

Trans-Boundary Early Warning Systems in Asia



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ABOUT THIS ISSUE

Since disaster risks do not adhere to national boundaries, it is imperative to foster regional cooperation among nations that are exposed to common threats and hazards. Trans-Boundary Early Warning Systems (TB-EWS) are a significant step to foster this regional cooperation on disaster risk reduction (DRR). This is especially important for a region like Asia-Pacific where the majority of disasters have been cross-border in nature. Similarly in South Asia, regional cooperation on riverine floods in India, Nepal and Bangladesh needs greater attention.

This issue of *Southasiadisasters.net* is titled, 'Trans-Boundary Early Warning Systems in Asia' and focuses on the important theme of regional cooperation for DRR in Asia. Community based TB-EWS for flood risk have been given special importance in this issue because of their significance in South Asia. Such systems enable local communities to utilise local resources and capacities to prepare and respond to and enhance their resilience to flooding risk. Some of the other relevant themes explored in this issue include livelihood recovery, economic cost of climate change and protecting children in emergencies. ■

– Kshitij Gupta

INTRODUCTION

The Context of Trans-Boundary Early Warning System

Trans-Boundary Early Warning Systems (TB-EWS) are set in a context. And the context – geo, political, economic, social, and ecological – makes a major difference in terms of the design and performance of such systems.

The All India Disaster Mitigation Institute (AIDMI) has been working on TB-EWS for over seven years all across India and South Asia. The following actions on TB-EWS have been drawn from AIDMI's work as well as debates at the recently concluded Asian Ministerial Conference on Disaster Risk Reduction (AMCDRR) 2018 held in Ulaanbaatar, Mongolia.

- It has been found that wherever TB-EWS is set up in a just and reality oriented context, the performance of TB-EWS is better in terms of saving lives and reducing damage.
- It has been observed that TB-EWS must reach both, men and women. However, the performance of such systems in saving lives is more effective wherever women, children and other marginalised communities have been empowered to respond to EWS.
- In any TB-EWS the communities and the river, both, are important. Often of EWS focus is on communities. Rightly so. But rivers need attention. Embanking, Cleaning Bank Plantation. And more. Whenever TB-EWS has focus on both, the community and river ecology the performance is more robust and lasting.

What makes TB-EWS work? The TB-EWS works well when it is community driven, where the community has a substantial and sustaining share in the decision making process for resource allocation. For instance, community based flood early warning system (CBFEWS) is an integrated system of tools and plans managed by and for communities, providing real-time flood warnings to reduce flood risks. CBFEWS

is based on people-centered, timely, simple and low-cost technology. It disseminates information to the vulnerable communities downstream through a network of communities and government bodies. A properly designed and implemented system can save lives and reduce property loss by increasing the lead time to prepare and respond to flood on ground level.

It is also been found that TB-EWS works better whenever partnerships among a wide range of organisations across diverse sectors are struck. Inclusive and open TB-EWS solutions tend to work better.

TB-EWS would also work better in an environment of increased regional cooperation. The regional cooperation across the countries of the region, primarily India, Nepal and Bangladesh, on riverine floods across South Asia is a major concern that merits immediate attention. Often the destruction on account of the floods happens due to inability to obtain timely information from the various institutions that are designed to generate, analyse, disseminate and communicate the information to a range of stakeholders at different levels on a trans-boundary basis.

TB-EWS are now set to grow from pilot phase to a more mainstream stage addressing humanitarian needs and demands. It is now up to the leadership of the communities and countries of South Asia to facilitate the spread of TB-EWS by allocating better human and financial resources for its growth. Thus, the context of TB-EWS is as important as the TB-EWS itself. ■

– Mihir R. Bhatt

References:

1. Flood Resilience Portal, Regional collaboration for better flood early warning and resilience in India
2. ICIMOD: Community Based Early Warning Systems
3. United Nations ESCAP: Initiatives on Multi Hazard Early Warning Initiatives

ADPC's Role in Trans-Boundary Early Warning Systems and Risk Management in the Asia-Pacific Region

The Asian Disaster Preparedness Center (ADPC) is an inter-governmental organisation and works with the vision of disaster risk reduction (DRR) and climate resilience (CR) for building safer communities and sustainable development in the Asia-Pacific region. ADPC being a leading regional technical resource center takes up focused approach to strengthen capacities of the countries of the Asia-Pacific region to strengthen their multi-hazard early warning systems (EWS) in various layers.

