala for decades. However, it was always known that Kerala could have a major flood as the memory of a massive flood event in 1099 Malayalam Era (1924 AD) is etched in Malayalee literature and social memory. However, as it happens, as time elapsed, neither the population nor the administration took it seriously. This is partially at the root of the catastrophe in 2018 which killed hundreds of people. Now that we know that Kerala can also have major disasters, how should we prepare for the same ?

DISASTER SCENARIO ACROSS THE WORLD

Those following media reports indicate that there are a lot more disasters now than in the past. Even twenty years back, there was no discipline called disaster risk reduction

and no universities were offering courses in disaster management. So clearly there are more disasters and more people are thinking about it. Is it true ? In order to answer this question correctly, we should first understand what causes a disaster. Disasters happen at the interface of three elements. A hazard, like earthquake, flood or landslide, is the starting point of a disaster. It translates to potential loss in terms of human, infrastructure or environment when there is a valuable asset exposed to it. A tsunami hitting an empty coastline or an earthquake in a desert does not translate itself into a disaster. Finally, the lack of coping capacity of the community to deal with a hazard interacting with an exposed asset is what creates a disaster. It is for this reason that the United Nations International Strategy for Disaster Reduction defines disaster as "a serious disruption of the functioning of a community or society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope with using its own resources".

Hazards leading to disasters can be broadly sub-divided into geological (such as earthquakes, tsunamis and volcanoes), hydrometeorological (cyclones, floods, droughts) and man-made (oil spill, industrial accidents, vehicle accidents). In general, the risk of geological hazards are not increasing in human time scale. The number and scale of manmade risks are certainly on the rise since the Industrial revolution. Changing climate is certainly having an impact on hydroclimatic disasters be it floods, droughts or increasingly forest fires. However, what has really changed dramatically over the last two hundred years is the extent of human exposure. The number of people on the planet has increased from around 1 billion in 1800 to over 7 billion in 2018. People are also living in more vulnerable areas, be it coastal areas, cities, flood plains or hill slopes. Moreover, our wealth has also increased manifold since the Industrial revolution. Consequently, a flood or tsunami affecting the same geographical location will affect ten times more people and cause 1000 times more damage. This is the real reason why we hear about lot more disasters now.

WHAT ABOUT DISASTER RISK REDUCTION?

As disasters happen at the interface of natural hazards and exposure, one could reduce the number of disasters by changing exposure even when we are not able to reduce the hazards. In addition, increasing the capacity to anticipate, plan, provide early warning and prepare the community for effective response can all lead to reduction of disaster risks. This has been clearly seen in many parts of the world where the natural hazards remain the same while the consequences are very different.

The starting point for disaster risk reduction is risk and vulnerability assessment. At every geographical location, there are potential for multiple disasters and it should be assessed and mapped. This information can be obtained in some cases from historical records (such as floods and earthquakes), many from research (especially geological hazards) and some from modelling (climate change). In most developed economies, hazard and vulnerability maps are available at very local level so that even before one starts to build their own houses, they can check the local disaster risk.

The second aspect is the structural part of disaster risk reduction. Based on the natural hazards at a place, one should use effective land use planning as well as targeted building regulations to reduce disaster risks. One of the most interesting and well-known example is that of Japan, where buildings are designed to withstand major earthquakes. So while earthquakes of moment magnitude 7 and above leads to death of tens of thousands of people in most countries, in Japan even a magnitude 8 earthquake (which is

about 30 times more powerful than magnitude 7 earthquake) hardly affects people and property. This was also shown dramatically in 2010, when a 7 magnitude earthquake in Haiti killed over 200,000 people in January 2010, while a magnitude 8.8 (close to 800 times stronger), killed less than 500 people in Chile. Earthquake engineers always say: "Earthquakes don't kill people, buildings do".

Thirdly, one should always prepare for effective response. A good example comes from Cuba, where even though it is a country with low per capita GDP, the country's disaster preparedness and response are considered world class. By establishing an effective early warning system and involving the community at every level of preparedness and response, Cuba has been able to reduce disaster risks, primarily from hurricanes, in a way which even high-income countries wish to emulate.

Finally, making sustainable investments in disaster risk reduction is a key factor. In most countries, disaster management is often focused on post-disaster response. Funding is made available, on emergency basis, after a disaster. However when funds are sought for disaster prevention, the funds are often not available or adequate funds are not provided. Even when post-disaster investments are made, most of it is directed towards recovery and rebuilding and very little is directed towards disaster risk reduction.

WHAT ARE THE LESSONS FOR KERALA ?

Kerala has many positive aspects in terms of disaster risk reduction like a well-educated community and established three-tier system of Government. The disaster management systems, established after the 2004 Tsunami as per the Disaster Management Act, are also gaining capacity and clout. In terms of disaster response, our capability is slowly increasing. The performance of Kerala's disaster management systems in the recent disasters from cyclone Okhi to 2018 floods, has been appreciable. However, when it comes to disaster risk reduction, the story is very different. While there is knowledge in the state capital about the likelihood of various natural disasters, the community at large still only have `grandmother's tale' to go by regarding whether their specific area is prone to disasters. There is no established system in the state's Local Self-Government Department to provide the community with information about the potential hazards of any particular area where people have settled or plan to settle or build houses. The same goes with building regulations. While Kerala has a very varying landscape from sub sea area in Kuttanad to high ranges in the hilly areas, the building codes are not calibrated to the differential landscapes and potential disasters stemming from the same.

Kerala should invest a lot more in disaster-risk reduction by way of preparing the community for reducing disaster risks as well as for effective response to disasters. The youth in Kerala came out in large numbers during the 2018 floods to support rescue and relief work without adequate training or planning. This social capital should be mobilized and built so that we can be better prepared in the event of any future disaster. Promoting youth voluntary services for disaster response and disaster risk reduction will be an effective policy.

While Kerala does have a State Action Plan on Climate Change and an Institute for Climate Change Studies, in reality there is no substantial understanding of climate change in Kerala. We are still under the assumption that climate change is something which is likely to occur in future and mattering only to people in remote places like Maldives or Tahiti. The fact is that climate change is already here and Kerala will be impacted in many ways, by rising sea levels, increased intensity of rains, increasing gap between rainy days and so on. While there is very little Kerala can do to mitigate climate change, in terms of adaptation we are already late.

Across the world, various countries have realized that ecosystem- based approaches to disaster risk reduction and managing climate change hold much promise and that investing in healthy ecosystems provide a viable route. Kerala should consider preserving its ecosystems, including unique features of Kuttanad, our wetlands, forests in high ranges and the coastal areas as a way to act as a first line of defence against disaster risks.

TOWARDS BUILDING A STRONGER AND SAFER KERALA

By integrating an environment and sustainability centric model at the heart of our development, we will, to an extent, be able to offset some of the repercussions of future calamities.

Shashi Tharoor firmly believes that Kerala state will be able to counter some of the negative repercussions of future calamities only through building a development model which is environment-centric and sustainability-centric. Excerpts from an interview Shashi Tharoor gave ISDG.

Can you explain about your personal experience related to flood response, relief and recovery ?

My experiences were largely two-fold. As the Member of Parliament from Thiruvananthapuram, my first responsibility was to my constituents. So my days between August 15-17, 2018, when the district faced peak flooding, were dedicated towards reaching out to affected residents, coordinating with the authorities that were undertaking relief and rescue operations and visiting the 18 relief camps that had been set up in the district and ensuring that the needs of the displaced and those who were evacuated were met. Subsequently, as Thiruvananthapuram became the staging ground for all relief operations in the state, as a consequence of the fact that our airport was the only major viable airstrip in the state, my office played a crucial role in coordinating relief efforts and redirecting aid that was being flown in towards the central and northern districts of the state which were among the worst-affected.

Once my executive duties in the constituency were completed and after residents of the district had gradually begun to make their way back to their homes, I rushed to the United Nations Headquarters in Geneva (UNOG), in my individual capacity and at my own expense, where I held a series of high-level briefings with the senior leadership of the UN and its agencies in order to identify avenues through which the international system could support relief operations in the state. Together, we identified 5 R's that were of critical importance to the state— Rescue, Relief, Risk of diseases,

Rehabilitation and Reconstruction. We have now largely moved beyond the short to medium-term requirements of the first four R's but the long-term challenge of reconstruction is an ongoing process which will need a dedicated and collaborative effort to successfully accomplish the task. The results of my discussions in Geneva were then first shared with our Chief Minister, whom I met immediately after returning to Thiruvananthapuram which was also subsequently shared with the public through a press statement that my office released.

What are the challenges you faced and how did you manage to address the challenges ?

One of the immediate challenges as the floodwaters began to recede was the urgent need to sanitise residential areas before people could start returning to their houses. There was an imminent threat of an outbreak of an epidemic on account of unsanitary conditions and in particular, carcasses of decaying animals that had been washed up once the waters receded. Given the scale of the crisis that we were already fighting with, such an outbreak would have most certainly had a devastating effect on the state. Leveraging my networks, I managed to arrange for over 100 tonnes of lime, a substance that is used widely as a disinfectant. This large shipment of lime was handed over to the state government which employed it to sanitise affected areas.

Similarly, another serious threat was of the spread of leptospirosis, a zoonotic bacterial infection, which has periodically cropped up in the state. One way to treat the disease is through doxycycline tablets, of which there was a serious shortage in the reserves of the state government. In a bid to ease the strain on the government's resources, I managed to arrange for over 5 lakh tablets of doxycycline, which, to an extent, helped the state government manage the shortage they were was facing.

Of course there were also challenges faced in terms of procuring other emergency items such as food, clean drinking water, clothing, sanitary napkins and medicines. But I am happy to note that we were able to arrange for these materials through our networks or through request letters I had written to major FMCG groups in the country like Dabur, PepsiCo and ITC, many of whom generously sent truckloads of these items at my request.

Looking back, what are key lessons you have learnt from your experiences in Kerala and elsewhere regarding response, relief, rehabilitation and reconstruction during a natural disaster?

One of the most striking lessons from the floods was the need to review our position on accepting aid from friendly foreign countries in the event of a severe natural disaster. Under the UPA government, our stance was that if we were in a position to adequately cover the costs of operations associated with disaster relief and reconstruction through our own internal sources, then we would not seek or accept external offers. But, as the situation with Kerala floods highlighted, the paltry quantum of allocation of funds by the Central government suggested clearly one of two things: either an apathy towards the situation that Kerala found itself in, or a lack of resources to spare. Now if it is the latter, then there is definitely a need to revise our position and accept offers of aid extended by foreign countries. We are not alone in the world and there is no shame in taking the help extended to us by friends. Even the US, for instance, openly accepted voluntary aid (including $5 million from India!) in the aftermath of Hurricane Katrina in 2005. Protocol on matters such as this cannot and must not be decided by the issue of 'prestige'.

The second lesson is regarding adequately attracting and utilising foreign aid in the most optimal manner. Interestingly in several of my meetings, the 'Bhuj Model' of utilisation of foreign aid was brought up, where initially, through the medium of an international aid conference, foreign humanitarian funding was channeled into Gujarat, which helped kickstart the rebuilding and rehabilitation process in a significant way in the aftermath of the devastating earthquake of 2001. Similarly, Kerala must also consider organising a 'Rebuild Kerala' international conference with the same aims as the 'Bhuj Model'.

Another equally important lesson relates to how best we can equip our local communities in terms of capacity-building with the explicit aim of disaster mitigation and rescue. For instance, we are all well aware of the game-changing role played by our fishermen, who, at the height of the flooding, took out their boats and at great risk, expertly navigated through the swirling waters to reach out to stranded citizens. In many cases, even official rescue forces banked on the knowledge of our fishermen, in order to safely navigate through the waters. A similar role was also played by members of these communities during Cyclone Ockhi. One suggestion that I have repeatedly brought to the attention of the government, is the need to develop a marine equivalent of the Territorial Army (TA). Like the TA, this force would be an auxiliary voluntary outfit, whose membership would be drawn directly from members of fishing and coastal communities. During times of calamities such as the floods, the invaluable experience and expertise of these individuals would complement the efforts of the Indian Navy and Coast Guard. Moreover, given that they would be trained by the Navy, they would be well versed in the protocols and operations styles of the Navy and thereby ensure enhanced coordination between the two.

What are your suggestions for improving the policies and systems to ensure disaster risk reduction, mitigation and effective responses?

In addition to the three suggestions I outlined in my previous response, I also strongly believe that we need a set of more comprehensive and dynamic disaster management laws that authorise and support our relief agencies in a manner that allows them to rise to the severe challenges posed by natural disasters. Currently, as Kerala has painfully realised during the floods, in terms of quantum of allocations towards disaster relief, our official policy is woefully inadequate. That is why in the last Winter Session of Parliament, I introduced the Disaster Management (Amendment) Bill, which sought to establish a national fund for rehabilitation & reconstruction work post a disaster. It mandates a 30-day period to the Centre to provide adequate funds to the affected State and prevents arbitrariness in allotment. The Fund is intended to finance rehabilitation and reconstruction work after a disaster. Importantly, I have intentionally not defined rehabilitation and reconstruction within the Bill, so that the common parlance of these two terms can be used by the State Governments to their advantage. If these terms are defined in the Bill, it may restrict a form of rehabilitation in the future which we may not be able to conceive at this stage. The Act is to be read conjointly with the National Disaster Management Policy, 2016. The Policy lists the various types of rehabilitation, such as physical, social, economic and psychological rehabilitation; therefore the components of rehabilitation have already been enumerated in the policy.

With changing climatic factors acerbated by man-made environmental destruction, incidents like the Kerala floods are likely to make frequent appearances in the future and possibly be even more severe in magnitude. Therefore, we also need to think on how we can improve infrastructure in the state as well as reimagine our overall development paradigm in terms of its capacity to withstand and even mitigate these instances. One immediate suggestion is the urgent need to invest and develop disaster-resilient infrastructure, particularly housing, across the state. Another aspect is to revisit the sustainable development paradigm in the state and to assess man-made damage to the environment

and how we can address this. By integrating an environment and sustainability-centric model at the heart of our development, we will, to an extent, be able to offset some of the repercussions of future calamities.

Ultimately, in many ways, it is important to look at the post-flood era as an opportunity and an impetus to better imagine our state by going back to the drawing board and developing innovative solutions to the problems that have been exposed by the floods.

To what extent can civil society initiatives play a role in disaster risk reduction along with governmental action?

I have always maintained that civil society has an invaluable role to play in augmenting official government initiatives to tackle India's most challenging development concerns. This remains equally true in the domain of disaster mitigation and risk reduction as well. As we saw during the Kerala floods, civil society stakeholders played a crucial role in drawing additional resources to the state, reaching out to marooned citizens, coordinating some aspects of search and rescue missions by a regular monitoring of distress calls on social media, and also garnering additional contributions to the disaster management fund by leveraging their internal networks. But at the same time, I would argue that civil society has an even greater responsibility as we move forward, particularly with regard to helping society develop ideas and avenues through which some of the aspects that I have outlined earlier, such as disaster-resilient infrastructure, monitoring networks, sustainability paradigms and better policy positions are incorporated in our official disaster management policy. Our governments have too many competing interests that will limit them from adequately exploring these options. But that is precisely where our wealth of civil society stakeholders, experts and technical solution providers must come in. Together I am confident that we will be able to build a stronger and safer Kerala in the future.

REBUILDING KERALA - A DISASTER RISK MANAGEMENT PERSPECTIVE

SEKHAR LUKOSE KURIAKOSE

Kerala needs a coherent long-term investment plan and sustainable risk-financing mechanism to finance institutionalization and implementation of disaster-resilient measures.

Kerala, with its long sea coast and a steep gradient along the slopes of the Western Ghats, is highly vulnerable to natural disasters and the changing climatic dynamics. It is also one of the most densely-populated Indian states (860 persons per sq km), making it even more vulnerable in times of disasters. Floods are the most common of natural hazards that affects the state. Nearly 14.5 per cent of the state's land area is prone to floods, and the proportion is as high as 50 per cent for certain districts.

The State lies in seismic zone III which corresponds to Moderate Damage Risk Zone (MSK VII). The state falls under Moderate Damage Risk Zone for Wind and Cyclone (Vb=39 m/s). As per IMD data for the period 1877-2005, the state witnessed six cyclonic storms and five severe cyclonic storms. It also witness high incidence of lightning strike, especially in the months of April, May, October and November, causing heavy loss of lives.

Every year especially during monsoon, landslides are reported along the Western Ghats in Wayanad, Kozhikode, Idukki and Kottayam districts (as happened in 2018). The hilly regions experience several landslides during the monsoon season (Kuriakose, 2010) leading to road collapse, silting of river beds and heavy damage to public and private property. About 14.8 per cent of the state is prone to flooding (CESS, 2010).

The coastline of Kerala (590 km) is one of the most densely-populated areas in the country. This coastline is exposed to huge waves, storm surges and even tsunamis. Sea erosion is one of the recurring natural hazards affecting the coastline in the state, as part of the erosion - accretion cycle. The state has taken efforts to reduce the erosion with multiple interventions such as coastal sea walls, breakwaters/spurs jetting into the sea, underwater sand-filled geo-textile tubes to reduce the intensity of the waves, etc.

More than 50 per cent of Kerala's land area is moderately to severely drought suscep-
tible. Between 1881 and 2000, 66 drought years were experienced. After the drought
years of 2002-2004, 2010, and 2012, Kerala was officially mapped as mild to moderately
arid by the Indian Meteorological Department (IMD). In 2017, the IMD stated that the
year brought the worst drought in 115 years. Increasing incidence of drought is mainly
due to weather anomalies, change in land use and lifestyle of people. Other natural haz-
ards faced by the state include forest fires, soil piping, swell waves and tsunami.

2018 FLOODS IN KERALA

The heavy monsoon of 2018 brought widespread flooding to several districts of Kerala
and impacted almost 5.4 million people - one-sixth of the state's population. The torren-
tial rains forced the release of excess water from 37 dams across the state. Nearly 341
major landslides were reported from 10 districts, 143 of them in Idukki district alone. A
total of 1,260 villages out of 1,664 villages in 14 districts were affected. The seven worst-
hit districts were Alappuzha, Ernakulam, Idukki, Kottayam, Pathanamthitha, Thrissur
and Wayanad. The floods caused 435 deaths and nearly 6,85,000 families were affected
forcing many to seek shelter in relief camps. Many also suffered loss of property and
the state's roads, power lines and infrastructural facilities were also badly damaged at
many places. The government was able to conduct efficient rescue and relief operations.
Affected communities mobilized aid on their own and voluntary youth groups also sup-
ported the rescue operations through the effective use of IT tools and social media. The
people of Kerala also showed remarkable resilience during the floods and within one
week of the flood waters receding, many of the flood victims returned to their homes to
rebuild their lives.

RISKS IN THE STATE

Disasters sparks detailed analysis as to their reasons and effects. Kerala State Disaster
Management Authority (KSDMA) in its Disaster Management Plan (DMP) has identified
39 hazards that the State is susceptible to. These were categorised under two broad
heads i.e. Naturally Triggered Hazards (Natural Hazards) and Anthropogenically Trig-
gered Hazards (Anthropogenic Hazards).

Disaster risks are exacerbated by a crucial factor that has been silently rising in the state,
which is the land use pattern and practices. Multiple, incongruent Acts, orders and rules
on land use do not allow the development of a single land management policy/regulation
which official agencies can enforce. Due to this reason, business and habitation zones
have overlapped over the years. This is further compounded by the State's high density
of population of 860 people per sq km (2011 Census), narrow roads, dense and intrinsic
road network, high density of coastal population and the general higher standard of
living of the public.

The widespread flooding in urban and semi-urban areas of Kerala has buttressed the
charge of absence of risk-informed urban planning, non-compliance to design standards,
and non-incorporation of resilient features in urban infrastructure. Uncontrolled expan-
sion of habitations on the banks of the rivers/water bodies, encroaching into water chan-
nels/bodies and constricting the floodplains, inadequate storm water drainage and silting
of minor storage ponds and flood plains in urban and urban sprawl areas have only
added to flood risks.

CHANGING CLIMATE

The impacts of climate change are largely present through increases in the intensity and frequency of extreme weather events, unpredictability of precipitation, and changes to water regimes and peak seasonal runoff, caused in part by erratic precipitation, and rising temperatures. The state has had to face serious droughts in 2013 and 2017. These impacts are aggravated by lack of risk informed planning of the state. Another impact being witnessed is progressive coastal erosion affecting nearly 63 per cent of the state's 580 kms coastline.

DISASTER RISK INFORMATION

KSDMA, for the first time in the history of SDMAs in the country, had released landslide and flood susceptibility maps of Kerala in Geoinformation file formats for public use in its website. The State Disaster Management Plan has placed restrictions in hazard zones and has laid checklists for risk assessment to be followed by the implementing departments prior to granting approval to any infrastructure development projects. The collection and availability of disaster risk information, including hydro-meteorological data, is limited and is scattered across multiple agencies which is often not shared among the agencies. The official meteorological agency, the India Meteorological Department has only 11 automated weather stations. An underlying issue is the prevalent protocol of information-sharing which is subjected to receipt of forecast data from a single source – Indian Meteorological Department (for weather) and Central Water Commission (for floods), leading to lower level of accuracies and lesser time available for the state to undertake emergency response measures. The Government of Kerala had requested IMD to improve and downscale weather predictions to the village level and increase the observation network. Due to lack of response, the Government has approached Indian Space Research Organisation (ISRO) for adequate support and the ISRO has responded positively to the request.

LEGAL FRAMEWORK

The Kerala State Disaster Management Authority (KSDMA) established under the Disaster Management Act 2005 (Central Act 53 of 2005), in the aftermath of 2004 Indian Ocean tunami, identifies disaster risks as one of the main challenges to Kerala's development aspirations. KSDMA started to function only from 2012 and had only 9 staff until cyclone Ockhi in 2017. Additional multi-disciplinary scientific staff was appointed later.

Kerala's minimum relief code is the highest in the country. In most cases, the amount of relief offered is almost 30 times greater than the national minimum relief code. Kerala is the only state to have instituted a vulnerability-linked relocation scheme totally funded by the State Government. Under this scheme, the State provides Rs 4 lakh for house construction and Rs 6 lakh for purchasing 3 to 5 cents of land for those families who are certified to be living in unihabitable terrains. The State also provides the same amount to those living within the high tide line to 50 metres inward in the land, for such families to relocate to a land chosen by them beyond the 50 metres.

The Disability-inclusive DRR programme of KSDMA has been referred to as the national model for developing the National Disaster Management guidelines - Disability and Disasters. This programme proved very useful during Kerala floods where NGOs trained in the area by KSDMA conducted special missions to rescue persons with disabilities.

Multiple government agencies and departments deal with Disaster Risk Management (DRM) directly or indirectly. The existing institutional arrangements for DRM mainstreaming is complex. Risk governance, capacity and funding limitations indicates that DRM mainstreaming efforts have not been fully embedded in the core sector activities in the state. As per the approved stakeholder responsibilities of the National Disaster Management Plan, the responsibility of early hazard detection is vested upon various central agencies namely India Meteorological Department (IMD), Central Water Commission (CWC), Geological Survey of India (GSI), Indian National Centre for Ocean Information Services (INCOIS) etc. The responsibility of the KSDMA is to support the central initiatives which KSDMA has done substantially. The State Disaster Management Plan mandates a checklist for all infrastructure projects to follow, prior to acceptance for financing by the State. However, this rule is not complied with by the departments.

Under the existing governance structure, KSDMA and District Disaster Management Authority (DDMAs) are placed to support DRM across various government departments and agencies in the state through its coordination and facilitation mandate. However, protocols for relationships and links between the KSDMA and other agencies that produce and analyze DRM-related data and information need to be clearly defined. For example, the role and responsibilities of the Department of Water Resources and agencies under it responsible for flood protection infrastructure and hydrological activities need to be clearly articulated and strengthened. The existing information management capacity of KSDMA and DDMAs needs to be substantially expanded and strengthened. The Fusion Centre of KSDMA when fully functional will consist of necessary decision support tools for state-level decision-making. A high-power committee constituted by the Government has recommended additional measures to strengthen KSDMA. KSDMA has recommended that the state should consider developing a data analyzing structure in the State, preferably under the Kerala Spatial Data Infrastructure (KSDI).

FINANCING DRM

Lack of adequate finances for DRM is a key constraint as hazards could occur in an unprecedented manner and at random. KSDMA has an annual budget of Rs 5 crore. It also has a State Disaster Mitigation Fund as deemed necessary from time to time by the state executive committee. For response purposes, Kerala utilises National Disaster Response Fund (NDRF) and State Disaster Response Fund (SDRF). The contribution pattern to SDRF is 90 per cent from Government of India and 10 per cent from Government of Kerala. The state draws its finances for institutional capacity development schemes from NDMA and UN organisations. Tsunami Rehabilitation Project was implemented with the support of multi-lateral agencies. Presently, Kerala is implementing National Cyclone Risk Mitigation Project with the financial support of World Bank.

Guidelines are in place for establishment of flexi-funds, that enables 10 per cent of the CSS schemes budget to be undertaken for disaster mitigation/restoration activities by the respective implementing agencies in the State, for DRM in the respective sectors. Kerala has already approached the 15th Finance Commission to strengthen its abilities in Disaster Risk Reduction. Kerala needs a coherent long-term investment plan and sustainable risk-financing mechanism to finance institutionalization and implementation of disaster-resilient measures in all investments across sectors. The State Government on approval of Government of India, may institute a 'disaster cess' on the Goods and Service Taxes (GST) for three years to finance rebuilding activities in Kerala.

Integrated disaster risk assessments, disaster management information system and operationalization of early warning system are needed for both pre-disaster and post-disas-

ter management. Central agencies should strengthen their monitoring and early hazard detection systems. Additional staff as recommended by the high-power committee may be sanctioned to KSDMA for strengthening its capacity. A wide range of equipment would be required to be installed by IMD, CWC, GSI and INCOIS for early detection of possible hazardous events. KSDMA, DDMA and responsible departments need additional last mile connectivity systems for communicating actionable directives to general public living in disaster-prone areas. Building the capacity of vulnerable communities and civil defence through nonstructural community-based DRM interventions, and raising the awareness of youth on DRM through educational institutions could play a vital role in reducing losses caused by disasters.

WAY FORWARD

The 2018 floods provided an opportunity for Kerala to accelerate implementation of priority actions and risks from Centrally-notified and State-notified disasters. The broad actions that may be undertaken are broadly detailed as follows:

RISK IDENTIFICATION AND TECHNICAL STUDIES

i). Landuse categorization studies.
ii). Comprehensive 1:10,000 scale land use mapping and terrain linked land use zoning.
iii). Detailed state wide vulnerability assessment of critical public infrastructure and assets to site/location specific hazards.
iv). Multi-hazard disaster risk mapping and impact assessments including hazard zoning and mapping high risk zones/urban areas based on protocols and methodologies laid by the concerned central agencies.
v). Establishment of last mile hazard communication systems and updation of existing SOPs for triggering preparedness and emergency response actions.
vi). Implementation of State-wide civil defense and capacity building for the civil defence volunteers.

RISK GOVERNANCE

i). Creation of a comprehensive risk informed land use plan, land use Act and rules considering the ecology, sociology, and social milieu of human being are important. This may be led by Department of Planning with the help of Land use Board and Kerala State Remote Sensing and Environment Centre. Government may issue a guiding document in the preparation of the land use plan.
ii). Restriction of use of forest land for any commercial or residential or further construction activity with the exception to the existing rights of the tribal communities living in the forest areas.
iii). Land Revenue Department may be notified as the implementing and enforcement authority of the Land use plan - a reorientation and renaming of the department as Land Administration and Management may also be considered.
iv). All urban local bodies may be directed to immediately approve and notify their master plans.
v). Improve design standards for basic public services taking into consideration the multi- hazard susceptibility, flooding extent of a 1 in 30 year return interval and landslide/land subsidence events.
vi). Consider amendments to Kerala Municipal Building Rules and Kerala Panchayath Building Rules in the light of National Building Code and IS Codes.
vii). Improve compliance of all new critical infrastructure projects to safer standards and

specifications, and apply third party structural and safety audits to ensure compliance.

viii). Increase the scope of vulnerability-linked relocation plan of the State and provide incentives to constructions that comply with safety standards and have considered site-specific hazard susceptibilities.

ix). Development of Emergency Action Plan and updating of Operational & Maintenance Manuals for Dams to facilitate improved dam management.

x). Formulation of a long-term Coastal Zone Disaster Mitigation Plan, a comprehensive Coastal Development funds package (as announced 2018-19 state budget) on a year-to-year basis for investments in coastal protection works/activities.