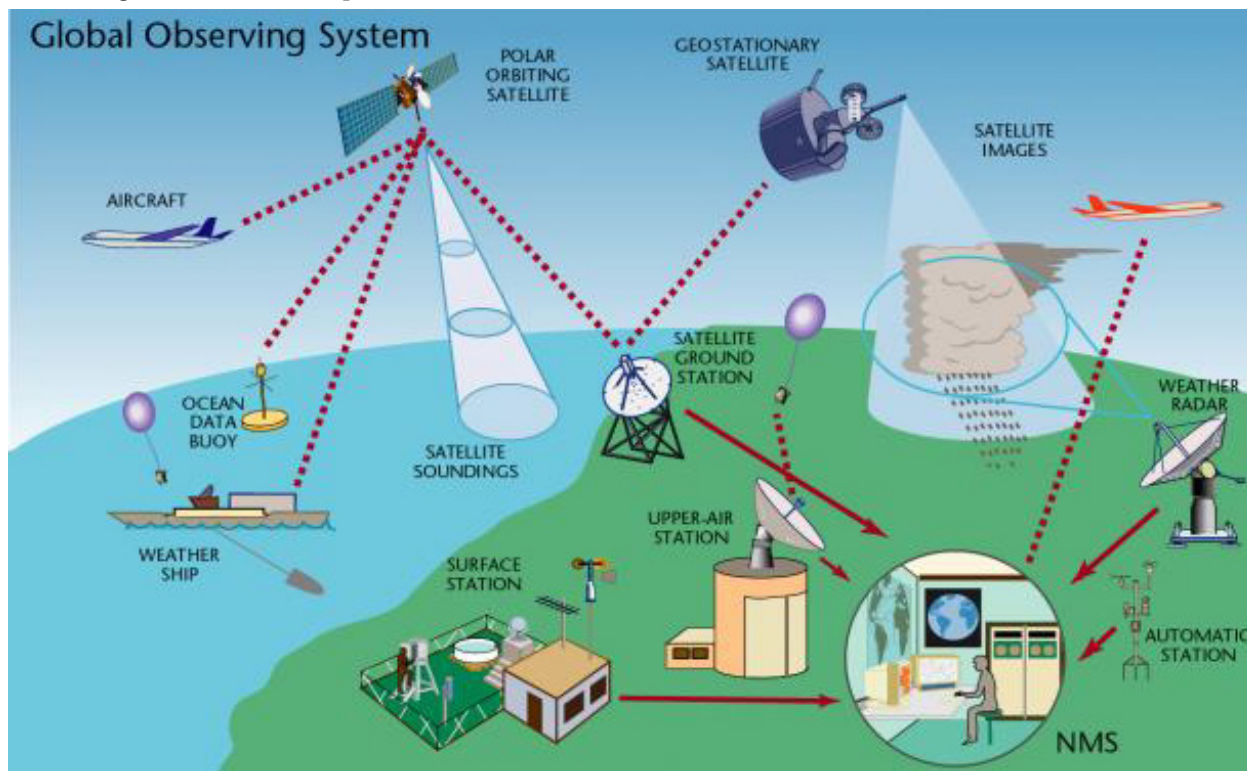
In the recent years, we have observed that various trans-boundary hazards including tropical cyclones across the borders, floods in the cross-border basins, trans-ocean tsunami and others have started to grow which often requires

trans-boundary actions. ADPC being a regional organisation is working with many trans-boundary partners for enhancing the capacity of trans-boundary early warning, risk management and tools development and so forth. In these endeavors, ADPC plays various key roles in keeping the agenda on the forefront of actions and planning where collaborations, sharing, exchange and coordination are critical for success.

ADPC in collaboration with various partners is working on various projects and programmes where the issue of trans-boundary early warning system was addressed from various fronts. ADPC has worked significantly for multi-hazard and multi-country efforts including: a) coastal hazards early warning systems across the Asia-Pacific

(under UNESCAP's Trust Fund for Tsunami, Disaster and Climate); b) building trans-boundary flood early warnings in Mekong (under MRC supported efforts); c) trans-boundary early warning systems and resilience in India-Nepal (under Global Resilience Partnership); d) drought monitoring and virtual rain-gauge tools development for Mekong region (under SERVIR Mekong); e) establishment of regional multi-hazard early warning systems (RIMES) for the Asia and Africa; f) supporting the establishment of the India Ocean Tsunami Early Warning Systems (IOTWS) and many other endeavors of trans-boundary nature.

ADPC is also supporting the Regional Consultative Committee on Disaster Management (RCC) which includes 26 countries of the Asia-Pacific region.



This is a unique forum that brings the member countries together for sharing and planning of the implementation of disaster risk reduction and climate resilience related initiatives to support national, regional and international goals.

In the Asia-Pacific region, ADPC is playing (also will play potentially in future) several proactive roles in the areas of trans-boundary early warning systems that includes the following (but not limited to):

Strengthening National to Regional Multi-Hazard EWS. Through a number of projects, ADPC in both South Asia and in Southeast Asian countries is supporting the strengthening efforts of National Meteorological and Hydrological Services (NMHSs) including strengthening hazard detection systems, forecasting capacity, improved visualisation and so forth. Also, the National Disaster Management Organisations (NDMOs) are supported on the EWS last-mile communication and warning response sub-systems which are critical part of the overall application and success of the EWS in the region.

Implementation of end-to-end EWS for trans-boundary hazards. ADPC in past couple of decades has implemented number of EWS related projects focusing on several trans-boundary hazards such as tropical cyclone, trans-boundary riverine floods, tsunami, El Nino forums and so forth. For floods these included the Ganges-Brahmaputra river basin, Chao Praya delta, Mekong basin and so forth. For tropical cyclones several WMO tropical cyclone zones are covered including the areas under Panel of Tropical Cyclone and Typhoon Committee.

Hands-on Training and capacity building on EWS and Forecasting/prediction systems. One of the regular trends of supporting the countries in the region from ADPC is to conduct

timely and needs based training and capacity building on EWS.

Forging regional-national partnerships, networking and exchange. One of the key roles that ADPC has played in the past decades is forging partnerships and networks where countries can start multi-country, multi-stakeholder and multi-thematic dialogue which can benefit the trans-boundary risk management including the trans-boundary EWS. In this respect, ADPC has worked with WMO, working with regional partners such as AHA center, MRCS and works as catalysing role for Asian Preparedness Partnership (APP) and RCC.

Research, development and innovation newer tools and techniques. As a regional resource

center, ADPC has also supported the member states in innovating newer tools and techniques required for TB-EWS and risk management. In this respect, various ongoing and completed projects of ADPC has helped the member states to develop, test, apply and mainstream newer approaches and tools required for strengthening the trans-boundary EWS and risk management in the region. In these endeavors ADPC has worked with various partners and tried to integrate science-based innovations and tests the adequate systems and application interfaces for the tools and protocols that are effective for trans-boundary hazards including floods, tropical cyclone, tsunami and others. ■

– **Hans Guttman**, Executive Director, and **Atiq Kainan Ahmed**, Senior Program Manager, ADPC, Thailand

CAPACITY BUILDING AND SOP

Trans-Boundary Citizen Forum for Flood Early Warning

Large number of communities across India and Nepal borders get pushed into poverty due to lack of early warning of upcoming floods.