MITIGATION INFRASTRUCTURE AND MEASURES

i). Construction of multi-purpose emergency shelters and improved access to such shelters that are handed over to the communities with corpus fund for operation and maintenance.

ii). Contingency crop planning should be developed to deal with climate variations, to ensure sustainable livelihoods in areas of recurrent climate risks by promoting supplementary income generation.

iii). Popularize crop insurance schemes.

iv). Construct all new schools located in hazard-prone areas to higher standards of hazard resilience; retrofit schools in high risk zones to increase safety; carry out technical audit of private schools; direct and provide guidance for retrofitting measures.

v). Incorporate elements of Disaster Risk Reduction in all subjects from the subject specific perspective.

vi). Conduct vulnerability assessment of hospitals in hazard-prone areas, promote hazard resilient construction of new hospitals and create intrinsic and extrinsic disaster management plans for hospitals.

vii). Flood mitigation options to be considered/developed comprising major works which are to be evaluated in terms of their hydraulic efficacy in delivering the required degree of flood mitigation.

viii). Conduct vulnerability assessment of all critical public buildings and carryout necessary/appropriate mitigation measures to increase safety. Promote hazard-resilient construction of new buildings with conformity to National Building Code.

LANDSLIDES MANAGEMENT STRATEGY

i). Development of an integrated approach involving land use planning, good land management practices in cropping, grazing and forestry, terrain-dependant road construction, terracing and other contour-aligned practices in fields and plantations, and participation of local communities.

ii). Initiate major shift in land use policies demarcating certain areas as 'no development zones and construction-restricted zones'.

iii). Landslide hazard zonation maps to be made available in a scale (1:10,000 at least) appropriate for planning at local level for all Municipalities and Panchayats in the Hilly areas.

iv). Local Self Government may be directed to consult the Soil Conservation Department, Mining and Geology Department and Ground Water Department before implementing infrastructure development projects to assess landslide risks.

v). Promote the use of bio-engineering solutions along slopes to prevent landslides.

RESILIENCE IN URBAN AND RURAL DEVELOPMENT

The following specific interventions may be considered for building urban resilience in Kerala:

i).   Revise urban planning norms to conform with the hazard mapping and zoning mandatory as part of the city master plans and regulations to ensure compliance by local governments with the planning norms and guidelines.

ii). Develop a guiding/policy document for preparation of Master plans with negotiables and non-negotiables, with parameters for critical mass management for urban local bodies (ULB) eg. 600K to 800K population/ULB. The guidelines should also include identification of urban sprawl areas and measures to curtail the same be legalized in the Master plan for approval and enforcement.

iii). Develop design guidelines for climate resilient municipal infrastructure and ensuring proper enforcement for all the physical construction works to improve the quality of infrastructure being developed for municipal services.

BUILDING RESILIENCE

The new resilient Kerala may be based on six pillars of Disaster Risk Management, they being:

Pillar-1: Legalizing and enforcing a pragmatic land use management institutional mechanism.
Pillar-2: Mainstreaming disaster risk management into development planning.
Pillar-3: Improving emergency response systems.
Pillar-4: Creation of Civil Defence.
Pillar-5: Road map for risk financing.
Pillar-6: Strengthening KSDMA and DDMAs.

Detailed plans are being drawn in line with each of these broad pillars of resilience and the Government and KSDMA are committed to building a 'new and resilient Kerala'.

REBUILDING KERALA, POLICY CHOICES AND THE WAY FORWARD: DEVELOPING AN APPROACH

M. A. OOMMEN

Improving environmental quality, health service delivery, education and working towards an equitable inclusive society should attract priority in any rebuilding exercise.

The unprecedented floods during the month of August 2018 have exposed not only the vulnerability of Kerala, but the poor capability and preparedness to respond to such calamities and disasters. It was more a consequence of anthropocentric neglect and interventions than an act of god. This paper address the issue from the larger perspective of renewing and rebuilding Kerala.

For any purposeful rebuilding we have to identify both the strengths as well as the weaknesses. Kerala has a fascinating human development narrative that has given it a unique place in contemporary development literature. Equally sui-generis is its rich bio-diversity, acknowledged as one of the most valued resources on this globe. Its geographical landscape, accommodating 44 river systems, beautiful lagoons and lakes majestically walled off by the Western Ghats from which the rivers originate is home to a rare combination of flora and fauna in this planet. When the Communist Party ascended to power through the ballot box in 1957, riding the wave of a process of expanding public action and public reason that could fight the worst forms of caste-class iniquities, Kerala created a great history. The last sixty years also saw significant reforms like abolishing landlordism, universal literacy, affordable health care and decentralised people's plan for deepening democracy to mention the most prominent. It also saw during the last four decades a great wave of migration of labour and inflow of foreign remittances that led to a consumption-induced growth trajectory which ushered in an era of commodification of health, education and environment, its most valued public good. Social failures like widening inequalities, the marginalization of the most vulnerable sections of society, increase in the crime rate, atrocities against women and children, high magnitude of suicide rate, mounting road accidents, rent-seeking politics and so on

have been persistently ignored by the governments led by the United Democratic Front (UDF) and Left Democratic Front (LDF). An approach paper that will take into account the weaknesses and strengths to turn the challenge into a great opportunity should be the first step. This note raises some issues relevant in this context.

Antonio Gramsci famously said that politics means conscious action (praxis) in pursuit of a common goal. While adversarial politics is part of democratic practice, extremely divisive and polarizing approach which Kerala witnesses today is unhelpful in a rebuilding context. The state needs a 'Venn diagram' approach (see the illustration given)   which provides a common ground for taking the project to success.

Figure : 1
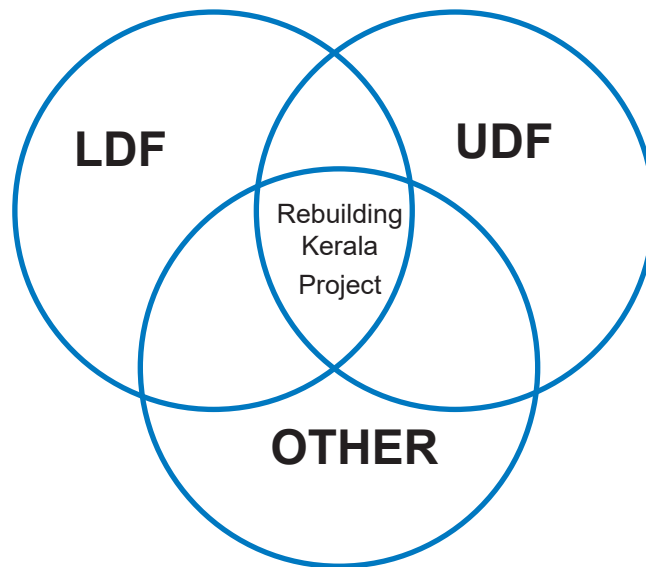
This demands high transparency guarantees. Transparency guarantees — "the freedom to deal with one another under guarantees of disclosure and lucidity", as Amartya Sen observes — have an instrumental role "in preventing corruption, financial irresponsibility and underhand dealings". Rent-seeking and growing disregard for the rule of law cannot be the basis for rebuilding.

Today Kerala is told, that it should recapture the spirit of renaissance. One needs to clarify this. I think it is discovering and rediscovering the essence of humanity which has been under a cloud in recent times.   Like the Enlightenment of Europe that threw up reason against religious fundamentalism, Narayana Guru brought out the significance of freedom for human beings who were suffering under caste-class unfreedoms. The moot question is whether Kerala will sink preconceived religious prejudices and political fundamentalism and proceed to persistently pursue a public sphere with public reason for the common good.

Local governments and decentralised planning system which only can rally the solidarity and voluntarism displayed   during the floods are the natural partners in the project of rebuilding. The third tier of governance in Kerala comprising nearly 22000 elected representatives have the legacy of an institutionalized multi-stage planning process of development and people's participation. What is wrong in making local government the epicentre of recovery and rebuilding?

 The current debates as well as the PDNA (Post-Disaster Needs Assessment)   report are silent on the challenging issue of urban governance in Kerala. Several problems of

Kerala arise out of the failure to address the issue of sprawling rural-urban continuum which saw 3.4 times increase in urban population in three decades. Urban Kerala has the highest monthly per capita consumption expenditure (MPCE) in India with accelerating demand for consumer durables and conspicuous consumption. This led to solid, liquid and electronic wastes which the PDNA report puts at 10044 tonnes per day. This is besides the colossal flood disaster debris that remains to be cleared. It is not difficult to revive the gram sabha spirit of the past as part of the rebuilding project. Section 55 of the Kerala Municipality Act 1994 provides for the creation of a state Development Council presided over by the Chief Minister with the Chief Secretary as convener and comprising all ministers and leaders of panchayats and municipalities. Both the UDF and the LDF have neglected this institution. Kerala is now on the threshold of a historic moment and the State Development Council can be made the umbrella organisation that will integrate the Nava Kerala Mission and the local governments to serve as the centre-piece of the rebuilding project. For community-led water management, for implementing disaster-resistant housing construction, for disaster management readiness and so on, the local government system should be significantly reoriented. The District Planning Committee (Article 243ZD) should be encouraged and empowered to draw up a new spatial and environment plan. If all the 14 districts fall in line, Kerala is on a rebuilding mission.

The overarching salience of a rebuilding project is to make Kerala a green state. Rebuilding a green economy cannot be done without understanding the havoc that has been done to the land-use pattern as well as to its beauty through indifferent policy choices and action. Reminiscent of Keats' line 'a thing of beauty is a joy forever', Kerala has to be consciously conserved, not just for tourists but for everyone. Human beings have to rely on Nature's resources for survival, but aggressive inroads invites its wrath like landslides (342 in August alone) and floods. The most striking trend in the land-use pattern and water management has been the sharp decline in the area under paddy cultivation from 35 per cent of the cropped area in 1960s to a low 7 per cent today. The rice cultivation in Kerala is done on a watershed basis which commands the highest environmental value per hectare in the world [Costanza, R etal (1997)]. The water scarcity that Kerala faces today is largely linked to paddy field reclamation. The natural flow of water and groundwater levels are seriously damaged. The PDNA report points out how land encroachment into space for rivers and water bodies of the wetland contributed to the reduced drainage of water from the system. Even the belatedly passed Kerala Conservation of Paddy Land and Wet Land Act (2008) did not make any serious progress, not much has happened except to ratify all illegal transgressions. Unless we realise that the quarrying, metal crushing and sand mining mafias (who could easily bend rules to their advantage) are endangering Kerala's eco-system, no meaningful land use and mining policy could be implemented. The Seventh Report of the Legislative Environment Committee (2014-16) regarding the working of the quarries declares the poor environmental management underway in Kerala where the fence tends to eat the crops. Placating vocal voter interests (as in throwing away the Gadgil Report) can never be the way to build common good and sustainable development. The PDNA recommendations for an integrated water resource management approach to build around the theme of the Dutch concept of creating more 'room for river' (which will mitigate flood risks) and 'making space for water' can be neglected only at the cost of rebuilding Kerala.

Several areas of Kerala which are vulnerable to erosion and flood should receive special attention in the rebuilding exercise, the most important being the coastal regions and the Kuttanad region which like Netherlands is way below sea level . The PDNA Report and Rajamony and Rakesh (2018) argue for a Master Plan for Kuttanad be dovetailed with the rebuilding project. The PDNA report has very useful suggestions for taking care of the coastal region.

Why the tribals and for that matter the historically marginalised remain neglected is a question that needs to be raised as part of the rebuilding project. Indeed, the disasters have brought into sharp focus once again the vulnerabilities of the poor in general as well as of the elderly, women, the transgenders and the disabled. Given Kerala's ageing phenomenon, the three million migrant labourers will have to be made a dignified part of Kerala's social life. Will Kerala see rebuilding as a great opportunity to put an end to the social exclusion through structural reforms and actions?

An accident-reducing road policy should be another priority of the rebuilding project. Kerala lost 433 precious lives in the floods of 2018. But you also cannot forget that during the year 2018 nearly 43,000 people were fatally injured and 4,800 persons died in road accidents. Kerala has already become insensitive to this type of mortality. The state needs a Road Reconstruction Policy that will reduce this everyday killing as part of the rebuilding project. Given the fact that hardly 1 per cent of passenger and cargo traffic pass through waterways, Kerala has to rejig its transportation policy.

To sectors that will engage top priorities are the health and education sectors which once has contributed to making Kerala an exemplar of development. The process of rebuilding requires a critique of the growing commercialisation of these sectors and identifying the areas that need correction and reorientation. Kerala cannot make any stable progress unless the quality of research in higher education including medical education is made comparable with the best in every field that counts.

Once the contours of the development strategies of the rebuilding project are outlined, an inevitable counterpart of this will be to have a financial plan, which will spell out the pattern of financing and the accountability mechanisms. The Government of Kerala (GoK) must come out with a white paper particularly because there are several off-budget projects that are launched and proposed to be launched. In what manner they will be integrated with the rebuilding programme needs to be made explicit. Already the budget for 2019-20 provides for a fiscal deficit of Rs 26,290.58 crore. Given the fact that there is a marked slippage from budget estimates this could even be larger. The moot question that comes up is whether we can raise the required resources to finance the rebuilding project. The answer is certainly in the affirmative.

The PDNA estimate for rebuilding for five years is placed at Rs 31,000 crore or Rs 6,200 crore per annum or Rs 4030 crore if we allow for beneficiary contributions and other private sources of financing. If we allow for a liberal 5 per cent inflation, the rebuilding cost for 2019-20 will work out to Rs 4,232 crore. For financing this, the annual contribution from the Chief Minister's Disaster Relief Fund (CMDRF) which is heading towards Rs 3,500 crore will be around Rs 700 crore or 16 per cent of the total size. This means 84 per cent of funds have to be raised from other sources including the budget. The utilisation of the National Disaster Response Fund, additional funds via Centrally-sponsored schemes, additional taxation notably via the 1 per cent cess on GST for the next two years, the magnitude of borrowing envisaged beyond Fiscal Responsibility and Budget Management (FRBM) ceilings including KIIFB (Kerala Infrastructure Investment Fund Board) funding through corporate social responsibility sources, World Bank, from Grameen Development Bank and so on have to be spelt out. The white paper has to spell out all these as part of public accountability. Not only that, it must critically review the fiscal management of the last decade and use it for evolving reform options. To illustrate, it is important to know that the State has seldom achieved many of the targets fixed in the Medium-term Fiscal Plan. There has been heavy tax revenue losses due to tax evasion and avoidance which could be easily estimated. The yawning gap between interest payments and pension payments since 2009-10 should be a serious concern to the State government. It is important to bring this to the notice of the civil servants as well

as to the public. Raising the retirement age to 60 years, suspending the five-year pay-revision commission, pruning wasteful expenditures and so on will have to be re-examined now. Persistent savings in Budget allocations and imprudent demand for supplementary grants are signs of poor fiscal management. That the State Disaster Management Authority which was constituted in 2011, utilised only a little over 43 per cent of the funds in the test-checked districts by the CAG from April 2012 through March 2017 shows the continued inefficiency of this institution which is mandated to ensure protective preparedness against disasters. The response of the administration to meet the challenges of the new governance system should be calibrated.

To conclude, this short paper that tries to bring home the need for developing an approach to rebuilding Kerala highlighting the major priority areas. To be sure, improving environmental quality, health service delivery, education, working towards an equitable inclusive society should attract priority in any rebuilding exercise. Piecemeal and ad hoc approach is good for repairing, but not for rebuilding.

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CAPACITY DEVELOPMENT FOR DISASTER RISK REDUCTION

KESHAV MOHAN

Theoretically, capacity development may focus on functional, technical, hard and soft domains enabling institutional framework, knowledge, leadership and attitudes.

The Hyogo Framework for Action (2005-2015) captioned 'Building the Resilience of Nations and Communities to Disasters (HFA)' had been considered as the first plan to explain and detail the work that was required from all sectors and actors for minimizing disaster losses. The HFA highlighted significance of Capacity Development (CD) through the pronouncement that: "Capacity-development is a central strategy for reducing disaster risk. Capacity development is needed to build and maintain the ability of people, organizations and societies to manage their risks successfully themselves. This requires not only training and specialized technical assistance, but also the strengthening of the capacities of communities and individuals to recognize and reduce risks in their localities. It includes sustainable technology transfer, information exchange, network development, management skills, professional linkages and other resources. Capacity development needs to be sustained through institutions that support capacity-building and capacity maintenance as permanent ongoing objectives".

It can be seen that the HFA was holistic and inclusive in nature. Capacity Development is essentially the combination of all the strengths, attributes and resources available within an organization, community or society to manage and reduce disaster risks and strengthen resilience. Capacity development is the process by which people, organizations and society systematically stimulate and develop their capacities over time to achieve social and economic goals, including through the improvement of knowledge, skills, systems and institutions.

The Sendai framework for Actions (2015-30) has a set of goals enshrined 'A Vision of Risk-Informed Sustainable Development by 2030'. The Sendai Framework for Disaster Risk Reduction seeks to establish among all stakeholders a common understanding of capacity development within the disaster risk reduction (DRR) context. The strategic ap-

proach is to empower all the relevant partners and stakeholders through providing inputs for the development needs with a broad understanding of obstacles and constraints, and focusing on key principles, elements and actions, which together could strengthen the planning, formulations and execution of DRR actions.

The Sendai Framework for Disaster Risk Reduction (DRR) puts forward four priorities for action to develop capacities to prevent new disasters and reduce existing disaster risks. They are (i) Understanding disaster risk; (ii) Strengthening disaster risk governance to manage disaster risk; (iii) Investing in disaster reduction for resilience and; (iv) Enhancing disaster preparedness for effective response, and to "Build Back Better" in recovery, rehabilitation and reconstruction. The Sendai Framework is a clear understanding of where we need to go to achieve meaningful disaster resilience. The question that remains is: Do we have the capacity – the knowledge, skills, and resources - to make that happen?

Figure: 1
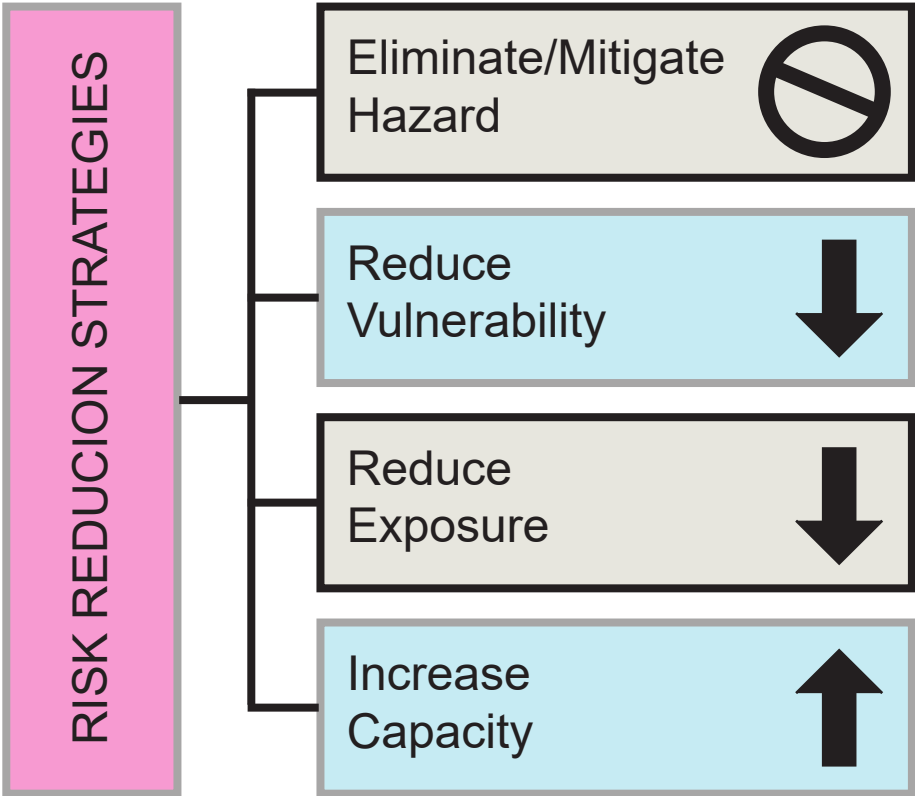
Twenty five years after UN member-states adopted the International Decade for Natural Disaster Reduction (IDNDR) and fourteen years after the adoption of the HFA, the global disaster risk count has been considerably reduced. However, the progress was not in any way significantly impressive for the low and middle-income countries which still remain highly

vulnerable. Improvements in disaster management have led to dramatic reductions in mortality rates in some countries. However economic losses were on an average $250 - $300 billion each year [UNISDR, 2015] and the year 2018 recorded a total economic loss of $107.7 billion at the global level. Despite concerted efforts, growing urbanization, persistent social and financial inequality, unethical and unscientific investments in hazard prone areas and the threatening climate change have put many countries under stress towards controlling or reducing hazard risks.

 In this background, the Sendai Framework for Disaster Risk Reduction envisages all-inclusive 'safer state' approach and recognizes the State's primary role in facilitating the achievement of its disaster risk reduction (DRR) goals and priorities for the period 2015 – 2030. Disaster risk management is a challenge faced by all the stakeholders, not just by a nation or a local disaster management authority or a civil protection office. A 2016 report describing World Bank's risk-related activities found that, "despite the level of investment (in boosting the capacity of developing countries to better understand emerging disaster risks, reduce their vulnerabilities to natural hazards, and adapt to climate change, capacity [development] is often considered secondary to larger activities" and that "there is little systemic knowledge about the effectiveness and long-term impact of capacity [development] activities…… within the broader disaster risk management (DRM) community".

Theoretically, capacity development (CD) may focus on functional, technical, hard and soft domains enabling institutional framework, knowledge, leadership and attitudes. Understanding risk focuses on the knowledge domain of disaster risk in all aspects, including exposure, vulnerability, mechanisms for likelihood or consequence reduction, among others. Therefore hazard identification and risk zonations aim at technical capabilities of functionaries and communities. Some of the action areas are critically analyzed below.

ACTION AREA – 1 : RISK INFORMATION

Risk information is a very vital component of capacity development. Information on all relevant aspects needs to be accessible and freely available to those who seek it because in this information era, right information at the right time determines the capacity. As per Sendai framework of actions, risk information may be integrated into the planning process for meaningful and inclusive realization of DRR.

Achievement: Kerala State Disaster Management Authority (SDMA) had brought out a natural hazard zonation map to a scale that is useful to administrators and public down to the village level. This information tool aims at capacity development on technical domains. The Institute of Climate Change Studies, Government of Kerala (GoK) initiated a massive programme aimed at incorporating Climate Change Disaster Risks in the planning processes of Local Self-Governments (LSGs) through training people's representatives and functionaries. The DM centre of Institute of Land & Disaster Management have made good progress in developing manpower for DRR. These are some of the efforts towards inclusive functional capacity development of important stakeholders.

Lacunae: Information has been confined to a few who treat it as their monopoly. Therefore, dissemination of the information is low and it is seldom put into practice in almost all levels. Although training programmes attract the interest of participants and beneficiary stakeholders, they are mostly inconsistent and out of focus.

ACTION AREA - 2 : FUNDING

Funding and other resources have been identified as one of the greatest challenges to capacity development for DRR efforts. In fact, DRR eventually represents an investment in the protection of development gains. Disasters cause human suffering, environmental and economic damage and will hamper the work on eliminating poverty. Disaster Risk Reduction is a worthy investment for ensuring sustainability of economic development. Every dollar spent on reducing vulnerability saves seven dollars of economic losses in disasters. Identifying and innovating adequate funding mechanisms for DRR needs special attention. The Sendai Framework asserts that among the lessons learnt from the implementation of its predecessor, the Hyogo Framework for Action 2005-2015 (HFA), investment in DRR is cost-effective in terms of prevented future losses. Indeed, over the same 10-year timeframe as the HFA, the total economic loss was more than $1.3 trillion. Stakeholders must have a collective and common understanding and trust in the value proposition of DRR investments. Knowledge of the true economic costs of disasters and their negative impact on development play a key role in making such an understanding possible and ensuring that public and private investments are risk-informed.

Achievement: In the state of Kerala it is mandatory for all the key departments to prepare Disaster Management Policy (DMP) in line with State Disaster Management Policy (SDMP). The Finance Commission of India provides provisions of support for generic and specific sectors in DRR and makes financial allocations. The national policy envisages mainstreaming funding to support capacity development for DRR into sectoral budgets such as the carbon tax and green incentives. The Kerala State Disaster Management policy also encourages proposals for mainstreaming CD for DRR into sectoral budgets.

Lacunae: Most of the stakeholder departments and LSGs do not make prudent proposals for CD for DRR in its budget demands and the mindset towards this domain is of low enthusiasm.

ACTION AREA - 3 : UNDERSTANDING & INTEGRATING CLIMATE RISK

Understanding & Integrating Climate Risk in all sectors and plans that addresses the interlinked challenges of disaster risk, sustainable development and climate change are core priorities in the scenario that 90 per cent of recorded major disasters caused by natural hazards from 1995 to 2015 were linked to climate and weather including floods, storms, heat waves and droughts. The five countries hit by the highest number of climate- related natural disasters were: United States (472), China (441), India (288), Philippines (274), and Indonesia, (163). Margareta Washistrom of UN commented that "Unless we act now, we will see more and more disasters due to unplanned urbanization and environmental degradation. Weather-related disasters are sure to rise in the future, due to factors that include climate change."

Achievement: Government of India redesignated the Ministry of Environment and Forests (MoEF) to Ministry of Environment, Forest and Climate Change (MoEFCC) and approved National Action Plan for Climate Change (NAPCC). It also announced several missions to combat climate change disaster risks in the wake of global initiatives. The Kerala Government has also formed a separate department for Environment & Climate change. It has also set up Institute of Climate Change Studies as a knowledge arm of DoECC. Kerala has drafted specific State Action Plan for Climate Change on the lines of NAPCC and got it approved by the MoEFCC.

Lacunae: While the need for integration was well-recognized, it was found that "functional links in policy and practice remain inadequate at the local and national levels. Fostering coherence and collaboration across national and regional mechanisms and institutions is of high importance but remains critically challenged.

ACTION AREA – 4: INSTITUTIONALIZING DISASTER RISK REDUCTION CAPACITY

During the Third UN World Conference on Disaster Risk Reduction, member-states with a renewed sense of urgency reiterated their commitment to addressing DRR and building resilience to disasters within the context of sustainable development and poverty eradication. It emphasized integration of both DRR and building resilience into policies, plans, programmes and budgets at all levels and within relevant frameworks. The development of the capacity to fully understand these critical inter-linkages and also to act to integrate their policies at every level of governance and among all stakeholders, is therefore considered as a matter of top priority.

Achievement: India has developed institutional capacity in terms of setting up of National Disaster Management Agency and National Institute of Disaster Management under the Union Ministry of Home Affairs. Kerala has also set up an institutional framework in the area of disaster management that extends up to the level of district administration. Disaster Management Centre is the knowledge arm of disaster management in the state.

Lacunae: The institutional framework on DRR is not functional at the level of villages. It is observed that the disaster management plan at the district level is not being updated. The knowledge arm of DM also faces the problem of financial constraints.

ACTION AREA – 5 : CONDUCTING EFFECTIVE RISK COMMUNICATION & KNOWLEDGE MANAGEMENT

The Sendai framework for Disaster Risk Reduction suggests improvements on how nations could manage disaster information before, during, and after disasters. It highlights the importance of emergency communication mechanisms, participatory processes for developing communications systems, and increased use of community, traditional, indigenous and local knowledge to achieve risk reduction. Effective knowledge management and risk communication are critical for capacity development.

Achievement: Despite challenges, governments and societies are taking steps to increase their information-sharing capacities. The National and State governments have achieved considerable strength in risk communication network.

Lacunae: Risk research is vital for area-specific knowledge generation. However, risk research is not given any priority and this affects risk governance adversely.

ACTION AREA – 6 : ESTABLISHING AN 'ALL-OF-SOCIETY' INCLUSIVE APPROACH

The role of community-level engagement has been articulated throughout the Sendai framework. Inclusive and all-of-society disaster risk management strategies which strengthen synergies across groups, are advocated under the framework. The frame-

work also highlights the need to address the concerns of women, children, persons with disabilities, old persons, indigenous peoples and migrants during and after disasters.

Figure: 2

Achievement: The Disaster Management Centre in Kerala has been successful in conducting DRR training sessions for students, teachers, volunteers, NGOs, residents associations, critically challenged persons and the public as well. A large number of people have been trained by the DM centre with grants- in-aid from the Finance Commission of India.

Lacunae: It can be seen that despite the large number of training sessions conducted by the DM centre, the state or district administration do not readily possess trained manpower for locally managing disasters. The training packages do not address any specific vulnerable community so that it is capacity-ready. There is also lack of continuity in ensuring community involvement in DRR.