Ghoghardiha Prakhand Swarajya Vikas Sangh (GPSVS) in India and Aasaman in Nepal jointly hosted the meeting.

Three out of ten deaths due to trans-boundary floods are caused by late early warning.

The meeting focused on the need to build local capacity to share and receive Trans-Boundary Early Warning System (TB-EWS).

On December 6, 2018 communities from Nepal and India met at Jainagar in Madhubani, Bihar, India, to find a way to share early warning across the boundary and reduce loss of life and livelihoods.

What is central to such TB-EWS Capacity Building is Standard Operating Procedure (SOP) that is multi-stakeholder and “doable”. ■

– **Mihir R. Bhatt**



Transcending Boundaries to Build Resilience: Emerging Lessons from Trans-Boundary Early Warning Systems and Community Preparedness Practices in the Asian Countries

Introduction: Community resilience is often regarded as a form of capacity that is situated at community level but can be strengthened either by community people themselves or by the efforts of internal-external stakeholders together. Effective and well-designed people-centric early warning system (EWS) is one element to it which can help absorb the disaster shocks in an ex-anti manner. EWS is proven to be critical pillar of overall disaster risk reduction (DRR) with its key component: risk knowledge; monitoring-observation and warning formulation; dissemination-communication, response capacity; and governance of these four key components in an end-to-end manner. These components are also applied for any Trans-Boundary Early Warning Systems (TB-EWS) as well.

In the context of South Asian hazard profile, the trans-boundary hazards are on the rise. Disasters and impacts of these predominant trans-boundary hazards (i.e. riverine floods, cyclones, tsunamis) are local, country-context-specific but these are sourced and extended in a trans-boundary context. These are trans-boundary in nature. In recent years, great deal of such trans-boundary



hazards are on the rise. These demanded a great need for establishing effective TB-EWS across the boundaries of countries, rivers, basins and coasts of South Asia.

While efforts of strengthening TB-EWS are relatively growing in past few years harnessing the lessons from these are important for us to move ahead. The gradual connectivity between the TB-EWS and resilience building initiatives are growing and some good lessons

have emerged from these in the past few year's time. In this short article, we would like to discuss two such promising efforts below -- among many - which can shed some light on these new trends of learnings and knowledge sharing from the region.

Endeavor # 1: TB-EWS efforts in the Koshi River and Narayani-Gandak River Basin through "community to community communications".

In Nepal-India border, two river basins – the Koshi river basin (KRB) and the Narayani-Gandak river basin – are historically affected by trans-boundary floods where Lutheran World Relief (LWR) and Asian Disaster Preparedness Center (ADPC) with partners have developed a unique case of trans-boundary EWS and trans-boundary

While efforts of strengthening TB-EWS are relatively growing in past few years harnessing the lessons from these are important for us to move ahead. The gradual connectivity between the TB-EWS and resilience building initiatives are growing and some good lessons have emerged from these in the past few year's time.

resilience build. These two river basins are often termed as "Sorrow of Bihar" and reflect a tough memory from the past. Colossal damages reported due to recurrent floods in these river basins calling for systematic and people-centric development of TB-EWS involving Nepal and India. With a few years of effort, focused efforts were put into development of TB-EWS connecting the Nepal Government (Department of Hydrology and Meteorology) upstream and the downstream local governments and communities downstream in border side and Bihar side. The effort pioneered the "Trans-Boundary Citizen Forum (TBCF)" which comprised of local citizens from both sides of the river-basin and bringing them together to solve the problem. This effort showed that TBCF members played an effective role in communicating the flood EW information among the communities and alerted the at risk communities ahead of time. The government formal early warning information received was not sufficient for them but the citizens through their "community to community communications" have played an effective and functional role of TB-EWS. This effort also showed that building resilience for at risk communities through systematic community based disaster risk reduction (CBDRR) and engaging them into TB-EWS can result a high level participation and vigilance beyond the boundaries.