CONCLUSION

The Sendai framework of Actions highlights that disaster risk reduction and management depends on good coordination mechanisms within and across all sectors including public institutions at the national and local levels   to ensure mutual outreach and partnership in roles, responsibilities and accountability. Transforming Our World: 2030 Agenda for Sustainable Development , the Sendai Framework for Disaster Risk Reduction, the Paris Agreement on Climate Change, the New Urban Agenda, the Addis Ababa Action Agenda, and the SAMOA Pathway for Small Island Developing States (SIDS) provide integral and ambitious set of action plans for countries, the UN system, and for all other development actors. Understanding of these inter-linkages among key decision-makers is important for mainstreaming DRR into all development planning and investment. DRR policies and action plans for Ministers, parliamentarians, legislators, national and local decision-makers are critically   needed.

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A DISASTER PREPAREDNESS PROGRAMME FOR KERALA

B. EKBAL

Disaster preparedness is most effective when built into the process of local-level development planning and implementation.

Kerala went through the worst-ever floods in history since 1924 during August 2018. It is estimated that at least one-sixth of the State's population ie 5.6 million, were affected. The flood-related loss of lives, livelihoods, property and infrastructure were catastrophic. We can be proud that Kerala rose up to the challenge to mitigate the adverse effects of the flood. At all levels, the people at large, civil society movements, and the government joined hands to initiate and execute a unique people-driven and community-oriented attempt to rescue, recover and rebuild Kerala.

While lauding the positive response to the flood havoc and its after-effects, many problems we faced during the recovery phase have once again brought to the fore the need for a comprehensive disaster preparedness programme for Kerala. This was pointed out as early as in 2000 when eight south-central districts of Kerala along with Coimbatore and Theni in Tamil Nadu, experienced earth tremors of moderate intensity. Meanwhile, Kerala was declared as a Multiple Hazard-Prone state and Thiruvananthapuram, Kochi and Kozhikode were listed as earthquake-prone cities in the country. Since then a Disaster Management Policy and the draft of a Disaster Management Act have been formulated by the Government and several steps have been taken to address the issue. However, the flood and factors that led to the flood and the massive losses that followed points to the fact that our disaster-preparedness set-up is inadequate to handle such major calamities.

India is one of the world's major natural and human-made theatres of disasters. It offers a classic case study of the nexus among nature, poverty and extremely bad (and often, the lack of) policies. Disasters occur here on a colossal scale. On an average, they affect over 56 million people and kill more than 5000 people every year. According to National Centre for Disaster Management, New Delhi, while floods hit over 11.2 per cent of India's total land area, about 28 per cent

of the total cultivable area is drought-prone. Of the 7,516 km coastline, high-velocity killer cyclones often strike the east-coast states of Odisha and Andhra Pradesh.

Human-made disasters too are not rare here. Communal and caste riots have punctuated India's recent history. India has 30 million people displaced within the country as a result of riots, militancy, disasters and, ironically, large 'development projects.' Conflicts in India's neighbourhood have offloaded about 240,000 refugees on us.

Fortunately, Kerala didn't bear the brunt of these disasters in the past. But the 2018 flood, 2004 tsunami and Ockhi cyclone of 2017 that hit the Kerala's sea coast highlights the need for immediate attention from all quarters. The essence of any successful disaster management programme is in developing a plan that could be implemented by an informed and alert populace which alone can reduce the casualties, mortality and destruction. This is possible only by having a people-centric disaster-preparedness programme in place well before disasters strike. Translated into action, this means the evolution of a people-based decentralised disaster-preparedness programme and action plan with the active involvement of people from various walks of life.

As documented in other parts of India and elsewhere in the world, the poor suffer the most during disasters. Recent studies of natural and human-made disasters point out that more than chance; it is the socio-political factors that push a section of people to bear the brunt of the disasters. The Human Development Report 1998 noted: "The poor are forced to deplete resources to survive; this degradation of the environment further impoverishes them. When this downward spiral becomes extreme, they are forced to move to ecologically fragile lands." Half of the world's poorest - over 500 million - live in marginal lands, drought-smacked uplands, flood-prone deltas and right at the edge of storm-subject seas. The UN's International Decade for Natural Disasters Reduction activities in India has spawned some efforts towards disaster reduction. But to optimise the results of such initiatives, it is important to have a comprehensive disaster management policy.

The situation calls for a state-level disaster management and response policy. Kerala, a state that has been able to demonstrate its capacity to achieve human development, can demonstrate a policy that is essentially based on perspectives of rights and equity. The much-discussed 'Kerala model of health care' may give some clues about the spirit and strategy one may have to follow in the case of disasters as well.

The objective of any disaster policy should be to shift relief and rehabilitation to a development mode, involving the people at risk and the affected communities as stakeholders. A multi-sectoral approach involving the government, Local Self- Government Institutions, Civil Society Organisations, academics, media and the affected communities, is perhaps the first step.

Preparedness is most effective when built into the process of local-level development planning and implementation. Adopting this route will help implement disaster mitigation at minimal cost in the long run. Simply put, it calls for carefully-planned roads and railway tracks, proper drainage systems, flood-proof bridges, community buildings, quake-proof housing, etc. Expenditure on such infrastructure would more than compensate itself in human and material terms over time.

It is crucial to understand the inter-linkages of disasters - both natural and human-made. Forced migration and even a large-scale movement of people in a pilgrimage to holy places may lead to an epidemic. Drought can lead to prolonged malnutrition, especially among children. Cross-studies must have an inclusive approach. It may be reiterated

here that those who face the risk must have a role in the formulation of policies. It must be based on their experiences and needs, rather than something thrust top down. The experience of Kerala in formulating and implementing the latest decentralised plan could serve as a role model. For community-preparedness to be in place, people must have access to information on disaster-prone areas, industries and activities in their habitat. The National and State Human Rights Commissions can monitor to what extent the rights of affected people (and disaster-prone communities) are protected by government and non-governmental interventions.

An overall development policy incorporating disaster response entails drastic changes in several related policies. Welfare schemes of the government departments and local bodies have to be sensitive to the felt needs of the people. Inclusion of the needs of the vulnerable sections, like fisherfolk in cyclone-prone coastal areas, should be made mandatory. A 'disaster risk audit' and resource mapping would yield synergic results. Open disaster-impact studies should be mandatory before mega-projects are commissioned.

It may be necessary to acknowledge and channelise initiatives of community-based movements that provide rescue/relief services during post-disaster scenarios. The challenge is to enthuse them to take up pre-disaster preparedness activities. Local 'rapid rescue and response forces' involving the community, local bodies and government departments will help to minimise the casualty figures. It is high time we include disaster preparedness in the academic curricula straight from schools onwards.

Though the media in general has reported the events during the 2018 floods responsibly and with restraint, it is to be reiterated that what is expected from the media during such events is not only objective reporting and providing warning signals, but also instilling confidence among the people at large to handle the situation. An effective early warning system, supported by a communications strategy through electronic media, social networks, radio, TV and other media has to be developed. An enlightened population can preclude both panic responses and passive acceptance. When Kerala plans for a disaster response programme, the key challenge for it is to empower the vulnerable sections of society. At first, it must be recognised that such a disaster preparedness plan (that includes humanitarian assistance in a post-disaster situation) is the right of the communities at risk, not an act of charity.

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TOWARDS DISASTER RISK REDUCTION IN KERALA: THE WAY AHEAD

N. VINOD CHANDRA MENON

Disaster Risk Reduction (DRR) must become a part of a culture of development planning at the state, district, taluk, grama panchayat and village-levels.

During the last monsoon season in 2018, Kerala faced catastrophic floods and landslides from August 8, due to a sudden climatic change. The State had witnessed a similar situation only in 1924, when Kerala had only a single dam - Mullaperiyar. The intensity of the floods in 2018 reportedly increased after the shutters of all the dams in Kerala were opened as the water-levels in dams had already reached dangerous levels by August 15, 2018.

2018 FLOODS - CAUSES AND IMPACT

Inadequate surveillance of water-levels in dams and rivers with the help of sensors, lack of effective coordination among agencies responsible for monitoring water-levels in dams, inadequate triangulation on reservoir-levels and inflow into the dams, absence of forecasts and 'nowcasting', not following priority concerns of power generation by hydro-electric dams and neglect of rule curves and management plans have all been found as the critical flaws that led to the cascading effect of floods and landslides. There is urgent need for introducing effective coordination mechanisms through an inclusive approach. In Independent India, no other State has ever witnessed all the districts in a state facing a 'Red Alert' issued by the Indian Meteorological Department (IMD), as was seen at 1.30 p.m. on August 15, 2018, in Kerala.

The following table indicates the unprecedented heavy rainfall during the month of August 2018. The excess rain, during these days, created stress on the dams in Kerala, that were already facing High Flood Risk-levels, forcing the authorities concerned to take a decision to release the water from the dams.

RAINFALL	August 8 to 15, 2018	August 16, 2018	August 17, 2018
Excess Rain	255 per cent	915 per cent	424 per cent
Normal Rain	98.44 mm	13.5 mm	14.5 mm
Actual Rain	349.7 mm	137 mm	76 mm

As the damage and loss caused to infrastructure, assets and amenities in the State are likely to exceed the expenditure from the annual Development Plan Budget allocation of the Government of Kerala, the State Government is facing a major challenge in finding resources to aid the rebuilding strategy. The rehabilitation, reconstruction and recovery work may extend across the tenure of this government and the succeeding governments. Undoubtedly, several bottlenecks will be faced in the reconstruction of houses damaged by the floods and rehabilitation of flood-affected communities. The delay in restoration of damaged infrastructure and livelihood of the people in the affected areas will be a major issue in days to come. The impact of the disaster can be seen in the 82,000 km of damaged panchayat roads, 14,000 km of damaged PWD roads and 221 broken bridges spread across the State. Crops in 52,000 hectares were also destroyed in the floods and power supply, water supply, telecommunication infrastructure were all severely affected. Water in the wells got contaminated with flood water and overflowing septic tanks. There has been considerable loss of life and disruption of livelihood. However, the floods and landslides in Kerala witnessed the people in Kerala coming together to help the affected people with overwhelming compassion and offering selfless service.

The origin of the floods and landslides in Kerala can be traced back to various factors like deforestation; unchecked growth of commercial plantations and monoculture; indiscriminate quarrying and stone cutting, often using explosives; sand mining from rivers; unauthorised construction in eco-sensitive areas; sediment, silt and debris deposits in rivers; construction of dams and check dams; encroachment and diversion of wetlands; lack of drainage facilities and inadequate provision for solid waste management.

In one of the largest rescue operations during the floods, 40 helicopters, 31 aircraft, 182 rescue teams, 18 medical teams of Armed forces, 58 teams of NDRF and seven companies of Central Reserve Police forces were pressed into service, along with over 500 boats with necessary rescue equipment. According to the government's estimate, a total of 4,537 fishermen participated in the rescue operations with 669 fishing boats. They managed to rescue more than 65,000 marooned people in the worst-affected areas in various districts.

It has been reported that 63 lakh Kudumbashree members contributed Rs 11 crore to the Chief Minister's Distress Relief Fund (CMDRF). A total of 1,36,885 Kudumbashree volunteers cleaned up 76,285 houses and 2,165 public buildings and 1,773 flood-affected families were rehabilitated by Kudumbashree members in their own houses. Kudumbashree Constructions, with their all-women team, built 70 houses and are planning to construct 700 houses for the families, whose houses were destroyed by the floods.

RECONSTRUCTION CHALLENGES

The reconstruction challenges include the need to analyse Land Use Plan Maps, Flood Inundation Maps and Landslide Maps in the worst-affected districts. Study of geo-morphology and hydro-morphology in the flood and landslide-affected areas are essential. Studies also needs to be done on subsidence, soil piping, fissures, liquefaction, chang-

ing course of rivers and other trends in the flood and landslide-affected areas. There is also need to explore relocation possibilities and cluster housing options in land scarce situations.

There is also an urgency to shift from dependence on supply- driven solutions to demand-driven solutions through multi-stakeholder engagement and consultations, especially with disaster-affected communities. There needs to be a shift from reliance on structural engineering solutions to increased acceptance of social engineering approaches through consensus-building with disaster-affected communities. The need for review of land use maps, flood inundation maps, landslide maps and analysis of geo-morphology, hydro-morphology, satellite imagery and remote sensing, susceptibility and slope stability analysis for considering the approvals for rebuilding of destroyed and damaged houses have been increasingly felt while taking up the task of rebuilding damaged houses.

While developing the blueprint for 'Nava Keralam', the disaster-prone communities must be at the centre-stage in community-led plan formulation, design, development, implementation and monitoring. Disaster Risk Reduction (DRR), Climate Change Adaptation (CCA) and Sustainable Development Goals (SDGs) must drive development planning at the local- level. Special attention needs to be given to the marginalised and weaker sections, elderly, differently-abled people, palliative care patients, etc. Rainwater harvesting must be made mandatory for all new houses constructed in Kerala. Solar panels for individual houses and micro grids at the local-levels with a possibility to sell saved surplus energy to the KSEB, must also be considered. Buildings of all new public institutions such as hospitals, health centres, schools, anganwadis, etc. must be made friendly to physically challenged. In coastal areas, mangrove plantations must be promoted with the support of local Panchayati Raj institutions. Appropriate solid waste management solutions must also be adopted by urban local bodies and Panchayati raj institutions through a multi-stakeholder engagement and inclusive consultative process.

THE WAY AHEAD

The 2011 Census enumerated 104 million elderly people in Kerala, 71 per cent of whom live in rural areas. The elderly people account for 12 per cent of Kerala's population. It has been reported that 61 per cent of the women above 60 years are widows. The number of physically challenged persons in Kerala has been enumerated at 7,62,000. Out of Kerala's population of 3.34 crore, 30.4 lakh belong to Scheduled Castes (51 per cent of whom are female), comprising 9.1 per cent of the population, and 4.85 lakh are Scheduled Tribes (51 per cent of whom are female) constituting 1.45 per cent of the State's population. Even though the Government of Kerala had taken up several progressive steps to improve the quality of life of the people of the state, there is an urgent need to address threats to mental health of vulnerable sections of the population, especially transgenders, elderly people, those who are physically challenged and those under palliative care. Out of around 25,000 transgenders in Kerala, there are 1,187 who are physically challenged and might need appropriate support system to ensure that they do not suffer from the adverse impact of their handicap and transgender status. It is a matter of concern that 32 per cent of the transgender population in Kerala attempted suicide because of such miserable situations they face. This highlights the need for paying attention to social protection of vulnerable sections in Kerala.

The foundation of 'Nava Keralam' must be rooted on eco-friendly sustainable development, organic agriculture, protecting endangered bio-diversity in Western Ghats in Kerala, strict enforcement of building by-laws and development control regulations, use of techniques for monitoring water reservoir-levels, proper rainfall forecasts and nowcast-

ing and mechanisms for improving coordination among the Central Water Commission (CWC), Indian Meteorological Department(IMD), Kerala State Electricity Board (KSEB), Kerala State Disaster Management Authority (KSDMA), Kerala Dam Safety Authority and Kerala Coastal Zone Management Authority and other relevant central and state government agencies.

The Department of Water Resources and the Department of Irrigation as well as institutions such as the Kerala Dam Safety Authority and the Kerala State Electricity Board need to learn from this experience of the 2018 floods and take corrective steps to prepare management plans and train the officials concerned to take informed decisions about releasing water from the dams, without waiting for such crisis situations to develop. In the flood affected grama panchayats and urban local bodies, special efforts must be made to mark the highest flood-levels at some prominent place in the locality so that the people in the area will be alerted while making decisions on constructing public buildings, private houses, infrastructure and assets.

Disaster Risk Reduction (DRR) must become a part of a culture of development planning at the state, district, taluk, grama panchayat and village-levels. DRR has to be mainstreamed in development planning. Comprehensive multi-hazard risk assessment has to be carried out at various levels to make sure that development planning address disaster risks and vulnerability. The increasing frequency and adverse impact of hydro-meteorological disasters indicate that natural resource management must receive adequate attention in the planning process. Risk identification, through risk assessment, must be followed by the review of risk remediation and risk reduction options. An appropriate risk reduction intervention should be done by incorporating it in the development planning process. Many of the risk reduction interventions will have to be carried out in phases, spread across several financial years.

Special efforts must be made to seek the guidance of geologists, civil engineers, structural engineers, geo-technical engineers and hydrologists to assist the District Collectors in identifying villages and settlements which may have to be relocated based on fissures, subsidence, debris flows, landslide history, drainage pattern and other relevant parameters. Floods and landslides in the State have provided an opportunity for rebuilding a better, safer and disaster-resilient Kerala.

LESSONS LEARNT FOR DISASTER RISK REDUCTION IN FUTURE

G. VIJAYARAGHAVAN

If one looks at the work done by the NGOs/ CSOs, it can be found that they have done more valuable work than what the government agencies together have done so far.

The most inspiring factor that emerged during the 2018 Kerala floods was the display of solidarity wherein several people worked collectively to help those in need during the rescue and relief operations. During the 2018 floods, we saw groups of civil society working together in various areas. We should remember that the entire operations were done in the initial stages without the government incurring any expenditure. The rescue and relief operations, involved the Indian Navy, Army and Air Force units, government machinery, coastal fishermen and large numbers of youth volunteers. This was a clear reflection of the commitment of various groups, especially the youth to the society. It should be recollected here that the first truck loads of relief material were those that left the Sri Moolam Club at Trivandrum which was the hub of social volunteering by all sections of society, notable were the efforts of employees of Technopark Companies (people who are generally referred to as techies and who many people believe have no social commitment). In a way the floods showed that these young people though not active in conventional political or social groups are socially very committed.

ADDRESSING FUTURE CHALLENGES

It will be good if we work out a structure for voluntary rescue and relief operations. At first, we need to create a core group of volunteers across the state, who should not be paid any remuneration. It should be a purely volunteer group. If we pay them, they no longer will be volunteers. Their return is the satisfaction that they get in being trained as potential rescuers.

Even if we may not face any major disasters during the next 10 years, the core group of volunteers should continue. They should have regular training. The government needs to spend on training programmes to acquire the services of

experts. That would help develop a very strong voluntary core. The voluntary core is something very similar to those existing in many countries where they are a part of re-serve force of the Army and where they are not paid anything extra. In the event of an emergency, they can be summoned. Although these people are given regular training, the government need not pay anything to meet their expenses. If they work with any organization, the organisation can give them seven days of paid duty leave per annum as a mark of its social commitment. Ranks can be created within such a core. Thus setting up a voluntary core will ensure that the group is readily available. Formation of such groups should start from the ward level. Thus we will have a few trained people in every ward of each panchayat. Such groups in different panchayats will constitute a larger group at the block level and then at the district level. Since the trained volunteers are not given any kind of remuneration, it will not become a 'project' of any political party.

KEY LESSONS

During the floods, the spirit of oneness was clearly visible. There was reasonably good coordination in supplying relief materials to the flood affected areas. During the im-mediate aftermath of the floods, volunteers engaged in relief work were found to act in unison irrespective of their job or status. The strong support of people, especially the youth for relief efforts gives room for optimism. The state is in safe hands of the younger generation. A general perception about the young people, particularly those working in IT sector companies was that they lacked any social commitment. This perception has now changed as one found a lot of young people in the forefront of relief and rescue work during the floods.

In the initial stages, the process of distribution of relief material went well. However, af-ter a while there arose allegations of some undeserving people also benefitting from the relief materials supplied. Further, a few political groups allegedly involved in certain un-acceptable acts during the relief operations. Some saw the flood situation as an oppor-tunity to gain political mileage. Workers of some political parties allegedly stopped the trucks carrying relief material and pasted their stickers on the vehicles. Stray incidents were also reported like taking vehicles carrying relief material by force to relief camps which certain groups preferred. The Government should work out a clear mechanism in order to make sure that such incidents never happen in the event of any disasters in future.

No delay should happen in the rebuilding of the flood-devastated regions of the state. Al-though some houses have been built for those who lost their houses in the floods, these were built with the support of individuals and organisations. It is unfortunate that the state government has not yet been actively involved in the rebuilding phase. This could greatly delay the rebuilding of the state. But, it has also to be mentioned that some MLAs have given commendable leadership and initiative in the rescue, relief and rebuilding operations.

ROLE OF SOCIAL MEDIA DURING FLOODS

Social media played a very positive role during the Kerala floods. But, there were also some social media contents which were misleading and lacking in authenticity. In fu-ture, the state should have registered agencies of the government from which one can get authentic information. For instance, the government can think of entrusting a single approved news agency for people residing in a particular area/ river basin. During any disaster, there should be a trusted agency to give authentic information on latest weather forecasts, likely rainfall, flood threats and the like. The authorities should also develop a

centre for responding to messages and distress calls. There should be competent people to monitor it also. Although the impact of social media during the floods was high, it was largely unorganised. In many places, there were glaring gaps in conveying information which at times created misunderstandings and disinformation. Social media groups like 'Anbodu Trivandrum' functioned very well during the flood relief work. It had coordinated with different agencies involved in the rescue work including the Indian Navy. During the floods, messages seeking help coming into a few social media groups were passed on to a person who would then verify whether a flood victim was already rescued or not. This setup worked very efficiently in many cases. There was 'some order in the confusion' in the functioning of social media during the floods. The collective strength of the social media was really great during a time when the rescue and relief operations were mostly outside the control of government and politicians.

It is the government which should play a key role in the rehabilitation and reconstruction work. However, in many cases, the affected people themselves had to take the initiative. For instance, people in several areas of Kuttanad, which was one of the worst affected, on realizing they were facing acute drinking water shortage took the initiative to make available water tanks and water purifiers without waiting for the help from the government. Many NGOs/CSOs helped in the rehabilitation and rebuilding operations very effectively. Several flood damaged schools were also rebuilt in this way. If one looks at the work done by the NGOs/CSOs, it can be found that they have done more valuable work than what the government agencies together have done so far.

Civil Society Organisations (CSOs) should have more responsibility in protecting the environment. One should avoid building houses in ecologically fragile places and same is the case with avoiding use of plastic as it harms the environment. People should understand that if you don't treat Nature with dignity, it could only respond with unpleasant consequences.

NEED FOR TRANSPARENCY

The government has a feeling that everything they do is right and that their failures will not get attention. People contributed substantially to the Chief Minister's Distress Relief Fund. The government has the responsibility to inform the people how the money collected for flood relief is being utilised. Care should be taken to avoid misappropriation and diversion of relief funds. Transparency and accountability of the government are very important for making disaster risk reduction initiatives effective and efficient.

REBUILDING A BETTER KERALA

MATHEW T. THOMAS

We cannot remain complacent by saying that this kind of extremely heavy rainfall occurs only once in a century.

The 2018 Kerala floods was an unprecedented disaster for the present generation of the people of Kerala. The rescue and relief operations in the aftermath of the floods had been successful and the focus should now be on rebuilding the state in the wake of havoc caused by the floods. It is imperative that the people of the state learn lessons from the experiences encountered during the 2018 floods and incorporate them in chalking out a new model to build a better Kerala.

RESCUE AND RELIEF OPERATIONS

Looking back, the rescue operations were carried out in an exemplary way in all parts of the state. The rescue operations could be effectively managed in the early days of the floods only because of the active involvement of all sections of society, especially of the local people and the coastal fisherfolk. It was the local people who acted much before the government in the task of arranging the relief materials for the flood-affected people in the relief camps. The active participation of the local people and the authorities was indeed amazing. The authorities of various grama panchayats also played a remarkable role in the flood rescue operations.

The District Collector of Pathanamthitta and the Deputy Inspector General of Police (DIG) took great initiative in securing the assistance from the fishermen for carrying out the rescue operations. The Collectors from Kollam and Thiruvananthapuram districts also played a decisive role in delegating the fishermen with boats to different places on time. The timely intervention of the authorities and the fishermen helped to bring down the number of causalities. Since some of the relief camps in the Pathanamthitta district were affected due to rising flood waters, they had to be shifted to other locations. Most of the roads in Pathanamthitta district were also flooded, adversely affecting the rescue and relief operations. The State Government took adequate efforts to strengthen preventive measures against the spread of diseases in the aftermath of the floods. Several medical camps

were set up in different districts for coordinating various efforts to prevent and control post-flood diseases. The local authorities and health officials played a crucial role in relief camps during the primary stage.

REAL CAUSES BEHIND THE 2018 FLOODS

The Amicus Curiae and the political parties belonging to Opposition have alleged that the main reason for the flood disaster was the mismanagement of dams in Kerala. In reality, it was the unusually heavy rains alone that resulted in the flooding. Broadly speaking, Kerala has been witnessing small floods once in two years. Kerala had witnessed floods of this magnitude only once before - in 1924. However, there were no dams in 1924 apart from the Mullaperiyar dam. This fact itself contradicts the statement that mismanagement of dams was the key reason for flooding. All the other dams were built subsequently. Further, from the 1924 edition of Malayala Manorama, one can observe that the locations which were flooded in 1924 and during the August 2018 floods were more or less the same. But the intensity of the recent flood was higher than the floods in 1924. The quantum of water released from Idukki (1500 m3/s) and Edamalayar (1400 m3/s) dams to Periyar was around 2900 m3/s. But by the time this water reached Bhoothathankettu dam, it rose to 7700 m3/s. It clearly indicates that the excess 4800 m3/s rise in water level was due to heavy downpour. The torrential rains received in the low lying areas of Bhoothathankettu formed a major reason for flooding. Similarly, nearly 2015 million m3/s water was released from Thenmala dam. But, there was no flooding in Kollam district as rain fall was less in the low lying areas of Kollam district.

The technical study on the causes of the 2018 flood conducted by the Central Water Authority and IIT Chennai reveals that the mismanagement of the dams was not the cause for the catastrophic flood. They have observed that the rainfall that the state received for three days from August 15 to 17, 2018, was excessive. While the capacity of the dams was just 1750 m3/s, the amount of rainfall received in all 14 districts was three to four times more than the storage capacity of the dams. The dams managed by the Kerala State Electricity Board (KSEB) are meant to generate power and those maintained by the Irrigation Department are meant for irrigation purposes. The dams are designed only for storage, and not for flood control. They are primarily designed to store water which can be used as and when emergencies arise. It is technically impossible to empty the dams while we were experiencing heavy rains. Studies have found that overexploitation of natural resources through quarrying, illegal construction in eco-sensitive areas, etc. also contributed much to large-scale landslides and flooding.

CHALLENGES TO REBUILDING A BETTER KERALA

The shortage of required financial resources impedes the speed of rebuilding process. As per the study conducted by the United Nations (UN), the quantum of money required for rebuilding Kerala amounts to about Rs. 36,000 crores. Raising the required funds for the rebuilding is a huge task. The State Government's attempts to mobilize funds through the 'Salary Challenge' in which each and every employee was requested to pay one month's salary to the Chief Minister's Disaster fund was vehemently opposed by the trade unions belonging to Opposition parties. The Central Government prevented the state from receiving any relief assistance from abroad either. In spite of the severe financial crunch, the State Government has provided a sum of Rs 10, 000 each to about 68,700 flood-affected families and Rs 4 lakh each to those families who lost their houses.

A new model of reconstruction is indispensable to rebuild a better Kerala. Geographically-- sensitive zones must be identified and any new further construction must be pre-

vented in these areas. New constructions must be prohibited in areas prone to frequent landslides. Similarly, dwelling houses should not be built in the flood-prone low-lying areas. The flood-prone localities should have halls or auditoriums that could be converted into the relief shelters in the event of future emergencies.

The livelihood of the common man has to be a major concern that needs to be addressed while rebuilding Kerala. For that, several small and medium ventures could be taken up by Kudumbashree units across Kerala. Small enterprises and establishments that suffered losses due to floods need to be provided with financial assistance.

A main shortcoming that the state currently faces is the lack of efficient, reliable and competent weather prediction mechanism. According to the India Meteorological Department (IMD), 160 mm – 205 mm (millimetre) is classified as extremely heavy rainfall but there was no such prediction regarding extreme rainfall in the weekly bulletin of IMD. Between 9 August and 15 August 2018, IMD had predicted only 9.85 cm of rainfall, but the actual rainfall received was 35.22 cm, which is 350 per cent more than the predicted level. So it is extremely important to have a much reliable and competent prediction mechanism.

One major reason for the unprecedented flood of such magnitude is the unplanned and illegal constructions and encroachments on the riverbeds by the local people that have reduced the capacity of the rivers. In 2017, the civil society (with the government in the forefront) had taken the initiative to restore two major long lost rivers i.e. Korayar and Varattar. Such efforts should be continued to restore dying rivers and tributaries to reduce the water crisis, rejuvenate the rivulets, and restore the natural flow of the rivers.

The development of infrastructure is crucial for the rebuilding of the State. The reconstruction process should focus on developing the physical, institutional and human infrastructure for achieving long- term goals of the State. From relief to rebuilding, the reconstruction and development must be planned and implemented on a sustainable framework. Planning should be done in tandem keeping in mind the welfare of the people.

CONCLUSION

We cannot remain complacent by saying that this kind of extremely heavy rainfall occurs only once in a century. We need to be more cautious and equipped for the future eventualities which are quite unpredictable. The existing development model does not support sustainable development because we are not much bothered about the effects on environment in the present development model. We need to develop a sustainable development perspective. There should be a balance between developmental activities and resource utilisation.

(The article is based on an interview Mathew T. Thomas gave ISDG)

AN INSIDER'S ACCOUNT OF FLOOD RELIEF OPERATIONS

V. D. SATHEESAN

The State government should build a disaster management machinery in every district which will have the expertise and resources to manage calamities more effectively in the future.

FLOODS – RECOVERY AND RELIEF

The water started rising on the night of August 14, 2018 in my constituency of Paravur in Ernakulam district. I was personally involved in all the stages of disaster preparedness of the district machinery. By the evening of August 15, almost all parts of Paravur were inundated. Around 1 am, I was informed that my own family was in danger and rescuing them was an arduous task as the roads were already under water. After ensuring their safety, I tried to get back to back to Paravur as soon as possible. I had to travel in a Taurus tipper truck since this vehicle had a higher ground clearance to wade through the flooded roads. I could see that the people in Paravur were panicking and most of they were out in the streets.

Over the next four days, the rescue efforts were in full swing. I was coordinating the efforts and working on the ground with the team and had gone without sleep for over 96 hours. Almost 2 lakh people were relocated to rescue camps. Even then, we had around 30,000 people stranded at different places. We managed to rescue all of them in due course and made sure that no one was left behind. As almost all the homes in my constituency had access to my mobile number, I was getting continuous calls through day and night.

During this four-day ordeal, no government officials were present. I had to personally take charge of the rescue operations and lead from the front. The first rescue teams could reach only 24 hours after the emergency alert. We had to coordinate with them and needed to be on constant vigil. The efforts of the Indian Navy officials, state disaster teams and the local fishermen were laudable. They joined the efforts at a very crucial stage when rescue operations were hitting the wall. The local fishermen's knowledge and expertise with their boats were a massive boost to the operation. The rising waters also created great panic among the people and ru-

mours about 'breaching' of Mullaperiar dam spread like wildfire. The spread of such fake news caused huge panic. People from my constituency and their relatives living abroad started calling me on the phone. I don't think I will be able to articulate the intensity of the experience. It was a challenge that I had never faced before in life.

CHALLENGES

This was an unexpected disaster. The incident also proved that our disaster management is in such deplorable state that we do not have people who have the training and expertise to handle such situations. Police and Fire Departments have their limitations as they do not have the knowledge or training to handle incidents of this nature. Only the Indian Navy was able to save the day by going all out with the rescue operations. But they were deployed in very limited numbers initially. It was the young people and local representatives who rose to the occasion and led the rescue efforts. In fact, they were the first and fastest to respond. The biggest challenge we faced was in reaching the affected areas. Almost all areas were inundated and the strong undercurrents slowed down rescue operations on many occasions. We had to rely on helicopters to airdrop food materials in areas that had become totally inaccessible. But again, we ran into several obstacles. For instance, helicopters could not access many homes as they were too old to withstand the wind from the helicopter's rotor blades. However, we decided to take the risk and made our way to those isolated homes in boats and distributed food and other relief materials to those stranded.

As there were no proper guidelines or protocol on how to properly rehabilitate the affected people we faced various challenges throughout the rescue and rehabilitation process. It is imperative that we chalk out a disaster management plan for each district in the state.

POST-FLOOD RELIEF OPERATIONS

The relief operations after the floods can be categorised into three phases: (a) Rehabilitation through camps, (b) Punarjani relief scheme and (c) Rebuilding. We initiated a post-flood relief scheme called 'Punarjani'. The scheme aims at supporting the close to 60,000 families that were the worst-hit. They had lost everything and didn't have the means to start rebuilding their lives. To compensate their losses and to help them tide over the situation, we provided them with food kits and clothes. As of now, we have finished the reconstruction of 15 homes which were transferred to their owners. Another 24 homes are nearing completion. A total of nearly 200 houses will be reconstructed under this scheme. This project is not part of any government-sponsored scheme.

Our post-disaster operations also extend to livelihood schemes that would support the affected people in the long run. This scheme would cover MSME sectors, and it includes working capital compensation and distribution of almost 1000 sewing machines. In the education sector, the repair work of damaged schools and the distribution of school bags, uniforms, notebooks and the like had just been completed. Repair works of computer labs that were destroyed during floods are progressing. Rather than looking at the damage as a setback, we should look at the incident as an opportunity to raise Paravur to the next level in terms of improved infrastructure, public services and the like. We want to showcase Paravur as a model panchayat in the rehabilitation process. We are addressing the welfare of all sectors including fisheries, agriculture, dairy and other informal sectors.

As part of a long-term disaster mitigation project, an expert team will be constituted to study about this project, and it would be led by an expert from IIT, Bombay. The primary

purpose is to identify areas of concern and what we could do to mitigate it. This also includes river basin mapping and course verification. Overall, this project will have both a short-term and long-term phase. At the same time, we are cleaning the canals and ensuring proper waste disposal. We are bringing out a standard colour code for waste segregation and removal. We have the support of almost 300 volunteers and local bodies. Along with this, we are actively cooperating with the government initiatives. We envisage this as an elaborate scheme (Punarjani/ Resurgent Paravur) supported by Habitat for Humanity, Manapad Foundation and XIME. As part of this scheme, we conducted a damage assessment survey and collected primary data. This exercise has helped us identify the key areas that require urgent attention.

IMPROVING POLICIES TO ENSURE DISASTER RISK REDUCTION

The present system has many flaws. In fact, as we saw it was a total failure this time. During the time of cyclone Ockhi, the State Disaster Management Authority was found to be a colossal failure. Unfortunately, the same disaster management authority was in discussion with the KSEB about the opening of dams during the floods. Generally, there is a standard operating procedure for operating dams everywhere. We failed in this sector miserably. There should be guidelines and operating procedures for any eventualities of this nature. The government machinery responsible at each level should be identified and this information should be made available to the general public. Extensive campaigns should be organised to spread awareness among people. For a sustainable future, we have to seriously look into the Sendai framework and align our future development projects with its ideals.

ROLE OF CIVIL SOCIETY

Civil society should be made aware of how to face and address such situations in the future. People should be given training in disaster management so that they are able to handle an emergency situation if there is a warning - what are the immediate steps they need to take, where should they go and what they should do with their belongings and so on.

The government is yet to come up with a proper analysis of the major causes of this disaster. People have not recovered from the mental trauma. The government should come forward and accept the mistakes it made in handling the disaster. This is not only a natural calamity but also a man-made one. It is imperative to do a proper fault identification and rectification. We still have not properly de-silted our dams even though we have the best of dam engineers in our country. The State government should build a disaster management machinery in every district which will have the expertise and resources to manage calamities like this more effectively in the future.

(Based on an interview V.D. Satheesan gave ISDG)

DISASTER PREPAREDNESS: NEED OF THE HOUR

P.T. THOMAS

> *The authorities failed to take any precautionary steps to ensure that a rescue and relief machinery was in place in case of a disaster.*

Even though the 2018 floods were quite unprecedented for the present generation, a large number of people in and around Kerala, irrespective of religion, politics, gender and regional differences, came together to engage in rescue and relief operations in the aftermath of the disaster. My constituency, Thrikkakara, was not much affected by the floods compared to many other regions of Kerala. However, several rehabilitation camps were set up in this area too during the floods. There were altogether around 120 camps in the region comprising areas like Paravoor, Kalamassery, Aluva and Ernakulam which provided food and shelter to the flood victims from all across the region. A large number of political, religious, civil society groups, ordinary workers and youths in particular untiringly took part in the rescue and relief activities continuously for days together in the aftermath of the disaster. By being in the forefront of rescue and relief operations during the floods, youth and IT employees proved wrong a perception that they lacked any social commitment.

LACK OF PREPAREDNESS

In the initial days of the disaster, the role played by the government was too inadequate. The State Government with the Chief Minister as the Disaster Mitigation Authority chairman failed to take decisive steps to deal with the situation. Dr. Muralee Thummarukudy, the Chief of Disaster Risk Reduction, UN Environment Programme, had informed Government a month prior to the Kerala floods warning them about the possibility of heavy rains and the emergency steps that needed to be taken. Unfortunately, the State Government ignored his warnings. Further, in spite of the formation of the Kerala State Disaster Management Authority (KSDMA), with specific parameters and guidelines assigned to respective IAS officers and other government officials, the established mechanism also failed to take adequate precautionary measures to reduce the magnitude of the deluge. For instance,

there were no attempts to ensure the availability of JCBs in the event of landslides, no proper measures were taken to secure boats and helicopters for rescue operations or to keep the Fire Force on alert. Thus the authorities failed to take any precautionary steps to ensure that a rescue and relief machinery was in place in case of a disaster. The government machinery was caught napping despite having advanced technology and satellite facilities.

The massive fire that broke out in a warehouse in Kochi recently is another example. The blaze continued for 3-4 hours and was extinguished by the joint efforts of Indian Navy, Cochin Refineries and Fire Force. Despite the warehouse being in the middle of Kochi, the time taken to bring the fire under control is something that has to be examined.

Therefore there must be proper mechanisms to deal with any unforeseen disasters. When Himachal Pradesh experienced massive landslides in 2001, the death toll could have been reduced drastically if there was the timely provision of JCBs. As an MLA, I had sent a letter to the then Chief Minister of Kerala requesting him to take steps to ensure provision for emergency vehicles, drinking water, fire engines, etc to tackle any such eventualities. The Chief Minister had then given orders to all the district collectors and officers concerned to take effective measures to tackle any unexpected disaster. But, it seems that nothing is in place even today.

No wonder, during the first few days of 2018 floods, it was the people of Kerala who voluntarily took full charge of the rescue and relief operations while the State Government could not effectively do much at that time. The departments concerned miserably failed in the matter of dam-management. The well-known scientist Dr. Madhav Gadgil had pointed out that the recent flood was partially a man-made disaster. Many other prominent public figures like Mr. E. Sreedharan also were of the view that it was a man-made disaster. It is unfortunate that the state government has been insensitive to environmental issues. This is reflected in the government giving permission for construction activities in ecologically sensitive areas and not taking action against unauthorized quarrying or unauthorized construction works in eco-sensitive areas. Environmentally-fragile areas like Munnar and Idukki district, in general, are facing severe threats to their ecology and bio-diversity due to unauthorized quarrying, mining and illegal construction activities. Massive deforestation is also taking place with the active support of real estate mafia and certain religious groups.

Kerala cannot survive if we are unable to protect the Western Ghats. Although Dr. Madhav Gadgil led panel's WGEEP report was prepared with the objective to protect the Western Ghats, there has been stiff opposition to the Madhav Gadgil report particularly from vested interests. We cannot think of a sustainable Kerala without protecting the Western Ghats.

A FEW SUGGESTIONS

Some suggestions for Disaster Risk Reduction (DRR) are given below:
1. Adequate disaster management training must be provided to all citizens.
2. DRR lessons and swimming must be made compulsory in every school and college.
3. Scientific management of dams in the state.
4. Fishermen who played a crucial role in the rescue and evacuation operations could be given training to make them a skilled cadre (Theeradesha Sena) as a permanent disaster response team for the entire state.

(The article is based on an interview P.T. Thomas gave ISDG)

MITIGATING DISASTER – LEARNING FROM GRASSROOTS

TUSHAR KANTI DAS

Maintaining dignity and respect towards the flood-affected people was one of the valuable lessons learnt during the flood response activities.

''Water, water everywhere, and all the boards did shrink; Water, water, everywhere, nor any drop to drink ''

The above mentioned couplets of famous lyrical ballad 'The Rime of the Ancient Mariner' by Coleridge, truly depicts the real scenario following the huge floods that hit Kerala in August 2018. The flood waters had caused much devastation in the state forcing many people in the affected areas to shift to relief camps. More than a million of people including women and children had to shift to about 3,274 relief camps in the state during the floods. Food was in short supply and essential services like water and power supply were badly hit in many areas of the state. The supply of drinking water was affected and the government took steps to prevent the outbreak of epidemics or waterborne diseases during the crises.

To address the basic requirements of the flood-affected people especially women and children, Plan International (Chapter India) decided to venture into the affected areas to mitigate the sufferings of the people and organise relief work within a week of the flood disaster. The article gives a general assessment with regard to implementation of emergency response action by Plan India during the floods. The assessment has been prepared on the basis of the responses received from the stakeholders, local people and the experiences of team members in the flood-affected areas.

MULTI-STAKEHOLDER CONSULTATION

The first major learning that occurred during consultations with multi-stakeholders during the floods was the importance of people's involvement in relief measures. Further, the consultations with multiple stakeholders helped in gaining an assessment of the needs of the flood-affected people. The aim of the consultations was to understand the needs of the affected families. Those who were selected as stakeholders

included sections like girls and women, people's representatives at the village level like village panchayat members, government officials, NGOs and local volunteers. These consultations helped in the preparation of emergency response plans for the affected areas. Plans were then reformulated after further consultations with the stakeholders. This increased the participation by different stakeholders in the emergency response plan. In addition, field reviews were also conducted to avoid chances of duplication of work while implementing the emergency response plan. Chances of duplication generally occurred in terms of selection of targeted people for the distribution of relief kits, items in the list of the relief kits, selection of dissemination points and intervention locations. Consultations and involvement of stakeholders provided feedback for the emergency response action. Collectively, all stakeholders took efforts to assess the appropriate requirements of the relief material in the affected areas, the requirement of volunteers, the level of people's participation, location of distribution points for relief materials kits and assessing the number of affected people so as to arrange distribution of relief materials.

Selection of flood-affected people to supply relief material: Plan India identified people who were the most backward and neediest people in the area, and who had not received support material from other agencies. The names of these targeted people were collected initially from the list of the social entitlement schemes of the government like those who receive widow pension. Further, the list was verified with the village council members/ward members / local institutions. Attention was given to identify and reach the neediest people in the intervention areas. The collected information was shared with the local people of the community.

Finalisation of list of relief material kits: The list of relief items was prepared by the local people and relevant stakeholders. Plan India presented the relief material list and operational village details to Inter Agency Group (IAG) and the relevant government department to avoid duplication and also to collect feedback. Plan India also initiated dialogues about the needs of the flood-affected people during interaction with other agencies. Three kinds of distribution kits were identified and distributed by Plan India on the basis of the need. Education kits containing books, notebook, pencil box, water bottle, tiffin, school bag and crayons were distributed in flood-affected educational institutions to be passed on to children. Ration kits containing 15 days' ration for meeting the needs of a family were distributed and non-food item kits consisting of cooking utensils and gas stove for meeting the cooking requirements of a family were also distributed. The supply of relief material kits at short notice in interior areas was a major challenge. Therefore there were regular consultations with supply chain members to deal with the issue. Advanced credit was made available to avoid any delay in supply of relief materials. At distribution points, the participation of local volunteers was encouraged for the distribution of relief material kits as well as for collecting people's feedback. Efforts were made to build the capacity of the local people to deal with unforeseen disasters like floods.

Learning from stakeholders' experiences: By participating in Plan India emergency action plan, the stakeholders gained new experiences and these experiences proved valuable to enhance the soft skills of the local people like critical thinking for making conscious efforts to provide relief support to the flood-affected families, problem-solving ability, selection of most vulnerable people who require support, leadership skills, communication, teamwork and precautionary steps to be taken in flood-prone areas.

Learning from the involvement of government department: Learning from the involvement of government departments unfolded the scope for receiving the latest information of flood, coupled with the opinion from the government departments for support and initiate relief action as part of a larger government initiative.

MANAGING EMERGENCY RELIEF ACTION

The second major key learning during the floods was on how to manage emergency relief action through timely involvement of volunteers of NGOs, local volunteers and utilizing donor support. The emergency response plan included ensuring timely supply of relief material at the distribution points and proper crowd management. Among the major experiences were the active involvement of volunteers in relief work, support from panchayat office-bearers and members of the flood-affected panchayat areas and participation of Village Officers (VOs) in relief work.

Proper planning for setting up distribution points and for providing guidelines to volunteers in distributing relief material were important aspects in helping volunteers perform their activities efficiently. It was also important to properly deal with people who were left out of the beneficiaries' list in receiving the relief materials. Those who were left out had to be patiently told about why they were not in the list and about the selection criteria in selecting beneficiaries. The major challenge was the language barrier and for this the support of local volunteers was required. The interaction process with flood-affected families involved discussions with them as well as collecting feedback and opinions from them about the emergency response action. The collected feedback is a valuable tool, which provides scope for improvement while preparing the next action plan along with evidence of transparency in the complete response action. In order to mitigate the problems related to proper supply of relief material during the relief work, beneficiary cards were introduced. The beneficiary cards were given to all the selected flood-affected families along with every relief kit. The list of items in each kit and their quantity were printed on a card in the local language. Support from the local volunteers was the only option to obtain feedback from the people.

It was a pleasant experience to see that cordial behavior and empathetic attitude of the staff and volunteers towards the flood-affected families. Maintaining dignity and respect towards the flood-affected people was one of the valuable lessons learnt during the flood response activities. Overall, these learning experiences during the floods proved valuable in designing a complete action plan in a participatory mode. It gave us an idea of the importance of sustainability and involvement of people during disasters.

Under its disaster response action, Plan India had reached out to 22,022 families and 8,736 children in five of the worst flood-affected districts of Pathanamthitta, Alappuzha, Idukki, Thrissur and Ernakulam. Plan India continues to carry forward its support to build a more responsive and flood-resilient community in the state. The key suggestions to deal with possible disasters include developing a preparatory plan before floods in future and providing training in disaster risk reduction in schools, colleges and in the community. Action plans should be prepared for rebuilding the flood- affected areas. Plan India proposes to formulate Emergency Response Plans for properly managing water in various dams in Kerala. Efficient scheduling for the release of water from dams should be worked out to prevent any sudden release of water from dams, especially during heavy rains.

ROLE OF MEDIA IN DISASTER RISK MINIMISATION

M. G. RADHAKRISHNAN

Though social media can be a double-edged sword, its positive aspects outweigh negative ones.

Social media have been doing a wonderful job in highlighting cases of natural disasters all over the world. Whenever natural disasters occur and affect humans, the social media has always taken care to ensure a fast dissemination of news. It has been providing a powerful communication link between the worst-affected people and the authorities.

KERALA FLOODS : ROLE OF THE MEDIA

In the context of 2018 Kerala floods, our state was witnessing such kind of a disaster for the first time. National disasters are not so common in Kerala and we lack practical experiences on the score. The first major disaster was the tsunami (2004). But at that time we did not have adequate electronic means of communication or advanced audio-visual channels classified as social media now. At that time, I was a correspondent working with India Today. During the times of the disaster, I personally realised how important social media should be on such occasions. The social media can be the most crucial requirement for an effective intervention. A major difference between the 2004 tsunami and the 2018 floods in Kerala is the way the social media responded creatively to such an alarming situation. It is perhaps the most powerful tool for communication that we can imagine. Secondly, a striking factor of the 2018 floods was the public support or efforts witnessed in the rescue and relief phases, which was possibly the best example of people's participation in the face of an unprecedented calamity. It captured the attention of the whole world. In fact, social media made it possible.

Rescue and relief operations during the floods were conducted remarkably because of the presence and active participation of young people. Young people all over the state came forward volunteering all kinds of assistance. The preconceived notions about the younger generation have now been completely changed. Social media has had a key role

in providing leadership as also in bringing together the public. The much-accomplished rescue and relief works that we all witnessed during the Kerala floods were largely due to the guidance and involvement provided through the social media and enlightened professionals. Asianet News utilised the possibilities opened by the social media by not just reporting the news but also going beyond to speed up the rescue operations. So what we did was to form a complete team of young employees from different departments and to open a control room on a war-footing. During the floods, many messages and calls about the distress had poured in from all over the state. We could successfully help a good number of families/ persons. It was just because of the social media that we could gather information and transmit them effectively.

A particular incident that came to the limelight was the case of a pregnant woman being rescued and airlifted, and it was something that we relayed from the media room. Our reporter, Ms. Sujaya, received the information and she sent an urgent message to the pilot who was operating the helicopter. So the incident captured the attention of the whole people of Kerala and it was a proud occasion for all of us. As a media organization, it was actually a new experience for us. The entire operation was a successful mission primarily because of social media and its advanced technologies. We got help from many IT professionals from different countries, creating an interface which lightened our work. It was because of the social media that we worked round the clock and helped so many people thanks to the advanced technologies in the field.

ADVANTAGES AND DISADVANTAGES OF MEDIA

There is also a flip side about social media though this may not have any bearing on this particular case, viz. the Kerala floods of 2018. But it can also play an alarming role at times like that in the case of communal riots. Since technology brings communication so fast, it is possible that baseless rumours can fuel communal tensions and riots. Rumours have had a major role in inciting communal riots as evidenced by our experiences in the past. For instance, the Bhagalpur riots of 1989 resulted in violent clashes between Hindus and Muslims. Many people died during the rampage. Without rhyme or reason, the emotions went high and many innocent people were killed. Indeed, this is the biggest challenge that the media face today. We have lost, so to say, the pristine ages of innocence. Sometimes, social media is being increasingly misused for furthering negative purposes like invading into one's privacy, spreading racist, sexist or casteist content thereby undermining the very base of our society. Hence, social media is not always an unmixed blessing. It can help people in cases of extreme emergencies or begin a chain reaction leading to serious problems. Even during the floods there were many messages or pieces of information which were misleading. However, the positive aspects of social media outweighed the negative ones.

On other issues, it was not the same. The core of every recognized or mainstream media is the checks and balances by which information is gathered, filtered and verified. The authenticity of the information is checked many times but that is not the case with social media. The social media is free for all to use and respond and that is why the entire gamut of fake news is creating havoc all over the world. The social media can be a source of fake news that could mislead the public with shameless lies, especially during elections. According to authentic studies, nearly 40 per cent of the electorate can be swayed through social media. Thankfully, it was not the case during Kerala floods. Though social media can be a double-edged sword, its positive aspects outweigh negative ones.

NEED FOR DISASTER MANAGEMENT AND PREPAREDNESS

Disaster preparedness is something we have yet to learn. Unlike advanced nations and societies, we are not quite familiar with disaster preparedness since we are not very prone to natural calamities. Fortunately, we have never had such perilous disasters like the 2004 tsunami. The memories of a historic flood go back to nearly 100 years and the present generation does not have any inkling about it. Geographically, Kerala belongs to a comparatively safe zone unlike other states like Andhra Pradesh or Odisha. But as Kerala is a state with a long coastal area, it is vulnerable to the vagaries of climatic changes.

BLUEPRINT FOR FIGHTING EMERGENCIES

The 2018 flood has taught us that we should also have to be prepared for unforeseen emergencies. We don't have flood maps or land utilization maps that could serve as guides with regard to flood possibilities and which will be very helpful while planning to face disasters. Kerala is an ecologically-fragile state. In fact, the Gadgil report had warned us that floods are a real possibility in Kerala. Kerala society, irrespective of political, social or religious differences, as a whole were against the implementation of the important recommendations in the Gadgil report or the Kasturirangan report, although the second report was alleged to have been a dilution of the Gadgil report. If there is large-scale deforestation as is occurring in the Western Ghats it could lead to an alarming situation in Kerala. It may also result in severe water scarcity or in dangerous floods. This naturally deserves special attention and care. Kerala is also now witnessing large-scale land encroachments. There are also more than 2500 unorganised or unlicensed quarries operating in the Western Ghats area. Even the people are not aware that they are being operated illegally because they are not really aware of the legal aspects. We really have to think about the needs of the people.

It is important that the first stage of the floods viz. rescue and relief operations, should have to be carried over to the next logical step, which is recovery and rehabilitation. In order to step up recovery and rehabilitation initiatives, people who are interested or people who were really involved in these operations should create volunteer groups by utilising social media in the most fruitful way. Social media is something society has to give maximum attention. We should know how to utilize it in an optimal manner. Therefore social leaders, political leaders or other enlightened people who can mould public opinion should have to closely watch, monitor and study what is happening in the social media sector and inform the public.

ROLE OF THE AUTHORITIES AND PEOPLE

People have not only to come forward and create committed groups; they also have to calibrate them effectively during the rescue/rehabilitation phase, with the assistance of a powerful tool called the social media. As in other parts of the world, with the help of social media we can strengthen our efforts and reap more benefits from it. We should create groups that work through the social media at the time of any phase of a disaster. People like the District Collector, presidents of local self-government institutions like municipalities or panchayats, or others with good leadership potential have to initiate the process of forming groups and pushing them to work from the very beginning of a disaster. Possibilities should be explored to use social media in a positive manner.

We should also teach the subject 'Environmental Sciences' from Class I onwards giving more emphasize to practical aspects of environmental conservation than the theoretical aspects. The entire curriculum and pedagogy, the way of teaching children also should be changed so as to make our children aware and conscious of the traumatic effects of climate change.

IMPORTANT ROLE FOR CIVIL SOCIETY ORGANISATIONS

The disaster-fighting machinery consisting of dedicated social groups should evolve mechanisms and formulate clear methods in which even the layman can be trained and equipped on how to use social media during times of disasters. The Disaster Management Authority can demonstrate and arrange classes for the public and students about the usefulness of social media during disasters. Civil Society Organisations (CSOs) have to put pressure on political parties, institutions, media, and the police force to alert public about disasters. Ultimately, it is the people who suffer the most during calamities if timely help is not forthcoming from the government. CSOs have to continuously initiate programmes to educate people about disaster risks and also to equip people on how to deal with such threats. Civil society groups should be formed and they need to be very conscious of the fact that there is no meaning in blaming the government or political parties alone. In fact, the government and political parties may not function effectively if the CSOs fail to mount pressure on them.

(The article is based on an interview M.G. Radhakrishnan gave ISDG)

A JOURNALIST'S PERSPECTIVE ON DISASTER MITIGATION

SNEHA KOSHY

We have to build up an efficient communication system to meet the challenges during a disaster.

SOME PERSONAL EXPERIENCES DURING THE FLOODS

Kerala floods of 2018 did not happen all of a sudden. It took place in different stages. The very first thing which happened was the opening of the Cheruthoni dam. Several journalists went to Cheruthoni for reporting. Things seemed to be under control on the day the dam was opened. The administration had adopted various measures, and as part of the precautionary measures, people living on the banks of the canal were asked to evacuate. Since the communication facilities at that time were operational, we as reporters thought that the situation was very much under control. But soon with the intensification of the rains, the situation started to deteriorate. Landslides soon began to occur across Idukki district and there were many massive landslides.

We were asked to move to a safer place by the administration officials. We looked for a safer place to stay and enquired about ways to move out. Obviously, we did not know what would happen and where. During the same night itself, local people started moving to nearby schools for safety. Thereafter, everything happened very fast. Shelter camps came up quickly. Since Idukki district has a hilly terrain with step cultivation, houses are built diagonally one after the other. So if one house was hit by a landslide, then the entire stretch would collapse. It was late night when major landslides started occurring in more places. Many people died in those areas. Several houses were damaged or were totally destroyed. During the 2018 floods, it was the Idukki district which was mainly affected by landslides. As a result, even the roads were cut off in several areas of Idukki and Munnar.

After returning from Idukki, we wanted to go to Chalakudy. But the roads all around were blocked as the water levels kept on rising and it was impossible to travel. Chalakudy

bridge was completely submerged. We had no option left but to stay that night in Angamaly near Kochi. As we could not find hotels nearby, we stayed in a relief camp. We did not have any connectivity. Phones were not working and there was no electricity either. I had a Jio Dongle with me and it was functioning. We started doing live videos from that particular area showing the existing situation. With that Dongle, I began tweeting on Twitter. We started connecting with relief teams and the Chief Minister. We also started sending SOS messages and tried to get these messages verified. But we could not make any phone calls. We were only using the Internet and that too sparingly. I was constantly getting messages from other districts too. People were in dire need of help and were trying to gain access to those providing help. In such a situation, journalists became a link between the Government, the administration, the rescue teams and the affected people.

The Indian Army, Navy and Air Force personnel also had begun relief work. We started forwarding the panic calls to them for the rescue operation. In many areas, although the intensity of the rainfall had come down, several houses were totally submerged or only their roofs were visible. As people started returning to their houses, they realized that nothing much was left there with many houses damaged and belongings lost or damaged. The 2018 floods taught us several lessons. I saw a great community spirit. Although people had lost everything in the affected areas, they came together to help others in need. There were groups of young people from colleges who rendered help in whatever manner they could. Even before the relief materials of the Government started reaching those affected by the floods, people of various localities had started helping fellow people. With 70 to 80per cent of the state affected by the floods, voluntary help from communities considerably supplemented the official relief and rescue measures.

ROLE OF SOCIAL MEDIA

Social media played a very crucial role during the Kerala floods. At the time of distress, phone calls could not be made as electricity was not there. Many people had switched off their phones due to lack of electricity and even functioning phones were used sparingly by switching it on only to call a particular relative or friend. In several cases, that person would call another relative or a friend who would then put the message on social media or online and tag reporters, authorities or even the Chief Minister. This was how people spread the information about the affected people via social media. During the disaster, several people created Whatsapp groups and they would verify the information, collate and send it to the authorities concerned.

People from the rescue teams, Air Force, Navy and our friends who were in those services were getting many distress calls. We forwarded the calls to those in charge of or conducting rescue operations. All this was largely based on confirmed information from social media. So, social media provided invaluable information during those times of panic and distress. Even reporters were heavily depending on social media to help those who were in dire need. People, many of them even from distant places in India or abroad, made numerous communities on Whatsapp or Facebook. They showed amazing sense of responsibility. They did not even know each other. They came together and pitched in whatever help they could give. It was mainly through social media that people came to know about the ground situation and started rushing to relief centres with essential items for the flood-affected. Social media played a pivotal role in getting the attention of rescue and relief teams also. Most of the volunteers had emerged out of social media. Social media thus played a very important role. In fact, it is difficult to imagine what would have been the situation without social media.

A FEW SUGGESTIONS

We have to build up an efficient communication system to meet the challenges during a disaster. So, the first priority in terms of facing a natural disaster will be to have reliable communication facilities for getting inputs. It should be able to ensure the primary communication link between the affected and the local administration which often get disrupted in many places during a disaster.

The density of population in Kerala is very high and this has put pressure on land. However, Kerala has failed to observe rules and regulations regarding construction or land use, particularly on reclaimed lands. We need to have rules relevant to land use and construction of buildings, roads, etc., and these rules and regulations need to be strictly followed.

We need to strengthen the local administration to monitor and coordinate the rescue/relief operations in case of a disaster. We should form a volunteer force in every district. Pathanamthitta was one of the districts which was badly affected. For instance, according to the District Collector of Pathanamthitta, if such a crisis situation arises again, they will have an already collected series of contact numbers of young volunteers which will help the district administration meet the emergency situation better. Since the administration cannot do everything on its own, it is important to keep a reserve group of volunteers. This could be done not just in Kerala, but also in other states of India. If a disaster happens in one district, teams of volunteers from other districts also could go there and help. These groups of volunteers should be given training. We also need volunteers who can give training to other people. This would help in raising enough number of volunteers during any rescue/relief operations.

Basic First Aid training also should be given to people especially the young in order to provide immediate assistance during natural calamities. For this, basic first-aid training should be included in schools/college curriculum.

(Based on an interview Sneha Koshy gave ISDG)

NEED FOR DISASTER-RESILIENT AND ECO-SENSITIVE HABITATS

G. SHANKAR

The flood has given us the opportunity to erase mistakes made previously and rebuild green and eco-sensitive habitats.

The 2018 floods was the first of its kind that Kerala has ever witnessed. The unusually high rainfall during the first two weeks of August was 164 per cent above normal. The accumulation of several simultaneous and unique phenomena resulted in extreme floods. The magnitude and the extent of damage were far greater than the Tsunami in 2004 and Ockhi Cyclone in 2017.

Just like any disaster, we saw the floods in three phases: pre-disaster, in the course of disaster and post-disaster. Looking at the positives, we realise that in the hour of need the entire state came together. Social mobilisation was unparalleled. Hundreds of fishermen reached out to the worst-affected areas. They braved the weather and treacherous waters to rescue marooned people. Local self-help groups were organised and within no time relief camps were set up with necessary supplies. 1.5 million people were rehabilitated to these relief camps and were closely monitored. Utmost care was taken of aspects such as hygiene and sanitation ensuring no outburst of diseases. Not even one life was lost due to post-flood diseases.

There are many factors that led to the disaster. However, in the shelter sector, the extent of damage could have been greatly reduced if we had strictly followed existing land use policies. Kerala has three geographical terrains: mountains, plains, and coastal line. Traditionally, every building was built by taking the terrain into consideration, unlike what is practiced today, where people flatten land, clear forests and find other means to mutilate their surroundings to suit their convenience. This has led to a situation where landslides, land slips, soil erosion, etc. have become a daily phenomenon. Buildings are ruthlessly being raised in a non-environment friendly manner. During the floods we saw bus shelters completely collapse at Vythiri and Cheruthoni. These are classic examples of human interventions that stood in the way of nature.

The construction industry is a major cause for climate change. It is responsible for the degradation and deterioration of the environment. We are using highly energy-intensive materials like steel and cement unnecessarily in our construction. Today's building spurt calls for sustainable building interventions. We must take cues from traditional building idioms and promote concepts such as Habitat Literacy, Incremental Housing, Adequate-Housing, etc. We must design and build houses that expand in the future based on our needs. Before building monstrous habitats, we should understand and address our basic necessities. Access to a clean cooking space, access to clean sanitation facilities and portable drinking water - these are our primary needs.

Kerala is blessed with a platter of locally available building materials and a legacy of craftsmanship. Effective use of these materials and local skills will be the first step towards sustainability. Additionally, we should be considerate towards the surroundings, place and context.

The disaster has left us with life long memories and a plethora of opportunities. Today, climate change is an evidently visible phenomenon and disasters of various kinds can come back again. Therefore, this is the right time to build up resilience.

Keeping these values and virtues in mind, UNDP and Habitat have come together to set up ten Shelter Hubs in disaster struck areas of Pathanamthitta, Idukki and Wayanad. We recognise the need for identifying local and alternative building technologies while rebuilding Kerala. The shelter hubs promote disaster-resilient, cost effective and environment friendly construction practices. The project is threefold: it includes, free consultancy for affected beneficiaries, networking and creation of a skilled labour pool and outreach and advocacy.

The shelter hub is a one - stop shop for all post flood shelter related activities. Consultation for beneficiaries is free of cost. Our hub engineers help them assess damage caused due to floods and then assist them to select appropriate house plan / models keeping in mind site conditions and personal requirements. They also provide technical support regarding estimates and quantity of materials required. Additionally, they also tell the beneficiaries as to where they can source materials from. Consultation happens on site where the beneficiaries are advised on rebuilding with disaster-resilient features like horizontal and vertical tie beams, corner reinforcement, door and window jambs, etc. Cost effective techniques like use of rat-trap brick bonds, filler slabs, using coconut shells or fifth grade Mangalore tiles as filler material, bamboo reinforcement, etc. are also advocated. These techniques not only cut cost, but also ensure thermal comfort inside the house.

Contractors and masons in each district have been identified and contacted to form a network of skilled artisans. The masons and contractors in this network undergo a two-day training program with classroom sessions and hands-on training sessions on Disaster Resilient Construction Strategies and Sustainable, Eco-friendly and Cost-effective Construction Technologies.

We are undertaking a study to discern the feasibility of 'Compressed Stabilized Earth Block' production in the district of Wayanad. The study aims to look into the technical as well as socio-economic feasibility of mud-block production so that it results in a self-sustaining enterprise thereby creating livelihood options for the local people.

Training materials, handbooks, brochures, presentations have been prepared. These are used for the training sessions and are even shared with school and college students, government officials, etc. We have also reached out to people through exhibitions and

road shows. In the past four months, our team has visited 1300 beneficiaries to provide technical support and 800 plus masons have been trained on Disaster Resilient Construction Strategies and Alternate Construction Practices.

We aim to bring a culture where building and construction is looked from a sustainable angle. With the help of well-informed beneficiaries and trained masons who will pass on these learnings, we hope to create a ripple effect that will last even after the floods are forgotten. The flood has given us the opportunity to erase mistakes made previously and rebuild green and eco-sensitive habitats.

ACCOUNTABILITY CHALLENGE

S.M. VIJAYANAND

To instill a sense of comfort among the people who underwent the trauma, it would be in the fitness of things if the government suo motu declares an accountability challenge.

Every citizen has the right and duty to demand accountability from the Government. This becomes intensified in times of large-scale calamity and tragedy. Specific attention is drawn to the recent floods in Kerala and the visionary decision of the Government to rebuild a New Kerala (Navakeralam). The sufferings of the people numbering nearly 15 lakh, was extreme and harsh. It is difficult to visualize how they endured the painful days. The only silver lining was the self-mobilization of the rescue workers in a true expression of genuine social capital, far above and beyond the narrow, multiple divisions which criss-cross the society of Kerala. The traditional fishermen stood out among the selfless rescuers and their spontaneous rushing into the unknown to save life and property of people whom they had never seen and, may never see in future, is unparalleled in history. In a sense, it brings back memories of the freedom struggle when unknown people rose above the self and gave up everything to fight for freedom, in a condition of total uncertainty.

Further, financial assistance started pouring in from all corners of the world and was not limited to the Malayalee diaspora. Funds are coming not only from kind hearts but also from formal financial institutions and aid agencies, national and international.

The State Government rightly came out with the salary challenge and crowd funding challenge. These should not be seen merely as fund-raising techniques; they are attempts by the Government at reaching out to its people to seek their help, not as charity but as their contribution to the well-being of their own native land. These embody the spirit of participatory development at its very best. To give moral authority to these challenges and instill a sense of comfort among the people who underwent the trauma, it would be in the fitness of things if the government suo motu declares an accountability challenge. It implies a graceful and grateful but a bold and firm commitment on its part to assure its people that even a small decision or small expenditure in respect of re-

construction will not only be totally free of partisanship, nepotism, waste and corruption but also will be seen to be so and be verifiable by any citizen.

Accountability has of late grown beyond verification of accounts and formal audit. It has become the hallmark of a civilized society, the essence of democracy, the distinguishing characteristic of progressive politics, key indicator of development and the best test of good governance. It goes without saying that social accountability which is downward and to the citizens is the most advanced form of accountability. It encompasses a social contract between a responsive and caring State and responsible and active citizens. It is based on "voice" and not based on "votes". Simply put, social accountability makes power-holders take responsibility for their actions and be ready to explain the rationale and relevance of their decisions, the principles, norms and criteria informing them and their expected and realized impact. In the best form of social accountability every single rupee is accounted for simultaneously with its spending, to the public in general and, to the people for whom the money is spent, in particular.

It is well-known that post-calamity especially in respect of reconstruction, the initial passion and enthusiasm would wane very quickly and the usual ills of governance would rise in the implementation. Lack of fairness in allocation of funds, wrong priorities in the choice of works and wastage and siphoning of funds during implementation are typical not only in the country but all over the world including developed world. Therefore it is not easy to come out of these hard realities. Unless bold action is initiated, the sufferings of the people would turn to cynicism and then to antipathy. If this happens, it would be an insult to the brave sacrifices during the rescue and relief phases.

Some of the specific measures of social accountability in the current context are outlined below:

1. People are quite anxious to know what happened and why it happened, not to find faults, but to avoid or at least mitigate such possibilities in future. Such an assessment could be best done by a People's Commission consisting of the best experts from within and outside Governments and from within and outside the country. Such a Commission would need to go around, interact with the people, probe into the situation - present and past, access available data, and the studies and reports already made and conduct further studies to fill up gaps, if any, and come out with a report, bringing out lessons for the future.

2. Simultaneously, a participatory assessment of the current situation needs to be made. Excellent tools are available readymade. Such a situation analysis needs to be prepared for every affected ward in the State and consolidated at the level of Village Panchayats, Municipalities and Corporations.

3. Based on the situation analysis, consultations should be held with the affected people with special focus on women, socially and economically marginalized groups, elderly, differently-abled and children. The needs and priorities would thus emerge from below. The institutions of Grama Sabhas and its urban counterpart the Ward Sabhas are quite weak and ineffective even in Kerala. But they form the most critical institutions and perhaps even the raison d'ètre of local democracy through local governments. It is admittedly difficult to excite citizens to participate actively, for different reasons. But in the case of people who have experienced the worst, it is reasonable to expect them to be pro-actively involved in the Grama Sabhas and Ward Sabhas and participate with not only feeling and passion but also with the clear sense of priority. Thus, in a way, consultations with the affected people could activate the people's institutions.

4. The local governments particularly the Village Panchayats, Municipalities and Corpo-

rations need to be fully involved in both the exercises. Of late, one gets the feeling, that participatory planning and local governments do not get the political importance they merit, even though they control a substantial chunk of development resources, manage most of the institutions of public service delivery and are responsible for the creation and upkeep of a lot of infrastructure especially, water supply, public buildings and roads and, most importantly, they are closest to the people, understand local needs better and cannot but be responsive to people's issues. Of course, these local governments need to be assisted by resource persons drawn from different walks of life. This is a right time to revive the forgotten concept of Voluntary Technical Corps (VTCs) so wisely enunciated by late Shri E.M.S. Namboodiripad. In these days of electronic communication, experts from all over the world can join in and contribute their wisdom for situation-specific applications. VTCs can be constituted at different levels and for different purposes.

1. One of the biggest problems of prioritization of needs is the creeping in of bureaucratic rigidities and political partisanship both of which affect rational decision-making. This would call for norms and criteria which are socially constructed or at least socially accepted to be developed after the participatory situation analysis and widely published. This would achieve transparency in decision-making resulting in public acceptance and ownership of decisions and avoid trivial controversies and malignant campaign by vested interests.

2. It has to be noted that resource allocation to affected localities has to be on the basis of fair norms. Already 1259 villages out of a total of 1664 have been declared as flood- affected. It is plain knowledge that severity varied widely across the affected areas. Therefore an ABC analysis needs to be done on the basis of rational and verifiable criteria to decide eligibility of funds. If the funds are allotted on the basis of these norms, there will be all-round satisfaction and appreciation.

3. During implementation, there is greater risk of inappropriate costly technologies being used, inflation of estimates for works due to the feeling that additional funds are available and the usual leakages typical of public works. It is worth mentioning that people who are generally intolerant of corruption would not countenance any waste or siphoning off of funds to which they had contributed or to which the future generations would be contributing (as bulk of the expenditure would be from loans, the repayment of which would stretch to decades). To avoid such reaction from the people, several measures could be adopted like:

i).   Proactive and simultaneous disclosure of all facts and figures including the rationale and justification of decisions.
ii). Provision of summaries of estimates in an idiom, understood by the common man before the work is started.
iii). Details of assistance to individual beneficiaries and details of exclusion of claimants with reasons.
iv). Publication of photographs of all works at different stages in the website including charts showing timelines of different stages from start to finish.
v).   Forming local committees of benefited population to oversee the works.
vi). Putting in place a rigorous grievance redressal system with definite timelines for final redressal failing which it could be automatically escalated to higher authorities, right up to the Chief Minister.
vii). Holding of public hearings to settle disputes.
viii). Holding rigorous social audit of all expenditure for flood reconstruction. (It is shameful that Kerala was the last State to form a Social Audit Unit mandated by the Mahatma Gandhi National Rural Employment Guarantee (MGNREG) Act for which Central rules were issued more than seven years back. Also it is the only State where no real Social Audit has been done though the Kerala model of devel

opment is equated with Public Action.)

ix). Social Audit has been followed up with evaluation including participatory evaluation.

x). Often regulatory measures are considered outside the purview of development. But going by expert opinion, both the proximate and distant causes of the extent of dam age could be attributed to regulatory failures related to environment especially land use. So a massive consultative exercise on undoing the damage caused to the environment, whether it be through filling up of paddy land or construction in fragile areas or operation of quarries in sensitive slopes or deforestation in ecologically critical areas or filling up of water bodies or unscientific waste management, is es sential. It would be best to adapt the British system of floating Green Papers seeking both citizen and expert comments before coming out with clear policy.

It goes without saying that accountability, especially social accountability measures, would have several advantages like:

i). Restraining power and prevent its abuse.
ii). Reducing alienation of the people.
iii). Shaking the system out of apathy.
iv). Reducing waste and leakages.
v). Prompting reforms in processes and procedures.
vi). Motivating people to contribute in cash and kind.

Going in for all-round social accountability would be a politically wise move. It would promote trust in the Government and reduce the distance from the people. It would open space for inclusion of those left out of from development. It would improve utilization of the budget.

It is worth recalling a stand taken by the late Dr Y.S. Rajasekhara Reddy in the undivided Andhra Pradesh when he politically insulated the implementation of MGNREGA from patronage and corruption. It yielded him rich dividends in the 2009 elections of the State Assembly. After all, social accountability is both good economics and good politics. If at all any State could operationalise this post-modern politics, it is Kerala with its rich history of public action, people's struggles and campaigns, participatory development and a natural pre-disposition to citizens' engagement with the State which even posited the co-existence and even symbiosis of governance and struggle that is 'bharanam' and 'samaram'.

POST-SCRIPT

It is three months since the above article was written. Sad to note, in spite to the clear recommendation of the extremely well-formulated Post Disaster Needs Assessment by the United Nations, no initiative has been taken to consult the affected people and set off the participatory process. The Local Governments do not appear in the picture at all. As a very senior professional from a multi-lateral agency commented sadly "There seems to be a re-bureaucratization in Kerala". Saddest of all, hardly any Village Panchayat or Municipality has deemed it necessary to listen to the voice of those who experienced the worst. Fear of God is the beginning of wisdom; but fear of people is the beginning of the end of democracy. Loud slogans and sharp and shrill statements are mere 'noise' and cannot substitute hearkening to the 'voice' of the people.

REBUILDING KERALA - NEED FOR DISASTER RISK REDUCTION STRATEGIES

T.P. KUNHIKANNAN

The floods was a reminder that Kerala also is becoming prone to the ill-effects of climate change.

Kerala is now in the phase of rebuilding the state after having to endure one of the worst floods in the history of the state last year. The Chief Minister of Kerala stated that the rebuilding task should not be 'business as usual', but instead should focus on a new development perspective. This note presents some guidelines on rebuilding the state for creating a resilient Kerala and emphasizes the need for adopting disaster risk reduction strategies in an environment perspective.1

To begin with, let us summarise the lessons for the state from the 2018 floods. It proved that three days of continuous rainfall was enough to cause much devastation and damage in the state as well as causing serious dislocation of life in many parts of the state. Further, the floods was a reminder that the Kerala also is becoming prone to the ill-effects of climate change. Moreover, the scale and intensity of natural calamities and adverse weather conditions are on the rise in the state.

In the year 2004, the tsunami wreaked havoc in parts of the state especially in the coastal areas and in 2017 the state was hit by cyclone Ockhi while in 2018 the state was faced with one of the worst-ever floods. In November 2018, the state had a narrow escape from another cyclone. The limitations of the state to effectively take relief measures were exposed in the aftermath of the floods. A detailed look at the 2018 floods showed that it had a direct bearing on at least one-tenth of the state's population. Though the flood intensity in 2018 was less than that of 1924 floods, the scale of damage in the present episode of floods was more severe.2 This was mainly due to the unscientific human interventions in many parts of the state, according to experts. Idukki district is one such example as it was the worst hit last year by intense rainfall, landslides, death toll, etc. If such intense rainfall had occurred in neighbouring districts as well, the scale of the devastation would have been unimaginable.

People's science movements like the Kerala Sastra Sahitya Parishad (KSSP)3 have coined the slogan `Sustainable Kerala; Secure Kerala'.  It has suggested that the rebuilding process should aim at gaining long-term social and economic benefits for the entire state, rather than short-term financial gains for a small section of the population. The message `Another Kerala is Possible' should be spread. Kerala now needs a development strategy and a master plan focussing on environmental stability and socio-economic security. Within the broad framework of the master plan, the State Government has to work out a strategy for rebuilding the state in a time-bound manner. The process of rebuilding the state should not be limited to a crisis management programme, but should cover wider economic and environmental aspects of development. Programmes for rebuilding should aim at promoting equity and distributive justice. Protection of Western Ghats should get top priority.

The package of proposals as enunciated by the Gadgil committee4 which includes the following should be looked into. (i). Zonation based on ecological sensitivity; (ii). Assessing the cumulative impact of each project; (iii). Assigning increased role to the three-tier panchayati raj institutions in decision-making. Further, the Western Ghats Ecology Expert Panel (WGEEP) has suggested putting the following proposals in the public domain for discussion: (i). Treat the entire Western Ghats as ecologically- sensitive; (ii). Regulate human interventions and development activities by taking into account ecological sensitiveness of the area; (iii). Stop converting public lands into private property; (iv). Prevent use of forests for non-forest purposes; (v). Reserving agricultural land only for farming activities.

While we focus on the environmental aspects of the rebuilding process of the state, issues related to land and water management, mining of natural resources, waste management, building construction and road transport system should also get top priority. In this regard, a senior economist has observed that "The Post-Disaster Need Assessment' (PDNA) report presents an excellent launching pad. This has to be underpinned and elaborated with a clear collective vision for ushering in a green state with an integrated water and land use approach enlisting the local government system currently under played as a natural partner in to the rebuilding project." 5   The PDNA Report by the United Nations, the World Bank and the European Union which covers the methodology to assess damage and loss in the wake of the floods, recommends recovery strategies too. At least 76 experts from 10 UN agencies across 13 sectors collaborated to develop the Report.6 The PDNA assessed the damage and loss incurred due to the devastating floods. It suggested that Kerala could become the first Green State in the country by building on the four pillars of integrated water resource management, eco-sensitive approaches to land use and planning, inclusive and project- centered approaches, and adopting knowledge, innovation and technology.7

In this context, the first issue to be addressed is the land use pattern of the state. It is noted that the root cause of all the `development' issues facing the state, is the existing unscientific pattern of land use. Thus a relook on the current pattern is highly needed. One of the suggestions is that while safeguarding the ownership rights, land use pattern has to be regulated by the public authorities. For this, social control measures may be promulgated. Zonation measures based on spatial planning is one of the strategies to be followed. A system of 'land bank' under the auspices of the panchayati raj institutions (PRIs) may be prepared for the smooth transactions of land.

Regarding water management, watershed-based planning, along with programmes like 'room for the river' and 'living with water' may be worked out.8 Kerala should take a positive approach towards the PDNA report, especially concerning water management. Apart from this, on-going programmes like well recharging, rainwater harvesting and project

of in situ water conservation should be entrusted to PRIs and people's organisations. There is a general misconception that Kerala has surplus water resources. This has to be corrected through informed water literacy campaigns. Another issue is that a large proportion of granite, laterite and sand mining quarries in the state are being operated illegally.9 This has an adverse bearing on ecological balance. It is unfortunate that till date there are no laws or rules in the state to take stringent action against the illegal mining operations. We therefore suggest that the State Government with the help of scientific institutions like the National Centre for Earth Science Studies (NCESS), Centre for Water Resources Development and Management (CWRDM), Kerala Forest Research Institute (KFRI), State departments of Groundwater, Mining and Geology, University and college departments of Geology and Geography, should take the initiative to scientifically map and assess the availability of natural resources and place limits on mining activities. The information so gathered should be placed in the public domain. Parallel to this process, the government should formulate and implement necessary laws to regulate mining activities.

Solid waste management has already become a major issue in the state. Except in the case of some selected panchayati raj institutions and R&D organizations, no broad steps have been taken to deal with the problem. Projects that promote in situ management, segregation and recycling of waste should be popularised among the public. There are some excellent models at the local level that can be followed. Kerala's building construction and related real estate business contributes to more than 30 per cent of the State Domestic Product (SDP), whereas productive sectors like agriculture and manufacturing together constitute less than 20 per cent of the SDP. It is noted that a fragile land area with sensitive environmental issues is not conducive for following this type of a `development' pattern.

It will be better for Kerala to follow a policy of 'building with nature' as proposed by the PDNA report. Propagation of new habitat culture based on eco-friendly and locally-available materials, coupled with a green building protocol can be opted. Regulations should be enacted to promote building construction that is in tune with local conditions and structural designs suitable to the topography of the area. It is also necessary to generate awareness among people about the `new habitat culture'.

It is a matter of concern that in Kerala the guidelines relating to construction of buildings are being flouted in ecologically-sensitive areas like Kuttanad, an area lying below sea level, and in high-altitude areas like Munnar. Coupled with this is the indifferent approach of the state Public Works Department (PWD) with its outdated building manual which stands in the way of developing a new habitat culture. There are excellent alternative construction models in the state built by the great architects like Laurie Baker which have been in existence in the state for the last five to six decades. However, the official (PWD) manual has failed to give the required importance to these alternative building structures and models. In this context, one should examine the possibilities of repairing and reusing old buildings instead of demolishing them.

With regard to infrastructure, many roads were badly damaged by the 2018 floods and this severely affected the transport system in many areas during the floods. In the rebuilding process, importance should be given to streamlining the public transport system in the state with a proper rail-road co-ordination. In view of the issue of climate change, some sort of social control over private vehicles is necessary. Passenger trains commuting at short intervals and connecting short distances will help reduce the road traffic congestion, limit the use of petroleum products as well as control carbon emissions.

The entire programme of rebuilding of flood-affected Kerala, must also focus on the is-
sue of climate change. People of Kerala should realise that climate change is a reality
and that the state's ecological footprint and carrying capacity have already surpassed
the affordable limit.

The special environmental factors in Kerala, viz. risks and vulnerability in the land use
pattern, low per capita availability of land, high population density, steep slopes, chaotic
topography, etc should all have to be looked into. Our earnest attempt shall always be
to minimise disaster causalities and material damage. It is the collective responsibility
of the state and its people to make sure that the state is well-equipped to meet similar
disasters in the future. Floods and droughts are natural, but acute disasters are man-
made. Our motto is to 'build a better and resilient Kerala'.

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RESILIENT KERALA: MATTERS OF THE MIND IS KEY

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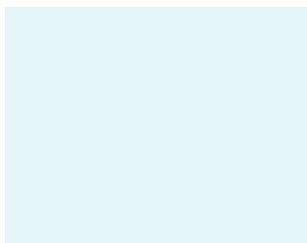
INTRODUCTION

Disasters result in bitter memories. Psychological suffering manifests instantly. These are mostly normal and natural reactions to an abnormal situation. Left unattended, symptoms and suffering linger for a long time. When people live through a disaster, there is only so much they can take, literally. Liken the mind to a balloon. If you keep pumping air into it and don't let off the pressure, something must give way. Mind matters in disaster settings. Matters of the mind should find a central place in disaster and development policy discourse.

The unusually high rainfall during the 2018 monsoon season triggered unprecedented floods in Kerala. This worst flood in nearly a century left 483 people dead and 14 missing[1]. About a million people were evacuated. During the peak of the floods, about 1.45 million people were in relief camps[2]. One-sixth of the total population of Kerala had been directly affected by the floods and related incidents. The Indian Government had declared the floods as a Level 3 Calamity, or "calamity of a severe nature".

During the floods, timely rescue work by the local people, fisherfolk community, young people and the State Government was complemented by the Armed Forces and National Disaster Response Force of the Indian Government. Working in coordination with the government, UN and local self-government units, local, national and international aid agencies also contributed to scale up the quantum of humanitarian assistance.

The overall rescue and relief efforts were efficient and effective in comparison with several other flood episodes in India and abroad. The 2018 flood being one of the worst-ever in nearly 100 years raised several challenges such as lack of contextual experience of dealing with floods, appropriate-

ness and prioritisation. Some reports indicate the anger and frustrations of flood survivors regarding deficiency in rescue and relief work. This paper is not able to verify the veracity of such reports.

Some issues didn't receive the due attention - some such issues being
• invisible needs such as mental health and psychosocial support (MHPSS)
• care and support for 'invisible groups' such as those who are terminally ill or who need end of life care
• prevention, care and support to tackle the public health consequences of the floods. Over 60 people[3] were reported to have died from leptospirosis, a preventable disease.

The flood is a wakeup call to strengthen disaster preparedness and risk reduction measures in Kerala. This paper explains the immediate and long-term impacts of floods and disasters on human minds. By drawing from direct experiences of working in disaster settings and by borrowing lessons and good practices from post-disaster settings in India and abroad and global standards, this paper suggests policy recommendations and pragmatic actions to put mental health and psychosocial issues at the centre of disaster preparedness, relief and rebuilding efforts. It cautions that the idea of a 'Resilient Kerala' won't be a reality if attention is not paid to matters of the mind.

Mind healing in disaster settings involves recognising people's needs, fears, anxieties and their aspirations and galvanising the social capital. It also requires an early start, long-term vision, community support and sensitive psychological and social interventions.

HOW DO DISASTERS IMPACT HUMAN MIND?

Immediately after a disaster, in most settings, life-saving aid flows in. Yet, while the government and voluntary agencies and academics have expertise in dealing with the physical needs, they can miss the invisible needs of disaster survivors - such as mental health and psychosocial support.

Different disasters impact the mind in unique ways. In some contexts, natural disasters such as earthquakes often brings the best of human beings and thus have a binding effect on the community. Survivors help each other. Violent conflicts polarise people. Lack of trust and information or fake news amplify anxieties in disease outbreaks (e.g. Ebola). Research[4] amongst children in Sierra Leone and Liberia in Africa during the Ebola outbreak found that Ebola has adversely affected the children due to loss of loving relationships, hope and self-belief, just as severely as it threatened their physical needs, as many have lost family members and friends.

Disasters impact different people in different ways- children and differently-abled people are often more impacted than others. One author of this paper came across children in conflict and war settings who have lost their legs from landmines which limited their mobility. Loss of mobility often hampers ability to play and engage in recreational activities. Years later, during a follow up visit to places impacted by the 2011 earthquake and tsunami in Tohoku region in Japan and the leak from Fukushima nuclear reactor, one author of this paper came across stories of children hesitating to flush toilets- since the sound and movement of the water reminded them of the deadly tsunami.

'Invisible Wounds- The impact of six years of war on the mental health of Syria's children[5]' revealed that 84 per cent of adults and almost all the children said that ongoing

bombing and shelling is the number one cause of psychological stress in children's daily lives. A total of 71 per cent said that children increasingly suffer from frequent bedwetting and involuntary urination – both common symptoms of toxic stress and post-traumatic stress disorder (PTSD) among children. The longer the war (in Syria) is allowed to continue, the greater the long-term impact on children will be.

During the ten-year period between 2008 and 2017, over 3751 natural hazards have been recorded worldwide[6] (based on information from 198 countries). That is more than one every day[7]. Today, 420 million children – nearly one-fifth of children worldwide – are living in a conflict zone; a rise of nearly 30 million children from 2016[8].

With disasters frequently occurring across the world, it is imperative that adults and children are equipped to deal with them.

Some planners assume that mental health work is optional and may be taken up during later stages of disaster response. Delay in integrating MHPSS will result in missing a crucial opportunity to address stress, delay or stop the progression of anxieties to irreversible mental health problems and clinical manifestations such as Post Trauma Stress Disorder. Thus, initiating MHPSS early during a disaster response is key to aid recovery and to put survivors back on their feet.

MENTAL HEALTH AND PSYCHOSOCIAL DIMENSIONS OF KERALA FLOODS

Some floods occur without warning and when they do, they have catastrophic impacts, including on human minds. Images of the speed and ferocity of the movement of flood waters, destroyed houses and belongings, uprooted trees, damaged roads and bridges etc all will impact the mind instantly. Sensations that may generate coping challenges include desolation of the landscape, the smell of sludge and sodden property, coldness and wetness, and vast amounts of mud. Most floods do not recede overnight, and many residents have to wait days or weeks before they can begin the cleaning up activities. An unprecedented and catastrophic flood that impacts a community that has no such previous experience may bring unique after-effects amongst survivors.

The thought of being struck by a disaster again and the imagery of the disaster may stay with the survivors. Some may start avoiding anything which can induce that imagery. Others may take to substance abuse as a coping mechanism or withdraw themselves from social life[9]. The most affected vulnerable groups are children, women, elderly, differently-abled persons and chronically-ill persons. Children would have long-lasting psychological impacts due to the floods.

Images and news of the 2018 floods that left most of Kerala submerged under flood waters, large areas cut off completely from rest of the world, without power, water, food and communication links also resulted in heightened anxieties among Kerala diaspora communities elsewhere. The State's economy was adversely affected because of the impact on tourism sector, which is the state's major revenue earner. Floods also damaged 30,000 hectares of crops where farmers face a bleak future[10]. These factors will influence recovery and mental health of flood survivors.

Fake news and misinformation propagated through social media accentuated the mental and physical sufferings of the flood-affected people. Nevertheless, a key factor that helped to generate hope and optimism was the heroic rescue operations carried out by hundreds of personnel from uniformed services, fisherfolk community, voluntary agencies, health workers, young people, youth organizations, media, students and the crowdsourced relief efforts.

Along with this, the mental health teams from different district hospitals and the District mental health programme were able to provide the initial psychosocial first aid and train the volunteers on Mental Health and Psychosocial Support (MHPSS) to integrate the same in the services[11]. This is expected to mitigate the psychosocial impact and distress amongst flood survivors. Psychosocial support needs to be an integral component of the rehabilitation services. The available systems like District Mental Health Programme and the activities of Social Welfare Department, in coordination with the other sectors, would be able to address the psychosocial services for the flood survivors.

LESSONS FROM OTHER DISASTERS IN INDIA

Lesson 1: Medical model Vs Bio Psychosocial Model: In 1984, during the Bhopal gas tragedy, the approach towards addressing the mental health of disaster survivors were more of addressing the psychological and or psychiatric symptoms without looking into the social and economic cause of the symptoms[12]. This has not helped much in a long run as the pharmacological treatment would not help in addressing the cause. So psychosocial support and mental health services should not be restricted to medical model which limits treatment to symptoms.

From the lessons learnt in the past, during the Orissa floods (1999), Gujarat earthquake (2001), Indian Ocean Tsunami (2004), the psychosocial needs of the survivors were addressed through various programmes that deals with a broad range of psychosocial problems. The programmes had an objective to promote the restoration of the social cohesion infrastructure as well as the strengthening the independence and dignity of individuals and community groups. It serves to prevent pathological developments and further social dislocation.

Lesson 2: Involving the community workers: The actual number of mental health professionals in the country is very limited (13,000 – 14,000)[13]. However, with increasing incidence of disasters and growing awareness about mental health and psychosocial dimensions of disasters, the need for larger number of professional expertise and trained human resources has been realised. Experiences from other disasters teach us that preparing the community-level workers from different sectors (such as Social Welfare, Education, Health etc.) and various civil society actors (such as Non-Governmental organisations, Community-based organisations and Self-help groups) will help in reaching out to the affected people from the early stages of a disaster and contribute to provide services in a sustained manner. They can also play a critical role to identify survivors who need specialised services and work as a catalyst to refer them to the experts.

Lesson 3: Capacity-building on Psychosocial and mental health services: It should be done at all levels of the administration and of people in all relevant sectors. Orientation and sensitization of the leadership and department heads will help to integrate MHPSS programmes across all sectors. While training the community-level workers, skills should be imparted through experiential learning methodologies (by simplifying and demystifying technical matters).[14,15]

Lesson 4: MHPSS from rescue to reconstruction: MHPSS should be both included in the short-term and long-term objectives of disaster response strategies. Psychological First Aid to build the psychosocial competencies of volunteers and communities should start instantly, and various time-bound activities should be undertaken throughout the recovery and reconstruction phase. In addition, the preparedness programmes focusing on MHPSS should be in place. The National Disaster Management Guidelines on Psychosocial support and mental health support in disasters (2009, Government of India)

should be implemented strictly at the national, state and district levels. This would help in integrate and institutionalise MHPSS in all sectors and at the community-level effectively.

KERALA'S MENTAL HEALTH CAPABILITY

Kerala has more than 600 psychiatrists and 400 clinical psychologists[16] in addition to a large number of trained psychiatric social workers. This is the largest human resource in any state in India. However, a considerable number of them are abroad. The State has three government-run and several private mental health institutions. Together, they count for almost one-third of the institutions in the country dealing with mental illness.They provide direct services and training. Some are done through the well-established District Mental Health Programmes available in every district in Kerala[17].

A closer scrutiny of Kerala's mental health profile reveals a paradoxical development. A report published in 2017[18] as part of national mental health survey coordinated by the National Institute of Mental Health and Neuro Sciences, paints the true picture of Kerala's mental health status. An alarming finding in the report is the high levels (12.6 per cent) suicide risk. This is double the national average (of 6 per cent). The report cautions that the risk of suicide is very high among 2.23 per cent of the population surveyed. Men are more at risk. The report also says that about 11 per cent of the people are affected by common mental morbidity. About 4.82 per cent are victims of various mental disorders due to the use of alcohol.

Kerala has exemplary track record for its physical and public health work. However, such a rigour is yet to be reflected in the area of mental health care despite clear and loud warnings by various studies and surveys. Some experts blame a combination of factors for the low levels of performance in the area of mental health, such as lack of political will and prioritization by the administration, poor planning and limited resource outlay. These factors have resulted in Kerala not achieving the long and short-term objectives set out in the state mental health policy that came out in the year 2000.

The indicators of poor mental health could jeopardize the achievements in education and physical wellbeing[19]. The challenges of mental ill-health in Kerala need to be relooked just not at the diagnostic numbers, but also on the increasing divorce rates, increasing numbers of reconstructed families, family issues, prolonged marital conflicts, problems of ageing, single parent families, increased alcohol/ substance/behavioural addictions and decreasing people support due to ever-reinforcing migratory possibilities. The government-run hospitals could be redesigned to provide bio psychosocial care that attracts patients and family members through multidisciplinary approach. The capacity of individuals in terms of social trust, harmony and support need strengthening for enhanced mental health at individual level.

MENTAL HEALTH AND PSYCHOSOCIAL CARE SUPPORT IN HUMANITARIAN SETTINGS – GLOBAL DIMENSIONS

Standards and guidelines:
There are universal standards and global guidelines and other tools to promote a scientific and evidence-based approach to MHPSS in disasters and conflict settings.

Sphere Handbook 2018[20] recommends evidence-based standards and makes a case for initiating MHPSS from the early days of disaster response. It calls for ensuring MHPSS and other humanitarian responses, respect for the impacted people and ensure a dignified response.

IASC Guidelines for Mental Health and Psychosocial Support in Emergency Settings[21] (IASC, 2007) is a collective effort of the World Health Organization and numerous agencies and practitioners worldwide. The IASC guidelines provide valuable information on how to respond appropriately during humanitarian emergencies. Specific sections offer useful guidance on mental health and psychosocial support, and cover key areas such as coordination, assessment, protection and human rights, community mobilisation, education, dissemination of information etc,

The guidelines include a matrix, with guidance for emergency planning, actions to be taken in the early stages of an emergency and comprehensive responses needed in the recovery and rehabilitation phases. The matrix is a valuable tool for use in coordination, collaboration and advocacy efforts. It provides a framework for mapping the extent to which essential first responses are to be implemented during an emergency.

Psychological first aid: Guide for field workers[22] (2011) involves humane, supportive and practical help to be rendered to fellow human beings suffering serious crisis events. This guide is for people to help others who have experienced an extremely distressing event. It gives a framework for supporting people in ways that respect their dignity, culture and abilities.

The guide has been endorsed by many international agencies. The guide also reflects the emerging science and international consensus on how to support people in the immediate aftermath of extremely stressful events.

United Nation's Central Emergency Response Fund (CERF) recognises mental health and psychosocial support as a "life-saving" component. CERF is a stand-by fund established by the United Nations to enable timely and more reliable humanitarian assistance to survivors of disasters and complex emergencies. Support from the CERF is based on the idea of prioritized "life-saving" assistance to people in need[23].

In disaster and humanitarian settings, various agencies bring out reports and other publications to highlight the impact and need to address mental health and psychosocial support.

The IASC MHPSS Reference Group[24] (established in 2007) supports and advocates the implementation of the IASC MHPSS Guidelines. The Reference Group consists of more than 30 members, and fosters a unique collaboration among NGOs, UN and International Agencies and academics, promoting best practices in MHPSS. The major aims of this group are to facilitate integration of the core principles of the Guidelines into all sectors of emergency response; foster collaboration and to develop relevant tools and institutionalise the Guidelines.

In India, National Institute of Mental Health And Neuro Sciences and civil society organisations have developed useful training and self-help materials.

LESSONS AND RECOMMENDATIONS

1. Recognise matters of the mind as a key priority in planning and policy-making. Resource it properly.
2. Develop a cadre of 'barefoot Psychological First Aiders'. Psychiatrists and doctors alone can't fight trauma. Strengthen the capacities of key actors in the community – e.g. teachers, health care professionals, palliative care volunteers et al.
3. Media and social media are powerful tools to inform, educate and empower people.

They can play a critical role to demystify matters of the mind. Most importantly, they need to stop spreading rumours and unscientific information.

4. MHPSS should be key component in disaster preparedness, risk reduction and re-silience-building activities. The government, private sector, academics and aid agen-cies must include mental health more actively in needs assessments, programme design - not just after disasters occur, but during and before the disasters too.

5. A community-based approach must be put in place . It should be cost- effective, should demonstrate ownership and should be contextual. To make community-based approach a reality, academics and experts must move beyond the walls of their labs, consulting rooms and lecture halls.

6. Simple messages (through media, social media and text messages)   during the peak of the crisis will help to stop preventable anxieties and instil sense of hope and confidence.

7. Recognise the importance of play, community and recreational activities.

8. Develop programmes to take care of the mental health of care-givers and relief work-ers.

(Disclaimer: *Information, ideas and opinions expressed by the authors do not represent the views of their employers).*

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SIGNIFICANCE OF WASTE MANAGEMENT IN KERALA'S DISASTER RISK REDUCTION STRATEGIES

GEORGE CHACKACHERRY, PRATHEESH C. MAMMEN

The floods have exposed and exacerbated the management challenges of solid wastes in Kerala.

George Chackacherry

Pratheesh C. Mammen

INTRODUCTION

The daily generation of total Municipal Solid Waste (MSW) in Kerala is estimated to be 10,044 tonnes per day (tpd) across corporations, municipalities and gram panchayats. Of this, households generate 50.1 per cent of the MSW, followed by street sweeping (12.2 per cent), commercial centres (9.9 per cent) and hotels (7.8 per cent). Detailed sampling studies in major urban centres of the state indicate that the level of waste generation is almost 17.5 per cent higher than the general estimates. As per these studies, the total MSW generation in Kerala is 3.7 million tonnes annually, which includes 1415 tpd of MSW generated by six City Corporations, 4523 tpd by 87 Municipalities and 4106 tpd by 941 grama panchayats. In addition, Kerala generates about 38100 tpd of slaughter waste from 15680 units that include 182 slaughter houses, 8707 poultry stalls, 1481 poultry and meat stalls, 2632 butcher and meat shops, 2482 meat stalls and 196 miscellaneous stalls handling meat and poultry. Out of this, 809 units have no facility for waste disposal, A total of 490 units disposes waste to open pits and 4104 to closed pits. The number of units which reported that they have other types of waste management facility was 8700 units which means that they are also to be considered as units without any waste disposal facility. Only 666 units work with treatment plants for waste disposal (GoK, 2018). It is a fact that less than one-fourth of the total MSW generated in the state is treated some way or other.

Health care institutions are also a major source of waste. Kerala has the highest number (about 27 per cent) of health care institutions in India and the total bed strength of hospitals in Kerala is 1,13,530. It is estimated that about 83,000 tpd of waste is generated in the hospitals of which 15 per

cent is infectious or toxic. Kerala also generates industrial hazardous waste to the tune of 71058 tpd from 542 industrial units. A Common Treatment Storage and Disposal Facilities (TSDF) has now been established at Ernakulam and 17 units have their own TSDF for managing industrial hazardous waste. There are no specific estimates on the generation of e-waste in Kerala, though it is a major source of waste in Kerala. Kerala still does not have an e-waste disposal plant and the e-waste mostly goes to the unorganised market for crude dismantling, recovery and reuse. In addition, accumulation of waste on roads and public places with waste litters, polluted water bodies, stagnant contaminants, eutrophication of lakes and waterways, etc. has had an adverse affect on the aesthetic appearance and hygiene environment (GoK, 2018). Pollution from pilgrimage stations situated near rivers and disposal of untreated municipal sewage have resulted in high faecal contamination in all the river systems. The backwaters of the state are also highly contaminated due to the indiscriminate discharge of municipal waste, agrochemicals, oil from fishing vessels, etc. During summer due to the reduction in water flow, the pollution load and intensity increases leading to fish kills and deterioration of water quality.

High density of population, coupled with predominant hilly terrain conditions in Kerala had resulted in relatively limited land available for solid and liquid waste disposal and processing facilities and this has caused Kerala to be more vulnerable compared to other States in dealing with waste management. According to the figures of national census 2011, the population in Kerala State is 33.4 million, and the state's population density is 859 persons/sq km. While India's urban population in 2011 was 23.6 per cent of its total population, Kerala's urban population was as high as 70.6 per cent of its total population. In Kerala, the high level of rainfall (3000 mm per annum) and humidity conditions complicate waste processing options. The peculiar characteristics of the State such as high water table in coastal areas, where most of the urban local bodies are situated and long period of monsoon season spread over six months in an year, makes the solid and liquid waste management a challenging job (Chackacherry, 2013). The collection, handling and processing of wastes in a delimited condition amongst the population creates much trouble and friction during floods as well as posing a fire threat during summer months. This leads to NIMBY (Not in My Backyard) protests which are in a way translated as protests of environmental protection.

Disposal of waste in Kerala has become one of the most serious environmental problems and it presents an increasing challenge to all concerned. Solid waste continues to be a perennial problem all across the State despite the various initiatives taken to contain them. Most of the Panchayats, Municipalities and Corporations face the problem of not being able to manage the solid waste that are being dumped from homes and establishments. The very high density of dug wells in Kerala also makes the job of waste management at the household level a difficult task. The well density in the state comes to about 400 dug wells per square kilometre. Water is contaminated at the household level through seepage and overflow from septic tanks into drinking water wells. Small land holdings having well for drawing drinking water along with presence of household latrines with on-site excreta disposal system are a common scene in rural settings. A study by the Centre for Water Resources Development and Management indicated that 70 per cent of the wells surveyed had faecal contamination. It is reported that poor sanitation and hygiene, inadequate garbage disposal and drainage facilities are responsible for transmission of infectious diseases and prevalence of Chikungunya and dengue fever in Kerala.

EXTREME EVENTS AND RECENT DISASTERS

Kerala is highly vulnerable to natural disasters and the changing climate dynamics due

to its location along the sea coast as well as with a steep gradient along the slopes of the Western Ghats. Kerala has a very long coastline of 580 km, out of which 322 km are prone to severe sea erosion. The state's vulnerability to climatic changes can be considered to be high due to the unique social, economic, environmental and physical conditions that increases its susceptibility to climate-related hazards and limits its capacity to cope with these hazards. The State is exposed to climate-related hazards like floods and droughts. The Kerala State Disaster Management Plan identifies 39 hazards categorised as naturally-triggered hazards (natural hazards) and anthropogenically-triggered hazards (anthropogenic hazards). According to World Meteorological Organisation, 2018 was a highly disruptive year experiencing floods to forest fires across continents in different countries. Kerala, a small peninsular state in India, also experienced extreme climate events. According to a study by Thomas and Prasannakumar (2016) the rainfall concentration during annual, southwest monsoon, and winter-scales exhibited significant decreasing trends, implying decline in the degree of irregularity in annual-and seasonal-rainfall. A recent study by Abhilash, et al (2018) signals that the occurrences of longer time-scale droughts are becoming more frequent in the recent decades over Kerala.

Tackling tropical cyclone-related events like the intense rainfall, strong winds and storm surges is a strenuous task for a landmass with variable topography like Kerala. The cyclone 'Ockhi' which hit the state during 2017 was unlike other cyclones. The cyclone had originated near the south-western coast of Sri Lanka and after crossing over to India had ravaged the coastal areas of Tamil Nadu, Kerala, and the Lakshadweep islands. The rapid intensification of a deep depression within a short span of time into a cyclonic storm and its long gestation period were the notable characteristics of 'Okchi'. According to a report tabled in the Rajya Sabha and Lok Sabha in April last year and which is available in the public domain, 'Okhi' resulted in 75 human lives being lost, 221 houses fully damaged, 3253 houses severely damaged in addition to causing losses to 7817.43 hectares of crop area.

Kerala experienced heavy floods last year due to abnormally high rainfall from June 1, 2018 to August 19, 2018. This resulted in severe flooding in 13 out of 14 districts in the State. The human impact of 2018 floods was manifested not just in deaths and people fleeing from homes, but in a number of ways and the impact of which is still continuing (Kannan, 2019). Over 17,300 families lost their residential structures. More than 1.7 lakh houses were partially destroyed along with 1,613 schools and a number of other public and private buildings. Many sectors like agriculture, animal husbandry, fisheries, infrastructure, water supply system, etc. were severely affected by the floods. UN study estimated losses incurred due to the floods at around Rs 27,000 crore, which is equivalent of 6.6 per cent of the state income in 2018. The State also experienced unprecedented landslides in the year 2018, most of which occurred in the districts of Idukki and Wayanad and hilly regions of Kozhikode. Kerala experienced over 500 major and minor landslides of which over 50 per cent occurred in Idukki (Sankar, 2018). While Idukki experienced a total of 143 major landslides, Wayanad was hit with almost 247 landslides, out of which 200 can be classified into road slips.

EXPERIENCE OF 2018 FLOODS

The floods in 2018 exposed the disaster vulnerability of Kerala and lack of adequate disaster preparedness and response and disaster risk mitigation. Prior to the floods, Kerala was doing well in terms of sanitation, having achieved Open Defecation Free (ODF) status in 2016. The State's sanitation coverage, based on Census 2011, showed that 67 per cent households had water-sealed toilets, and 95 per cent had a toilet facility

within the premises. The damage to Sewage Waste Management (SWM) due to the recent floods includes both flood damage to existing SWM units and solid waste caused by floods. The number of damaged SWM units is 2.68 lakh at household level, 349 at community level, and 6,848 at institutional level, across all districts. In the sanitation subsector, household latrines bore the brunt of the floods. Septic tanks and leach pits were the most damaged affecting their structural stability and functionality. An estimated total of 95,146 household latrines (of which 83,506 are in rural areas) were substantially damaged. This deprived about four lakh people of sanitation services. Damage to latrines and septic tanks may induce communities and households to switch back to unsafe sanitation options and open defecation, putting health of the citizenry at risk and stripping Kerala of its ODF tag.

Many households in Kerala, regardless of their socio-economic class, used open wells for drinking water purposes. Almost all these wells were contaminated during the floods. Almost 10,000 wells were ruined in Alappuzha district alone. It is estimated that 3.17 lakh shallow wells were damaged during the floods in the six worst-affected districts, which directly affected 1.4 million persons. The wells are still facing the increased risk of contamination resulting from flood- carried debris, human waste, carcasses, industrial waste, e-waste, etc (UN, et al, 2018). Solid waste management units were established at the household, community, and institutional levels. Damage to these systems and facilities, and the associated cost of recovery may affect the momentum in communities to push forward with these practices. The floods have exposed and exacerbated the management challenges of solid wastes in Kerala. Typical wastes from households that were caused by floods included beddings, furniture made of plywood or pressed wood, electronic waste (computers, televisions, etc.), white goods (fridges, washing machines), clothes, paper (books, newspapers), etc. In addition, where buildings fully or partially collapsed, construction debris also added to the piles of disaster waste.

STRATEGIES FOR KERALA

Disaster Risk Reduction (DRR) is considered as a cyclical process with four phases - preparedness, response, recovery and mitigation, in which, mitigation embraces all measures taken to reduce both the effect of the hazard itself and the vulnerable conditions to it in order to reduce the scale of a future disaster. Therefore mitigation activities can be focused on the hazard itself or the elements exposed to the threat (GoK, 2016). Considering this, it is high time to address the issue of waste management as a priority concern. Waste management is a complex process in Kerala owing to the space constraints and high density of population. Disaster risk reduction in relation to waste management in the context of extreme climatic conditions makes the situation even more complex than ever which should involve different Government departments like health and sanitation, water, environment, local self-governance, disaster management, industries, pollution control, biodiversity, etc. The extent of responsibilities become diverse annually from containment of waste in a space during floods, controlling the fire and smoke from the waste accumulated during summer, reducing the inconvenience to the public during the processing, etc. A clear cut vision and policy directive for a longer term endorsed by changing governments focussing on the integrated action endorsed by different departments is the key for DRR in waste management.

'Nava Keralam' is the State Government's vision of converting the crisis into an opportunity and 'Haritha Kerala Mission' embeds the idea of building a green and resilient Kerala. Haritha Keralam Mission is giving emphasis to scientific waste management, water conservation, organic agriculture, etc. The mission is being implemented to clear and remove waste from all the water bodies; ponds, rivers, lakes and streams. Disposal

of solid waste, removal of waste water and measures to increase the area of land under cultivation will be undertaken under the project. By following Green Protocol as an endeavor to reduce and manage waste in a systematic manner the state will definitely reduce the carbon footprint. As pointed out by UN study, it is necessary to reduce the 'risk of communities to disasters' and emphasise a rebuilding process that 'addresses the root causes of vulnerability'. As per law, there is prohibition for throwing, burning and burying solid waste. The law also necessitates every generator to segregate the waste generated and process, treat and dispose off the biodegradable waste through composting or bio-methanation within the house or institution premises as far as possible. The principle of sustainability necessitates the citizen to imbibe the habit of reduction, reuse and recycle of materials for minimizing waste.

In addition to going on with the traditional methods of composting and biomethanation now followed in the State for treating solid waste, it is required to move with modern technology such as thermal processing and modern composting or biomethanation in closed environment. A high- level committee constituted by the Government as early as in 2011 for suggesting suitable methods for solid waste management, pointed out that the State should have treatment systems with modern technology such as thermal processing for non-biodegradable materials like plastics, tyres, etc. and slow degrading organic material with energy recovery. The committee suggested modern composting or biomethanation in closed environment for treating wet wastes, and thermal treatment – incineration, gasification, pyrolysis with electric power generation – for dry wastes. It was also recommended that new generation incinerators for handling MSW can be considered, if they are provided with adequate provision for continuous feeding, air cleaning, sufficient stack height, facility for secondary gas burning, and online emission monitoring facilities (Suchitwa Mission, 2012). In the context of DRR, it is believed that the menace of waste could effectively be addressed only through centralised or decentralised modern facilities, in addition to the present decentralised source-level composting and biogas generation.

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WASTE DISPOSAL: CHALLENGES AND VIABLE SOLUTIONS

C.T. ARAVINDAKUMAR

The recent floods in Kerala served to remind us of the urgent need to work out practical methods for disposal of wastes.

The task of waste disposal in Kerala is totally different from most other Indian states. In disposal of waste, the state is faced with adverse factors like high density of population as well as inadequate space for sorting and storage of different kinds of wastes. Waste disposal has become more strenuous in the aftermath of 2018 floods. It is only with people's participation that the problem of waste disposal can be addressed effectively. Different kinds of waste have to be sorted, classified and kept separately. It is also necessary that we should make changes to our infatuation with consumerist culture if we are to successfully tackle possible natural disasters in the future.

The 2018 floods in Kerala served to remind us of the urgent need to work out practical methods for disposal of wastes, as the disasters could occur at any time or in any scale. Developed nations have evolved clear guidelines for disposal of waste after floods or other natural disasters. The adverse impact of natural disasters can be lessened if put in place reliable waste disposal systems. Local people as well as local bodies like panchayats, municipalities and corporations have all a key role in developing systems that could effectively deal with the problem of waste.

The main areas relating to waste disposal systems which require utmost attention are the following:

1. AVOID CURBING EXPENDITURE ON WASTE DISPOSAL PROJECTS

It is dangerous and counterproductive to limit expenditure on waste disposal systems by opting for cheaper methods of waste disposal. Costs alone should never be the main criterion while selecting waste disposal methods. Systems using advanced technology should be given priority and access to

funds can be gained by going in for private-public partnerships or by incorporating the private sector in the task. This is because attempts to save money through adopting less efficient methods could have adverse ramifications for the people and the government because people may have to spend exorbitant amounts of money caused by serious health problems resulting from poor waste disposal.

It is found that waste disposal projects are either discarded or kept pending because of comparatively heavy operational costs involved. This results in the spread of dangerous, infectious diseases like dengue fever and chikungunya. It is to be noted that proper preventive methods have to be taken to prevent the outbreak and spread of such diseases in the first place instead of relying on treating these diseases at great costs.

2. ACTION PLAN FOR WASTE DISPOSAL AFTER NATIONAL DISASTERS

It is important to have clear and scientific guidelines for disposal of wastes in Kerala particularly after disasters like floods. The guidelines should incorporate methods to adopt advanced technologies used by developed nations in such situations. In the event of floods or any such exigencies, the following steps are vital for the well-being of the people in general. i). Safe disposal of carcasses and organic animal wastes. ii). Cleaning and clearing buildings affected by the floods. iii). Chlorination of water and cleaning of wells after floods.   iv). Conducting chemical and organic tests to ensure purity of water. v). Note the behaviour of mice and their migration. vi). Adopting maintenance and repair works of septic tanks. vii). Developing practical methods to dispose of different kinds of wastes like paints, acids, batteries, pesticides and glass or plastic bottles and cans. The guidelines should be clear and precise and should contain viable methods to address the problems from a practical perspective.

3. FORMATION OF A WASTE DISPOSAL AGENCY

The initial step is to identify and bring together all agencies, including non-governmental organizations, devoted to the task of waste disposal, and ensuring the active cooperation of experienced employees in the field. Support for this task can also be garnered from experienced personnel in various fields like engineers, environmental activists, administrators, legal luminaries, public information, etc. An organization for waste disposal can be formed which will be able to predict the extent and possible consequences of accumulation of wastes in the event of disasters and help prepare action plans accordingly. The activities should be guided and coordinated, enlisting the support of NGOs, both at the district and at the regional levels.

4. PREPARING A DIARY ON WASTE DISPOSAL PLANTS

The diary should include data relating to waste disposal plants. It should also specifically state the different methods of waste disposal at a particular plant. If a particular type of waste cannot be cleared locally, the diary must enlighten the details of waste treatment plants that can successfully deal with such waste, even if it is far away.

5. TEMPORARY STORAGE SPACE FOR WASTES

People should be made aware of the storage facilities temporarily available for accumulated wastes. Even though storage facilities are comparatively scarce, one can enlist the cooperation of the people in times of any natural disaster. There should also be an intensive drive for making the people aware of the importance of the project.

6. CREATING AWARENESS ABOUT WASTE ACCUMULATION

This involves a master plan to ensure that our houses as well as public places in general should be free from all kinds of wastes, except unavoidable food wastes. There should be an increasing awareness about how the wastes would adversely affect us, as well as its indirect financial implications. If wastes are not properly treated and disposed of, it could lead to financial costs for the locality or the area concerned. People in general should be enlightened about the importance of prompt removal of wastes. Since almost all families in Kerala own motor vehicles there are chances of waste generation by way of dead batteries, worn-out tyres and spares discarded by service stations and garages. These types of waste should be promptly removed. This is also the case of damaged or old furniture items and household utensils,   including electronic or electrical wastes. It is found that some parents are bent on keeping children's toys for decades together as mementos for their children. There are considerable environmental hazards in such actions since toys are most often made of non- biodegradable plastic. It is very important that pesticides should never be kept in homes or at places accessible to children. It is also desirable to limit the number of clothes and dresses. A close examination of our sur-roundings would reveal the accumulation of waste in government organisations and any effort to clear them are blocked by red-tapism. It was found in the aftermath of the 2018 floods that a good share of the accumulated wastes were those dumped at some places over a long period of time. It is a sad that that we have realised it only now.

7. DISSEMINATION OF INFORMATION

In case of the occurrence of natural disasters, there should be clear guidelines on how to deal with different types of wastes and effective ways to pass on the information to the designated agencies as well as the public. The decisions taken should be communicated promptly to all those concerned, utilizing the modern facilities of information technology. It is important to promptly take action rather than take a sloppy approach when disasters overtake us.

8. LEGISLATION ON WASTE DISPOSAL

Existing legislation on waste disposal is inadequate to address current realities. There-fore it is necessary that existing rules and regulations be revised, modified or updated so as to keep up with changing times. Fresh legislation or updating of existing rules should be done with the cooperation and support of the public.

9. NEED FOR AN AUTHENTIC SURVEY ON POST-FLOOD WASTE DISPOSAL

It is of very important that the 2018 Kerala floods and the problems of waste disposal should be intensively reviewed to analyze their causes and impact so as to work out re-medial measures for dealing with any such disasters in future. Only then can we prevent the recurrence of such hardships in future. Such reviews are conducted and possible remedies suggested as has been done in countries like US, Thailand and Malaysia, to name a few countries.

It may be noted that these are some practical and viable suggestions on dealing with waste disposal and possible disasters. The active participation of people is inevitable for the success of waste disposal projects at the ground level.

IN THE AFTERMATH OF CYCLONE OCKHI

EUGENE H. PEREIRA

Though crores of rupees were spent on climate alert, disaster management and disaster preparedness, the provisions of assistance from government agencies were inadequate for people especially in coastal areas which were the worst-hit.

INTRODUCTION

During the 2004 tsunami, the government machinery proved inadequate to deal with the crisis. Though crores of rupees were spent on climate alert, disaster management and disaster preparedness, the provisions of assistance from government agencies were inadequate for people especially in coastal areas which were the worst-hit. The devastating cyclone - Ockhi- which occurred on November 30, 2017, also resulted in loss of life and severe damage to the livelihood and the habitats of fishermen in southern Kerala and southern Tamil Nadu especially in Thrivananthapuram and Kanyakumari districts.

The story of Lawrence Bernard and a deceased person Lawrence Antony, both from Poonthura village near Thiruvananthapuram, reveals the ineffectiveness of the rescue machinery when the cyclone Ockhi hit the Kerala coast. Lawrence Bernard and Lawrence Antony, both fishermen, had left for sea on their boat for fishing on November 29 evening from Poonthura. In the middle of the night, the sea turned very rough and all of a sudden they had to confront gale-force winds and turbulent sea waves and undercurrents. Their fishing boat capsized in the stormy weather and the two fishermen fell into the sea. They struggled hard to hold on to the boat with the ropes they normally use for safety during times of emergency. They struggled all through the night and they had the fervent hope that a rescue mission would save their life. As time passed, the water was getting chilly cold due to the heavy breeze. By using the rope they desperately clung on to the boat and in between climbed on to the capzised boat to escape themselves from the chilling cold water. They waved their clothes to attract the attention of aircraft, helicopters and the rescue ships which were passing in their vicinity. But to their dismay none of them came to the rescue. The day was fading and one more night was falling. The fishermen were losing hope. The third day too passed and the minds of the fishermen were filled with agony and anxiety. On the midnight hours of December 3, Lawrence Antony was

desperately crying out that 'the ambulance is coming'. Lawrence Antony's anguished call for help was his last call for help and he sunk into unfathomable depths of the ocean. When morning fell, Lawrence Bernard started shouting and searching for his comrade. Hoping against hope, he had hoped that someone would rescue his missing friend. It was to his surprise that a foreign vessel passing through the route rescued him from the boat. This was on the noon of December 3 and he was rescued from the sea at Cochin area. This is not the story of only two Lawrences. There were many other fishermen like them who had struggled to keep alive during the cyclone.

On November 30 evening, another fisherman Thaddeus, who was also caught in the cyclone Ockhi in the sea, had contacted the nearest Coast Guard station at Vizhinjam through his mobile phone seeking help to rescue him. Inadvertently, it was a trawler boat which was passing through the route which rescued him. Another fisherman Carlose from Veli was found adrift in a catamaran during the cyclone. There were many requests to the Air Force and Coast Guard to rescue him. When all requests failed to evoke any response, the local fishermen from Mampally near Anjengo decided to venture into the ferocious sea on a rescue mission. Two of the fishermen who were on the boat on the rescue mission were thrown into the sea due to the rough weather. Luckily for Carlose, the person who was steering the boat managed to locate and rescue him in the inclement weather. These are some of the instances of tragedies and hardships faced by fishermen during the cyclone.

INADEQUACIES IN DISASTER PREPAREDNESS AND MANAGEMENT

In the aftermath of the cyclone, in spite of repeated requests, there was no proper machinery to take stock of the number of fishermen missing. So the families of affected fishermen and the community had to face deep anguish and anxiety as to know the fate of their dear ones as well as to get the exact number of those missing. There were also reports of fishermen landing in various ports and fishing harbours of the country after the cyclone. There were problems with the docking of fishing vessels carrying traumatised fishermen who were without food for days and lacking in health care. In spite of having huge machinery with different sections under the Fisheries Ministry, Port Ministry and Revenue ministry, the government system failed to act promptly.

The India Meteorological Department (IMD) also proved to be inadequate both during the time of Ockhi as well as during last year's floods which caused untold misery to the people of Kerala. During these disasters, the people were left to fend for themselves despite the big technological advances made over the years. The India Meteorological Department which is responsible for operating the disaster warning system failed to give early warning or appropriate directives during times of natural disasters such as the cyclone Ockhi which resulted in the deaths of more than 350 fishermen, who were the breadwinners of their families. The cyclone, which developed near the Andaman and Nicobar islands, had crossed the southern coast of Sri Lanka and was forming into a deep depression. The joint Typhoon Warning Centre and the US climate prediction centre had clearly marked out the path of the depression as early as November20 and this suggested the formation of cyclone. This was reported in the newspaper Business Line. But the IMD in Delhi ignored the warning and sent the first e-mails about the depression only on November30 at 12.00 noon.

The State Disaster Management Authority (SDMA) formed in 2007 following the enactment of the National Disaster Management Act 2005 also failed in alerting the government through early warning and intervening properly in the rescue operations and other emergency action. No control rooms were opened to assess the scale of the disaster, co-

ordinate the rescue operations and facilitate the return of stranded fishermen who landed in ports of Maharashtra, Karnataka, Lakshadweep, etc. No committee was constituted to work out proper relief and rehabilitation measures as well as to rectify the shortcomings in the warning system and rescue machinery and to address the mental, psychological and physical concerns of fishermen who were rescued from the cyclone. During rescue operations, there were lapses in coordinating various sections of the government machinery - the Coastal Police, Marine Enforcement, Coast Guard, Navy and Air Force – with the local fishermen. Coordination was also necessary among state government departments such as Revenue, Fisheries, Social Welfare, Health, Disaster Management Authority, district civil authorities, to effectively implement relief and rehabilitation measures in a time-bound manner.

NEED FOR INTERVENTIONS

The following interventions are speedily required to be taken now to tackle possible disasters like cyclones along the coastal areas:

i). Early Disaster warning system: The State Government must discuss with the Central Government measures to install satellite-based disaster-alert machinery located in ISRO stations in the disaster-prone coastal areas and at hill stations. The IMD, CES and INCOIS must be integral to this satellite-based system.

ii). The State Disaster Management Authority may be reconstituted by including experts from the scientific community as well as local people from coastal and tribal areas who have sufficient knowledge about vulnerable areas.

iii). State-level and district-level disaster management plans have to be framed. These plans are to be framed in consultation with the stakeholders to address the issues at the time of disasters.

iv). Community-based and the vessel-based warning systems have to be developed and installed. Early warning centres have to be set up in disaster-prone areas and the fishermen should be provided with a two-way wireless communication system to be used in times of need and emergency.

v). Community-based disaster management committees have to be formed primarily in the disaster-prone villages and the members of the committee have to be provided with training to act in times of necessity.

vi). Disaster awareness programmes should be conducted at the panchayat-level through Kudumbasree, social service, cultural, community and religious organisations, to generate awareness in the civil society about possible disasters.

vii). Community-based mock drills have to be conducted at regular intervals to equip members of the civil society for disaster preparedness.

viii). Disaster awareness, preparedness and mitigation measures should be made part of the school and college curriculum.

ix). Fishermen registration: The registers of fishermen venturing to the sea for fishing should be maintained at the fishing ports, fish landing centres and villages with the support of the communities.

x). Safety equipment to fishermen: The fishermen should be provided with wireless communication systems, and safety equipment like life jackets.

xi). Education on disasters through media: Social media and the audio-visual media should be used as tools to educate the public about natural disasters such as tsunami, cyclones, earthquakes, landslides, floods and the precautionary measures to be adopted.

xii). Rescue operation systems have to be revamped with the participation of the local communities. In cases of emergency during disasters, the State Chief Ministers and Lt Governors of Union Territories must be empowered to seek the help of the chief of the local Army, Navy, Air Force, and Coast Guard wings as well as from the Marine enforcement and coastal police to expedite rescue and relief operations. The existing regulations of the Central Government in this field have to be amended.

xiii). Shelters should be built in the disaster-prone areas of the State for emergency evacuation at the time of disasters.

ROLE OF CIVIL SOCIETY ORGANISATIONS IN KERALA'S DISASTER RISK REDUCTION – A CASE STUDY

G. PLACID

There is urgent need for adopting a community-based participatory and inclusive approach for developing and implementing DRR and disaster management programme.

INTRODUCTION

Sahayi Centre for Collective Learning and Action (SAHAYI), a regional voluntary development support organisation, started its interventions by registering as a charitable organisation in 1990 with its headquarters in Thiruvananthapuram. The vision of the organization is 'the realisation of a self-reliant, self-sustained, peaceful and prosperous society with gender equity'. The important goals of the organisation include ensuring intensive and extensive use and practice of participatory approaches in training / learning, local governance and development and disaster management. Its main areas of intervention includes strengthening Civil Society Organisations (CSOs); making local self-government bodies in Kerala into true democratic institutions; women empowerment; promotion of peace and social cohesion; disaster relief, rehabilitation, reconstruction and preparedness; providing professional management consultancy support for CSOs and other development agencies, undertaking participatory studies and evaluations; development and publication of educational material; campaign on rights issues; public advocacy and policy lobbying. In connection with disaster management, SAHAYI was actively involved in the tsunami disaster relief operations in Alappad and Kollam, offered consultancy support services during 2017 Ockhi cyclone disaster and was moderately involved in the flood disaster relief in lower Kuttanad area in Alappuzha district.

TSUNAMI REHABILITATION STRATEGIES

Sahayi had actively participated in the relief, rehabilitation, reconstruction and disaster mitigation and preparedness work at Alappad grama pachayat in Kollam district when the

Indian Ocean tsunami hit this coastal area on December 26, 2004. Alappad panchayat is a narrow strip of land on the coast of the Arabian sea, separated from the mainland by a canal and a densely populated traditional village inhabited by the fisherfolk. The 17 km-long narrow strip of land, at the time of tsunami, was connected with the mainland by a single bridge located close to the southern edge. Much of the inhabited area lies below the sea level. The maximum width between the sea and the canal is 500 metres. There were no sea walls in many areas of the village at that time and the community had always been exposed to the monsoon tidal waves. Their vulnerabilities to the vagaries of nature had been augmented by the indiscriminate mining of mineral sand on the shore (which still continues). On the fateful day, ferocious tsunami waves descended on the village and engulfed everything – 148 lives were lost and fisherfolk lost all their belongings. This place recorded the highest death toll in Kerala (148 out of 196) and women and children were the worst-affected. The fury of the waves was highest in areas where there were no sea walls. The tragedy left thousands of people homeless and hundreds of families lost their means of livelihood. Hundreds were left destitute and many others orphans.

It was in this background that SAHAYI started its support interventions in a phased manner to address the relief, rehabilitation, reconstruction and preparedness needs of the affected community in the village. The strategies adopted by the organisation were participatory in nature and innovative in actions. This was based on four values – protection of the self- respect of the tsunami-affected community, ensure participation of communities to regain control over their own lives, reduction of dependency and ensure effective roles of local governments, civil society and CSOs in planning, implementation and monitoring, and the need for an effective linkage among various stakeholders. Child and youth recreation and development programmes, food and nutrition support for all with specific focus on the more vulnerable, construction of eco-friendly and gender-friendly thatched temporary shelters and toilets, support for maintenance and retrofitting, supply of sanitation kits and kitchen utensils, psychosocial rehabilitation care and support, disaster mitigation and preparedness and most of all giving orientation and training for rehabilitating and rebuilding the affected community in the village.

DISASTER MITIGATION AND PREPAREDNESS PROGRAMMES

Disaster mitigation and preparedness programme initiated by the organisation in the second half of 2008 was an activity as part of of its three-year-rehabilitation-and-reconstruction interventions in the tsunami-affected community in Alappad. It was the first and only intervention of such kind conducted in the area with clear perspectives. Coastal communities - like those affected by the Indian Ocean tsunami and cyclone Ockhi - are exposed to all types of coastal hazards such as fury of tidal waves, coastal erosion, cyclones, rise in sea level, etc., and are prone to disasters like cyclones based on vulnerability conditions. However, such communities are always excluded from the decision-making process for planning and implementation of Disaster Risk Reduction (DRR) programme. As a result, their views and needs are not heard or incorporated in the top-down DRR policies, approaches and plans. It is also evident from our experience that though the civil society and their organisations are the first and immediate responders to any disasters, they do not have any space/assigned role in DRR or disaster management. So there is an immediate need to empower the civil society and CSOs to ensure their active and effective participation in DRR in a sustainable manner. This is the perspective of the organisation. SAHAYI adopted a community-based participatory and inclusive approach to plan and implement the disaster mitigation and preparedness programme. The process was initiated with a detailed needs assessment and developing a plan of action to empower the community to help them deal better with any future

disasters through active participation of various stakeholders. The outcome was the identification of specific needs such as awareness generation on natural and man-made disasters, early warning system and eco-friendly disaster mitigation methods in coastal areas, training in swimming and rescue operations and policy lobbying and developing a disaster mitigation and preparedness development plan at the organisation level.

The programme started with the publication of a set of leaflets on tsunamis - their causes, nature, early warning system, consequences, etc. It was followed by organising a series of awareness generation programmes on topics such as coastal hazards, tsunamis, cyclones and on natural and man-made disasters and ways to prevent and mitigate such disasters as well as in disaster preparedness. Hundreds of community members in Alappad and nearby panchayats participated in the programme. Training in swimming and rescue operations, both in the Arabian Sea and TS canal which lie in the western and eastern side respectively of the village, was a 60-day-long programme. Initially a 30-member youth team - both male and female - from the village was trained by using the services of a professional swimming and rescue trainer. Another 150 youths and students, both boys and girls, were trained by using the services of the trained youth with facilitation and monitoring support of the professional trainer. A two-day training programme on early warning systems and its adaptation at the local level was another programme. First Aid training over three days and a two-day training on fire and safety were the other training programmes in the whole series. The training was imparted to a team of around 50 students and youths selected from among the participants of a programme on swimming and rescue operations. Publication/dissemination of information of SAHAYI's innovative operations and extensive use of community-based participatory approaches and actions was one of the major strategies of policy advocacy. The publications focused on the activities of SAHAYI not only in disaster relief, rehabilitation and reconstruction work, but also in disaster preparedness and mitigation programme. All of it were shared with various stakeholders including the government functionaries at various levels.

MAJOR IMPACTS

The training programmes in swimming and rescue operations along with physical exercises and simulated disaster risk response exercises in sea and the canal not only enhanced the confidence and capacity of the participants but also increased the level of confidence of the members of their families and the community. It gave them confidence that their children had attained adequate ability to save themselves in times of danger and rescue others in case of any future hazards or disasters.

As part of our advocacy efforts, SAHAYI had continuous dialogue with the functionaries of local and state governments. SAHAYI focused on pressurising them to develop a community-based disaster mitigation and preparedness plan incorporating swimming and rescue operations, especially for those communities living in and around different water bodies and are more vulnerable to disasters. However, the policy makers are yet to give a patient listening. But in the background of growing instances of children drowning in the state, the State Government decided in 2016 to teach swimming to all students in five years. This can be viewed as a relatively positive impact.

The increased awareness gained by the coastal community on disasters – their causes and consequences, early warning and alert procedures, structural and eco-friendly mitigation measures of coastal areas – has had a positive impact on these communities. It ensured the participation of trained youth in monitoring the sea wall construction and participation of the community in planting and maintenance of trees along the sea shore

in the village. There are several instances of active engagement of the trained youth in first aid and in the rescue operations of road accidents in and around the village. Several of them have been offering their services as resource persons for swimming training programmes organised by different schools and other institutions and some of them participated in the rescue operations of the 2018 Kerala flood disaster. This successful experiment had been replicated by several other agencies in the state, which is a note-worthy impact.

SUGGESTIONS

The strict regulatory regime has not sufficiently encouraged, motivated or equipped the civil society and its organisations either in disaster risk reduction or in rehabilitation and reconstruction programmes. This acted as a major constraint during the relief operations after tsunami, cyclone Ockhi and the 2018 floods. So there is an urgent need for framing policies that are CSO-friendly to ensure the active participation of civil society in DRR and disaster management. CSOs should actively engage in pressurising the government to enact proper policies and strategies in this regard.

The government agencies dealing with disaster management generally do not take into account or understand valid traditional knowledge on signs of disasters and measures of risk reductions and their uses. Special efforts are needed to combine the traditional and scientific knowledge and make the best out of it. This can be done best by the CSOs.

There has not been a clear policy/approach for developing disaster mitigation plans as part of the total development plan of the state or that of the local governments. The vulnerability reduction measures have been reduced to mere structural mitigation strategies such as construction of sea walls and breakwaters along the coastal areas of the state. This is the best example of implementing plans without studying the long-term impact on the livelihood issues of the coastal population and socio-ecological system across varied temporal and geo-spatial locations. Considering these facts and realities, there is urgent need for adopting a community-based participatory and inclusive approach for developing and implementing DRR and disaster management programme. This will help communities and their organisations to clearly articulating their needs and to ensure building a resilient society in a sustainable manner.

EMPOWERING COASTAL FISHERFOLK IN KERALA FOR BETTER DISASTER MANAGEMENT

MAGLIN PHILOMINA

Kerala's fishermen have proven their innate skills, selflessness and displayed amazing efficiency in a time of crisis.

During the 2018 floods that ravaged Kerala which caused untold sufferings to tens of thousands of people, Kerala's coastal fishermen emerged as the real heroes in the rescue operations. Local communities themselves took the initiative in the rescue and relief operations in the beginning. But considering the magnitude of the disaster, it was too inadequate. People from flood-hit areas were seeking help frantically. Realising the seriousness of the situation, coastal fishermen community mobilised its members. They got deployed in coordinated teams, with team leaders, to different flood-affected regions. The fishermen faced numerous challenges - both technical and non-technical - during their rescue missions. But the fisherfolk along with government officials, as well as Police, Army, Navy, Fire Force and others, were able to provide a much-coordinated support at the time of the urgent need. The rescue operations were the most strenuous. In the initial stage, the rescue boats of the Army were mainly inflatable, but these couldn't sustain the harsh weather conditions and gushing waters. However, fishermen were equipped with wooden boats that had greater manoeuvrability which enabled them to reach inaccessible areas, and rescue stranded people. They also coordinated with the State's rescue teams. Many of them even brought their own initial stocks of fuel and bore the costs of transporting their boats by truck to the flooded inland areas.

Hundreds of fishermen ventured deep into the worst-affected areas and also spent their own money to transport their mechanised boats and fuel in trucks. The boats were also provided with water, safety equipment and fuel that were collected by the fishing community. Thus the rescue missions were possible to a great extent due to the grit and experience of fishermen in operating under turbulent conditions. This was in addition to the rescue operations that were carried

out by the Army and Air Force and National Disaster Response Force (NDRF). The role of fishermen in rescue work was crucial in areas where airlifting was not neither feasible nor available. But the rescuers (fishermen) also suffered losses and sustained injuries. For instance, many of their boats were damaged after being struck by the debris floating in the flood waters, which is not a risk they usually face at sea. Some of them were also injured during the rescue efforts.

Despite being in the lower rungs of Kerala's socio-economic ladder, Kerala's fishermen have proven their innate skills, selflessness and displayed amazing efficiency in a time of crisis. However, in spite of the heroic efforts of Kerala's fishermen in the rescue operations, they are still invisible to many other residents of the state and are being neglected as a community by the government. To improve their state of affairs, there must be more formal government recognition for the fisherfolk as a community, which can be attained through improving their earning capacity and living conditions.

Many consider the catastrophic floods of 2018, as a man-made disaster to a large extent. The impact could have been reduced with proper disaster management system. The State failed in maintaining consistency in monitoring the 44 rivers of the State. The government had ordered opening the shutters of dams, 25 of them initially, in the midst of the heavy rains.

VICTIMS OF OCKHI CYCLONE

The fishing community had just recovered from the trauma of the cyclone Ockhi of November 2017, when many more fishermen were killed than those who died during last year's floods. In the aftermath of cyclone Ockhi, the response of Kerala society towards the plight of fishermen was not very encouraging compared to the support offered by them during the 2018 floods. Even the Coast Guard and Navy were not fast enough in their response during the cyclone, constrained as they were by their strict protocols and inadequate facilities. When the fisherfolk suffered in the cyclone in 2017, not many took notice of their plight and even now, the attitude remains changed.

The government has put forward certain conditions for releasing the compensation amount to the families of the deceased fishermen killed in the cyclone. A sum of Rs 20 lakh has been equally divided among the parents, wives, children, and unwed sisters of the deceased fishermen (Ockhi victims). Under the terms of disbursement, the sum is deposited in a bank fixed deposit for five years. The beneficiaries will receive the interest earned on that deposit in monthly instalments. In families where the deceased fishermen have children, the principal amount can only be withdrawn for their marriage. It is not clear when the parents and widows of fishermen, who died without children, can withdraw the lumpsum amount. In addition to complaints related to the compensation amount, relatives of the fishermen killed in the Ockhi cyclone, have been urging the government to provide sustainable jobs for the widows and adopt and educate the children of Ockhi victims rather than focusing only on the interim financial assistance.

FISHERMEN'S STRUGGLE

Many   families of fishermen have been struggling to rebuild their lives since cyclone Ockhi. It was the fishermen from Poonthura and Vizhinjam who joined the rescue operations in the 2018 floods. They were among those who voluntarily took their boats to the marooned areas and rescued thousands of people who were stranded there for days.

In fact, while people's attention was focused on the floods, the damage to houses on the coast due to the ingress of sea, strong winds and other factors, had not received much attention. Even now, large quantities of fresh water, silt and all forms of debris and pollutants have been pouring into coastal waters. Fishermen fear that this could adversely affect the fish catch and this has the potential to hurt their livelihood.

In the aftermath of Ockhi, the local self-government had developed a public alert and warning system, a local radio alert in Vizhinjam, to provide rapid, reliable and effective communication to local residents in case of major emergencies such as natural disasters. India has set up many departments and organisations related to handling possible disasters such as the National Disaster Management Authority (NDMA). However, the country is yet to achieve sufficient progress in the effective management of disasters. Kerala lacks a proper flood forecast system despite being prone to heavy rains and floods. This had terrible impact on local people who did not have much information about the impending flood disaster.

IMPROVING DISASTER MANAGEMENT

The Kerala Government needs to undertake appropriate action for sustainable use of resources and to help reduce the degradation of coastal and marine environment. Because Kerala is situated in a vital coastal zone, it is essential to develop a detailed disaster risk management plan like that in the Philippines, which is prone to typhoons, cyclones and floods. Philippines has advanced flood forecasting and management techniques. The coastal towns in Kerala have no such preparedness and usually a two-day warning by Indian Meteorological Department (IMD) is the only source of information for fishermen to get any required warning.

Following are some of the steps that are needed to develop better coastal disaster management:

1. A proper assessment must be made about damage caused to the boats of fishermen who participated in rescue operation during last year's floods. The Government and Disaster Management Authority should recognize the services of fishermen and select volunteers from among the fishermen to form permanent disaster response teams. The traditional skills of fishermen in rescue operations have been recognized and the Coast Guard and the National and State Disaster response teams must have statutory provisions to recruit youth from fishermen communities. These recruits may not possess high educational qualifications, but their skills will prove invaluable during crisis situations as was seen during the 2018 floods.

2. Disaster mitigation should be included in the school curriculum to train students to better equip them to deal with natural calamities and to help reduce casualties. Disaster management must focus on identifying infrastructure planning and making design improvements that address current pain points (nuisance flooding) that could withstand extreme weather conditions and recurring events. 'Blue-green' infrastructure should be incorporated and communication platforms should be updated along coastal areas.

3. The operations of civil society organisations should be extended from mere emergency response management towards more proactive measures such as learning from past experiences, making informed decisions related to team building and conducting research on the current status of marine biodiversity. Civil Society organisations need to work in a coordinated manner for better and more efficient disaster management. Typical interventions in the aftermath of disasters should include strengthening the monitoring and surveillance of water quality, soil management and

food safety. Hence, civil society plays a vital role in the development of sustainable disaster management strategies.

4. Disaster vulnerability can be effectively lowered through community participation. Thus dealing with a disaster is a social process that requires public support for planning initiatives and participation. An informed civil society is a potent force in better risk management and in generating people-oriented policies. For instance, the widespread use of plastic not only causes ecological damage but also coastal pollution. It disrupts the entire marine life causing damage to the whole marine eco-system. With better efforts of local self- governments, plastic can be segregated at source, segregated waste could be handed over and user fee could be collected, as per the by-laws of the local bodies. A provision has to be introduced to ensure the collection and channelling of plastic to authorised recycling facilities.

5. Preserving and conserving our environment and ecosystem is vital towards achieving sustainable development and should be made part of the state's rebuilding measures.Steps should be taken to involve local institutions in designing and implementing interventions to restore the natural flow of rivers and developing a comprehensive plan to revive the river system.

6. Oceans are the lifeblood of Planet Earth and mankind. Coastal disaster management must focus on developing improved forecasting tools and ways to minimise losses in case of disasters. Steps should be taken to deal with coastal inundation, flooding, shoreline erosion in the face of rising sea-levels, shoreline management and coastal hazard mitigation. Comprehensive vulnerability mapping, ensuring adaptability of coastal structures and disaster preparedness are important for effective coastal disaster management.

REBUILDING NEW KERALA: PRIORITY SHOULD BE GIVEN TO WOMEN EMPOWERMENT

SONIA GEORGE

The drive to build a new Kerala will yield positive results only if the rights of women are respected and preserved.

In the aftermath of last year's devastating floods, serious discussions on the issue of rebuilding Kerala has taken centre-stage. As part of this, steps have been taken to plan and implement various projects. Since there are diverse perceptions as to the policies to be adopted for the future of the state, there is need to integrate divergent views to reach a common ground.

There is strong criticism that the development strategies being followed by the state had aggravated the scale of flood disaster in the state. Against this backdrop, there are demands for adopting new policies and development models that would promote development along with protecting the environment realising the fact that nature and natural resources constitute the very basis of our existence. While discussions are going on about the policies and development concepts to be adopted for the rebuilding of the state under 'Nava Keralam', sufficient attention is not being given to the existential questions with regard to vulnerable sections of society which depend on nature and natural resources. These vulnerable sections which had been depending on sea, forest and land for their livelihood lost their means of livelihood during the flood. It is also difficult to arrive at the exact losses suffered by these sections due to flood havoc.

If foreign agencies and experts are engaged in formulating plans for rebuilding the state, these agencies are likely to overlook the collective experience of the people and their native wisdom and expertise. In a state like Kerala where people's participation is significantly high in planning and decision-making processes, great importance should be given in utilising the native wisdom and local expertise in the rebuilding process. The process of rebuilding Kerala should

begin from the collective resources of the people who had overcome the hardships of the 2018 floods through their resilience.

WOMEN'S ROLE AND LIMITATIONS

In the context of natural disasters, the worst affected are the women in any society. But the resilience shown by women in tiding over the challenges in the wake of the 2018 floods by and large generates hope. We have come across many women who had successfully overcome major challenges despite the limitations imposed on them by society. The efforts to overcome such limitations should be the main aim of 'Nava Keralam' in the days to come. During and after the floods, women played a major role in many areas and many of them had to undergo great hardship for stitching together their life that was in tatters. They had readily shouldered responsibilities and provided protection to little kids, girls and senior citizens. They also played a pivotal role in ensuring an atmosphere of peace and security in flood relief camps. There are many families where women are the breadwinners and a source of livelihood. It is important that efforts should be made to restore the source of livelihood to women who had lost their jobs or vocation. One of the basic priorities in future should be to ensure that women acquire the basic skills and expertise for disaster survival. In matters of development as well as women empowerment, women's needs and requirements can be classified as practical and strategic. While the practical needs can be more or less easily met, the strategic ones are more difficult to attain due to structural limitations. For example, the activities of Kudumbasree units are centered on small-scale financial transactions or savings schemes and thereby serve the practical needs of women up to a limited extent. But the strategic needs of women include gaining their rightful space in decision making process and thereby acquiring real gender equality. Rebuilding Kerala can never be totally successful unless the practical and the strategic needs of women are met. The drive to build a new Kerala will yield positive results only if the rights of women are respected and preserved.

WOMEN'S EMPLOYMENT STATUS LEVELS

As per official records (NSS 68th Round: 2011-12) only 24 per cent of women in Kerala are employed. This is highly surprising considering the high literacy rate and education levels of women in Kerala. It is found that a majority of women are employed in some vocation or the other. However, many of these women are not officially classified as workers as many of the jobs they perform do not fall under the official classification of jobs. The energy and time spent by women for performing these tasks are not officially accepted to be categorised as jobs. As per the current narrow criterion of employment, thus only 24 per cent of women fall in the category of being employed.

PROBLEMS FOR WOMEN IN UNORGANISED SECTOR

The rebuilding of Kerala can never fully materialise unless the problems of women in the unorganised sector are addressed, especially in the area of jobs. Women constitute a major section of the workforce even though conventional estimates do not officially acknowledge their contributions.

In the context of last year's floods, it is very difficult to assess the losses suffered by women due to the working days lost as well as due to the damage to their work facilities and source of livelihood. For example, a woman working as a domestic help cannot resume work even after considerable number of days after flooding. She cannot take up work because she has to set her own house in order after the damage caused by

floods. We have to take into consideration these facts while we estimate the number of working days lost after the floods. Sometimes a domestic help could lose her job as a fallout of the floods because another person would be employed in those houses where the services of a domestic help was urgently required. The daily life of some women in the flood-affected areas has been seriously affected due to loss of their house and belongings.

It can be seen that women are the worst sufferers due to the 2018 floods considering the loss of basic assets. Domestic animals like cows and sheep, fowls like hens or ducks had perished in the floods. They formed one of the chief sources of the earnings for many women. Moreover, the agricultural sector has also faced considerable losses due to the floods and women in large numbers are employed in farm-related occupations. Due to crop loss, the earnings of these women from farming have also been hit. Therefore it is important to give priority to revive the small-scale agricultural sector. Women also play a key role in many traditional occupations such as the handloom sector, coir industry and bamboo sector. Following the floods, the raw material supply for traditional industries has been badly affected and many of the traditional industrial units also suffered damage. Therefore it is necessary to revive such units and ensure supply of raw materials to avoid further hardships for women working in these sectors. Many of the women engaged in these jobs are concentrated by way of home jobs in a home-based working environment. These traditional modes of employment for women will disappear if steps are not taken to revive them. In the formal sector, many women are being employed by big companies on contract basis to enhance the profits of these companies. Some women are trained in assembling jobs.

However, women working in traditional sector are not classified as being employed in the formal sense. Such women are facing great difficulties to restore their jobs as they have lost their supply of raw materials needed for work due to the floods. Moreover, many of them had also lost finished products waiting to be marketed due to the floods. Many women have also lost the tools of their trade like sewing machines and machinery for food processing units in the floods. In this context, it is necessary to incorporate the interests of unorganised women in the rebuilding process of Kerala.

VIEWPOINTS ON STATUS OF WOMEN

We are all proud of the tremendous strides made by Kerala in areas of education and women's literacy. However, these achievements fade out when one considers the figures of highhandedness and harassment faced by women in general in their own homes as well as in public places. When one examines the criteria of the status of women in Kerala society, our state is found to lag behind. This is amply clear from the 'Vulnerability Mapping' conducted by Kudumbasree units covering the state as a whole. Women have now to take up the double burden of family responsibilities and social obligations and if they have to face harassment as in some instances, it could adversely affect them both mentally and physically besides affecting their work. The status of women can only be ensured if they are able to function in a safe environment and live honorably free of fear and enjoying mutual respect.

CAUGHT IN DEBT TRAP

One of the avowed objectives of Kudumbasree units was to ensure the financial well -being and stability of women by empowering them and removing rural poverty. Such efforts have borne fruit to some extent as it provided some relief for women from loans from external sources. However, for the past few years, micro-finance institutions have

invaded every nook and cranny of our cities and villages. It is ironic that these private financing institutions have increased their presence in the very areas where women are active members of Kudumbasree and Ayalkkoottam units. In effect, the poor women have simultaneously availed of loans from seven or eight institutions and are helpless in repaying loans which leads them to fall in a debt trap. Many women do not have proper employment or fair wages which makes them helpless in repayment of loans. Unless steps are taken to regulate the working of private financing institutions, the plight of women will only increase. Many women face mental and physical stress because of their difficulty in repaying loans. What is very important are steps should be taken to ensure that women get fair wages and continuous employment and this is necessary for them to properly repay the loans. The first stage of the flood relief operations began with the sanctioning of an amount of Rs. 1 lakh each to women to purchase of domestic appliances and furniture which were lost in the floods. In this context, it is important to note that the repayment of the loan is often considered the liability of the housewife alone and this also causes avoidable worry to women. The failure to understand the practical needs of women is what has resulted in such a situation.

GENDER DISPARITY IN PAYMENT

The wages fixed by the Central Government for its employment guarantee scheme is now being considered as a benchmark for whatever job a woman does. A daily wage of Rs 270 which is fixed for the employment guarantee scheme is now being uniformly fixed for women doing any kind of job irrespective of whether the jobs is skilled or unskilled. This wage rate itself needs to be revised along with taking steps to end wage differences between men and women in which women face discrimination. A domestic help which is usually a woman gets a daily wage of only between Rs 100 and Rs 400 for doing four to eight hours of work per day whereas an electrician, who is usually a male, is paid an amount of between Rs 200 and Rs 300 for doing work that does not exceed even one hour. This has been going on as a practice and such discrimination should end.

In this context, clear criteria should be fixed for wage rates for various types of jobs and gender differences in payment under which men and women are paid different wage rates should end. In the initiative to rebuild Kerala, steps have to be taken to ensure that women are paid statutory minimum wages It is time to ensure that women receive fair and decent wages. An 'honourable job' is nowadays becoming a dream. The International Labour Organisation (ILO) has put forward the slogan 'Decent Work for All' as the motto of the decade beginning from the year 2006. A decent job involves payment of fair wages, social security coverage and equality of genders in matters of payment. The agenda relating to 'Sustainable Development Goals 2030' also stressed the importance of 'decent job' as one of its basic objectives. There are many hurdles to be crossed to achieve this objective.

DECENT JOBS FOR WOMEN

The prevailing employment climate is not at all favourable to female workers while male workers have a greater advantage. Steps have to be taken to promote jobs for women which fetch decent wages and this should be one of the priorities in the initiative of re-building Kerala. It is necessary to recognize and appreciate the role and responsibility of women in social productivity initiatives. Steps should also be afoot to minimize the payment gap between highly remunerative jobs and jobs with comparatively low wages. So we have to compile relevant data accordingly. We should also have to compile adequate data on women's contribution to family budgets, the remunerative jobs they have, the possibilities of simultaneous and multiple jobs, actual wages, participation in social se-

curity schemes, etc. The criteria for determining skilled, semi-skilled or unskilled labour should also be clearly spelt out.

To avoid women going in for undue dependency on private financing institutions, the State Government should take steps to provide interest-free loans for self-employment schemes, particularly initiated by women. The Central Government-sponsored labour-intensive schemes like NRLM, NULM and NREG should be coordinated with labour generation programmes of the State Government and women should be paid decent wages besides social and job security. It is also necessary to ensure that women have easy access to raw materials, training in diverse labour skills, marketing of finished products as well as safe working conditions. Steps should be taken to provide practical training to improve the innate abilities of women.

ROLE OF LOCAL BODIES

Local self-government institutions play a key role in Kerala's developmental initiatives. The panchayati raj system in Kerala is very efficient and is an ideal working model for other states to follow. Moreover, local self- government institutions prove how strongly women are organised in many areas. The grama sabhas should be the basic forums for initiating efforts for the rebuilding and re-emergence of a new Kerala. In the context of last year's floods, Kudumbasree units under the active leadership of women and supported by local bodies, have a major role to play in various tasks, viz. renovating or rebuilding of houses, construction of clean and hygienic bathrooms, maintenance and protection of all precious water resources, disposal of wastes, etc. The resurgence of Kerala can bear fruit only if we ensure the sustainability of natural resources and safeguard long-term environmental interests. It is imperative that basic efforts and initiatives such as coordinating activities and ensuring a sense of direction in our developmental efforts, should come from women.

SIGNIFICANCE OF METEOROLOGICAL FORECASTS AND WARNINGS IN DISASTER RISK REDUCTION

GEORGE THOMAS

The State Government should take initiatives to create awareness among the general public regarding the importance of heeding to weather forecasts seriously.

The unprecedented and devastating floods in Kerala during August 2018 badly affected a very large number of people throughout the state. During the post-flood period, there have been innumerable analysis and discussions related to the causes of the floods. Some even expressed doubts about the capacity and reliability of the forecasts of heavy rainfall issued by the India Meteorological Department. In these times of climate change, it is very important that the authorities as well as general public take the weather forecasts and warnings more seriously. It would be interesting to know how the weather forecasts are issued, especially during times of heavy rainfall, cyclonic storms or thunderstorms.

A meteorologist keeps his eyes and ears open 24 x 7 recording the changes in the atmosphere to safeguard the interest of his fellow human beings. Meteorology, the physics of atmosphere, has achieved major strides with the advance of electronics and satellite technology. India has a well- established dense network of surface observatories for recording surface wind, temperature, pressure, humidity, cloud cover, rainfall, etc. Further, there exist pilot balloon observatories for recording upper wind speed and direction and radar stations to record upper air pressure, temperature, humidity, wind, etc. across the length and breadth of the country. A large number of automatic weather stations also function in the far-flung areas. The data from these stations recorded at 3 hourly, six hourly and twelve hourly intervals are plotted in different charts in the forecasting offices and analysed, different weather systems identified and forecasts issued to the regions concerned. The India Meteorological Department has a forecasting office in each state capital under the supervision of Regional and National Forecasting Centres at Pune and New Delhi. Therefore warnings and forecasts of any impending disaster likely to affect any part of India are issued under close scrutiny.

As the formation of any weather system is due to the changes occurring in the wind, temperature pressure and humidity in the troposphere, these values are recorded by well-trained and qualified officials. Whenever changes are noticed in the air, their development and movements are monitored through radars and the Meteorological payload installed in the INSAT Series Geostationary Satellite positioned over the Bay of Bengal at 36,000 kms above the earth. The formation of low pressure systems, depressions cyclones, thunderstorms, tornadoes, etc. therefore can never miss the eyes of meteorologists. The satellite provides pictures of the sky above India and neighbourhood as and when required so as to issue timely and correct warnings to the population concerned. The decades-old curt remarks about failed forecasts are products of ignorance. The Meteorological centre at Thiruvananthapuram is fully equipped to discharge its responsibility.

The frequency of annual formation of cyclones in the Arabian Sea is only 1 to 2 when compared to 3 to 5 in the Bay of Bengal. Moreover, the likelihood of a cyclone affecting the state of Kerala is too less and that is the reason why people in Kerala tend to ignore warnings during times of impending disaster whereas people of cyclone-prone states of eastern and western coasts of the country closely follow the warnings. During the last few years, the lives lost during severe cyclonic storms in Andhra, Odisha, Bengal and Gujarat are negligible. A cyclone forms only when the sea surface temperature is above 280 Celsius and also when other meteorological parameters are favourable. From the time of formation of a low pressure area in the sea, its development is closely watched and warnings are issued regularly to the state officials concerned and fishermen and general public through TV, press and radio. The State Chief Secretary, revenue secretary, chief engineers, revenue officials, collectors concerned, port officers, etc. of the respective states are regularly informed in order that they take precautionary measures and even to evacuate people from low-lying coastal areas at the time of land fall of the cyclonic storm. These warnings are ignored only at their peril as recent events had proved. Fishermen are repeatedly advised not to venture to the sea from the time the disaster weather system forms in the sea. It is essential for the officials to encourage the fishermen to heed the warnings. Some states have the system of providing radio sets to the boats of the fishermen for them to listen to the weather forecasts.

All through the year, a routine daily-twice coastal and sea area bulletins are issued and broadcast by coastal radio stations for the benefit of small and large ships sailing across the sea. Even in the absence of any disturbed weather or cyclonic conditions, the sea can be rough with high waves when there is a strong pressure gradient. On such occasions also, warnings are issued for the fishermen not to go out in the sea. During the southwest monsoon season (June to September), heavy concentrated rainfall occurs when low pressure and depressions form in the Bay of Bengal and Arabian sea causing floods in rivers. Timely warnings are issued during every such occasion.

Units of Flood Meteorological office in the Meteorological Centres issue Quantitative precipitation forecasts (QPF) based on the rainfall received from the catchment areas of rivers. These QPF values are passed on to the Flood forecasting office of the Central Water commission to issue flood warnings of rivers which face the problem of floods. Such systems do exist in almost all states. People must be encouraged to respect and obey the meteorological forecasts and warnings to save human lives.

The United Nations takes a special interest for the safety and development of all people on earth through the World Meteorological Organization(WMO). India is a prominent member of WMO. The data and forecasts are continuously exchanged with other countries through the NHEC (Northern Hemispheric Exchange Centre) and NHAC (Northern Hemispheric Analysis Centre) in New Delhi. The death and destruction which occurred

when the last three hurricanes hit the US coasts during the last couple of years gives an indication of how even the highly advanced countries are also vulnerable to the fury of cyclonic storms. The violent winds of about 150 to 200 kmph and the accompanying very heavy rainfall cause heavy destruction.

SOME SUGGESTIONS

Massive human effort is required to minimise the death and destruction due to cyclonic storms and heavy rainfall/ floods in Kerala and elsewhere. Following are some suggestions to effectively reduce the impact of such natural disasters.

1. Preparation of an Album Page containing list of officials starting from Chief Secretary of the state down to Revenue Secretary, district Collectors, revenue officials, chief engineers, irrigation officials, port officers, etc to whom weather warnings of heavy rainfall and cyclones are to be issued by the Meteorological Centre in the state, is the first requirement. This may already exist, but needs to be strengthened.
2. Construction of cyclone shelters in the form of high concrete structures along the low-lying coastal areas is most essential to save lives of vulnerable population in the event of storm hitting the coast.
3. Provide radio sets of high frequency to the boats of fishermen for them to listen to the weather forecasts and return from high seas when advised.
4. Install ordinary rain gauges at reasonable distance along the catchment areas of the rivers by the State government for recording rainfall along the river catchment areas. This can be installed on the compounds of public health dispensaries, panchayat offices, PWD offices, etc. and manned by their staff. The rainfall thus recorded will be of immense help to prepare QPF and thereby help in preparing flood forecasts by the Central Water Commission (CWC). If flood warnings are thus issued by the CWC, no life will be lost due to flash floods.
5. The State government should take initiatives to create awareness among the general public regarding the importance of seriously heeding to weather forecasts in order to reduce loss of life and property in the event of natural disasters due to cyclones or floods.

DISASTER RISK REDUCTION: LESSONS FROM A DELUGE

R. NANDALAL

The state machinery should be broadened by assimilating volunteers from among the general public both at the conception and execution of disaster management plans at different levels.

August 2018 will be a month which the state of Kerala will or should never forget even if the state doesn't want to remember it. The floods during that month literally inundated the whole state of Kerala causing widespread havoc in all districts, except Kannur and Kasaragod. The floods were a tumultuous event in the recent history of the state. The people of Kerala have read in the folios of history of a flood of 1924. But none of the people from those days with even remote memories of that flood were alive during the 2018 flood. So, for Kerala, last year's floods were an entirely new experience to take up rescue and relief activities on such a large scale. During the 2018 floods, almost everyone — be it the state machinery, disaster response teams, bureaucracy and its personnel, the general public, the fisherfolk — in the state rose to the occasion and were active 24x7 in tackling the challenges. During the floods, rivers and streams turned into raging torrents and swept away everything on their path and rivers burst their banks swallowing the entire area around. About 400 people lost their lives in the floods and a large number of people found their lives and dreams shattered by the widespread damage. The total loss due to the floods has been estimated at around Rs 36000 crores. The rainfall statistics relating to Kerala shows clearly that in 2018 there was a sharp increase in rainfall. In 2018, up to the third week of August, it rained more than the last five years' annual average rainfall in the state. The rainfall was much higher in the catchment areas of most of the dams in Kerala. These figures indicate the intensity of the rain and consequently the severity of the flood.

POSSIBILITIES OF FLOOD DISASTER IN INDIA

According to statistics of the National Disaster Management Authority (NDMA), about 30 million people are severely affected by floods during the monsoon season in India every

year. Tens of thousands of people lose their dwellings and farmlands due to this. An area of 40mh (million hectare) out of entire India's 329 mh, is vulnerable to severe floods, according to NDMA. According to statistics with Central Water Commission, every year 72000 sq.km of land in India is affected by floods of different intensity. About 1000 human lives are lost and about 0.1 million cattle perish in India every year due to the floods. From 1995 to 2005, the estimated average financial loss due to floods per annum was Rs. 44750 million. The Union Home Ministry has worked out a Flood Vulnerability Index (FVI) in its ongoing study on Disaster Risk Reduction, and listed ten states of India which are the most vulnerable to floods. Punjab is at the top of the list with an index of 6.67 out of 10. Kerala is seventh on this list with an index of 3.88. Such rankings do report Kerala as vulnerable to floods and related risks on a higher scale and we have experienced that in the floods of August 2018.

INEPT DISASTER GOVERNANCE

A report of the United Nations International Strategy for Disaster Reduction (UNISDR) said that India had faced 167 disasters during the 9 years between 2005 and 2014. According to the report, these disasters caused a loss of about USD 47000 million. However, sadly the Union Government still has no clear and precise statistics about these disasters or the loss and casualties caused by these disasters. This has also led to a dismal situation when services of some foreign organisations are needed to study the disasters in India. It is also a reflection of the negligence on the part of the government machinery in effectively tackling disasters.

The Comptroller and Auditor-General (CAG) report on the performance of National Disaster Management Authority (NDMA) in India specifically states that "NDMA has neither had information and control over the progress of disaster management work in the states, nor could it successfully implement various projects it had initiated for disaster preparedness and mitigation." This report clearly gives a picture of the Authority which is supposed to be coordinating all the disaster management activities in the country. Even if NDMA has a guideline for flood-related rescue and relief activities, it appeared that the Authority had no idea of such a guideline during the first days of the Kerala floods. In many places of the state, may be due to the inexperience in dealing with such large-scale flooding, the rescue and relief machinery was helpless and confused. Things worked reasonably well only because of people's initiative. Meteorology is now a well-developed discipline and weather prediction has better accuracy and precision than it had been earlier, thanks to the satellite images and other state-of-the-art equipment available with the Meteorological Department. The department had predicted last year's heavy rains, several days ahead of the disaster. But the Disaster Management Authority, both at the National and State levels, failed to take steps to face the imminent disaster or to make the people aware of it. This casual attitude results in people getting more exposed to risks and makes environmentally-fragile areas more vulnerable. The state is not at all willing to admit that there are environmentally-fragile areas in the state. This may have prevented the state machinery from issuing warning messages to the public.

RESCUE AND REHABILITATION – THE KERALA EXPERIENCE

Even though there was some slackness on the part of authorities in reaching out to all the flood victims in the first one or two days, they became active and strong subsequently. The Army, Navy, Air Force etc. were called into action along with the State Police force and Fire and Rescue personnel, and the services they offered were commendable. The dimensions of the tragedy would have been much higher if it was not for the selfless,

dedicated and round-the-clock services rendered by hundreds of coastal fishermen and thousands of volunteers and local people.

The flood was quite an unexpected development in Pandalam and Chengannur. Rescue work was undertaken by fisherfolk from the coasts of Kollam and Thiruvananthapuram who voluntarily came forward to take up the work. They came with their boats and various fishing vessels and ropes loaded in vehicles without any call or request from anyone. The service they rendered for Pandalam and Chengannur is unforgettable. These people were able to reach areas and terrains which were inaccessible even to the Navy rescue boats.

Similarly, Kudumbashree workers also put in commendable effort in rescue and relief operations. Each of them offered 5 to 10 packets of food prepared in their own homes to the hungry in the relief camps. It was the supply of these lunch packets which mostly ensured the survival of victims in the camps before outside help began to flow in. More than 7000 lunch packets reached the camps every day from Kudumbashree volunteers' homes. The Kudumbashree workers rendered remarkable and dedicated service to the flood victims in those days of stark uncertainty and hardship all around.

GUIDELINES FOR RELIEF CAMPS

According to informed sources, during the floods about 6000 relief camps were set up housing about 7.5 lakh people. Though essential items and food were supplied to those in these camps by the intervention of volunteers and government agencies, there were conspicuous problems arising from a lack of proper coordination among those involved in relief work. Some of the problems that affected most of the camps are listed below so that these can be noted for guidance in future.

1. The problem was mostly not the dearth of supply of relief material but excess of it. There was big response from the people, both within and outside the state, for the supply of relief material. However, there were no satisfactory arrangements in place to sort out the supplies and divert them to camps where they were actually needed. In spite of the availability of relief material, the issue of not properly assessing and catering to as to when, where and in which relief camps these material were needed, clearly point to a lack of coordination.
2. Lack of coordination is the first problem to be solved with regard to the collection of goods. Each camp should have a coordinator and there should be taluk and district-level coordinators to supervise and coordinate the activities of the former. Camp co-ordinators should assess the actual needs and report them to the taluk and district levels from where the supplies can be arranged as per the needs and priority of each camp so as to ensure supply of what is needed at the right place in the right time.
3. Arrangements for accepting and acknowledging goods coming from different quarters should be made; otherwise everyone posing as a volunteer can accept and misuse them, as has been reported from many places.
4. Cooked food supplied was wasted in many camps as stray requests on Facebook or WhatsApp, etc. were followed up without verification. This can be avoided if camp coordinators were consulted before sending them and verified through taluk and district-level coordinators who could assess the actual needs.
5. There can be people stranded in remote areas, unable to make it to the relief camps. This was the case in many tribal areas and inaccessible villages. Food and essential goods should be taken to them enlisting the services of a team of local volunteers who know the route and will be able to guide other relief volunteers to reach these victims at isolated places. There should be vehicles available for carrying supplies to

such isolated areas.

6. Adequate number of toilets/e-toilets should be made available to relief camps in proportion to the number of inhabitants; otherwise, it could create great difficulties for them.

REHABILITATION AND REBUILDING

Rehabilitation is the most urgent and expensive work to be undertaken with utmost care once the flood havoc subsides. Damaged houses, schools, roads, buildings, etc. have to be repaired, rebuilt and made available for normal use. In several cases, new constructions may be necessary. While victims return to their flood-affected buildings, steps should be taken, by using the services of expert teams, to ensure their safety against attacks or possible threats from stray animals and reptiles, surviving the flood. Another important task is cleaning-up operations.

Rehabilitation work should be done in a scientific, timely and economical manner. Volunteer services could be enlisted after giving sufficient training and proper orientation to those involved since much human effort is needed to tackle the post-disaster situation.

Providing safe drinking water is the first priority as the existing sources of drinking water are polluted. Scientific methods for purification and supply of pure water should be undertaken. Arrangements should be undertaken on a war-footing to avoid the spread of communicable and water-borne diseases. Emergency medical camps for checkup and curative intervention should be arranged at various centres. Public health officials and authorities should be on the alert against any lapses in maintaining hygiene and health.

Many of those people who are self-employed or employed in unorganised sector, should be given assistance to resume their work. Those who have lost houses, vehicles, etc. should be helped to expedite their insurance claims and to get their compensations, etc. with a post-flood, liberalised outlook. Insurance claims should be made on time, as late claims may be rejected by most of the insurance companies. Such problems of the common people should be solved with utmost priority. The rehabilitation and reconstruction process needs to be continued. Utmost care should to be taken to ensure that no major constructions are made in the environmentally-fragile areas as it may cause or aggravate the possibilities of flood or other natural disasters in future.

NEED FOR A BETTER GOVERNANCE SYSTEM

National Disaster Management Authority (NDMA) and State Disaster Management Authority (SDMA) have several limitations and constraints. If these are to be remedied, it would be better to sever them from Home Ministry or Revenue Ministry and brought under an independent ministry to be constituted to address disaster management. As a recurrent, life-threatening phenomenon, natural disasters itself calls for building durable capabilities in research, prediction, prevention, management and relief areas. There should be a master plan, taking into consideration possible threats, geographical conditions, ecological vulnerabilities, etc. of each region. A Disaster Management Plan should be evolved taking into account the experiences and research in other parts of the world and incorporating/ adapting them to suit Indian situations. Expert advice from each state is to be incorporated while formulating the master plan.

A public alert system to warn the people about imminent dangers and scaling up preparedness to avoid casualties by giving training/drills to people of vulnerable areas can do a lot to mitigate the scale of a disaster. People should be trained on how and where

to escape and how to save life in times of disasters. Services of experts from the United Nations, other countries and from our own country should be solicited to formulate a workable disaster management plan, to get ready a trained task force to meet emergency interventions, and to keep in place a public warning and rescue system. The state machinery should be broadened by assimilating volunteers from among the general public and disaster management plans should be conceived for different regions at various levels taking into account the uniqueness of each situation. Let the lessons from the 2018 deluge be a step to evolve better disaster management plans for the good of all.

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