Endeavor # 2: Coastal hazard early warning and coastal community resilience framework in the Indian Ocean countries.

Another unique endeavor which has made a systematic effort to connect trans-boundary coastal hazard EWS and community resilience building is under "Coastal Community Resilience (CCR)" initiative. This



initiative was initially developed under Indian Ocean Tsunami Warning Systems (IOTWS) and later widely adopted by many governments and civil society stakeholders in the region. CCR efforts have shown that EWS for trans-boundary coastal hazards such as Tsunamis, tropical cyclone and others should be developed in an inter-governmental interface but should be linked to the solid base of community resilience programming. These should be done jointly with the 'communities at risk' and 'sectors at risk' as well. EWS needs linkages with both 'short-term' and 'long-term' efforts such as disaster response and recovery on one side and sectoral developments (relating to coastal management) on the other. CCR framework and efforts demonstrated that resilience building should be planned, implemented and sustained

with the communities and sectors at risk. CCR efforts provided a framework to connect communities and EWS in a systematic manner. It showed resilience and TB-EWS are linked together when the knowledge and governance happen together.

Conclusions: These two endeavors are given as examples of how the TB-EWS and community resilience can be linked together. Success of one depends on another. Many efforts are underway in the region to find the meaningful ways to connect these two areas. In this growing practices there has been a 'healthy momentum' observed. From practitioner's perspective, these new growing knowledge and lessons on trans-boundary EWS and resilience building need wider sharing. How these two areas can be connected, what can be done to improve-sustain, what policy advocacies are essential, what technical areas to follow up and many factors. This is indeed an area to move ahead through collective sharing, exchange and programming - an agenda to focus together and transcend beyond one's regular knowledge boundaries. ■

- **Atiq Kainan Ahmed**, Senior Program Manager, Asian Disaster Preparedness Center, Thailand

From practitioner's perspective, these new growing knowledge and lessons on trans-boundary EWS and resilience building need wider sharing.

Trans-Boundary Early Warning System: Emerging Perspectives at 4th World Congress on Disaster Management



The 4th edition of the World Disaster Management Congress (WDMC) was organized by the Government of Maharashtra (GoM) in association with Disaster Management Initiatives and Convergence Society (DMICS), Hyderabad, the Tata Institute of Social Sciences (TISS) and the Indian Institute of Technology (IIT) Bombay in Mumbai from 29th January to 1st February 2019. This event was attended by a wide range of individuals and organizations hailing from over 50 countries.

The overarching theme of WDMC 2019 was The Future We Want: Bridging Gaps between Promises and Action and the Seven Pillars for Building Resilience to Disasters, as outlined in the Visakhapatnam Declaration and Plan of Action adopted at the WCDM 2017.

Over 500 papers covering twelve themes related to disaster management were presented at this event. The content and related debates and discussions were steered by Dr. Janki Andharia; Dr. Ravi Sinha; and Dr. Prabodh Dhar Chakrabarti.

The conference per se did not discuss the Trans-Boundary Early Warning Systems (TB-EWS) but this important theme did come up in several sessions including the plenary for debate and discussion. Some of the important information and knowledge shared by the participants of WDMC 2019 on the theme of TB-EWS is distilled below:

In a session on 'Strengthening Governance' Animesh Kumar from UNISDR remarked upon the significance of TB-EWS in the Asia-Pacific region. According to him, it is important to stay focused on the poor who suffer major loss and damage when TB-EWS is not available in the Asia Pacific region.

Simon Croxton, South Africa, drawing from work in Africa and South Asia underlined the need for such TB-EWS that covers the risks faced by ecology, agriculture, and livelihoods.

In his opening remarks, the Hon. Chief Minister of Maharashtra, Mr. Devendra Fadnavis emphasized the importance of Early Warning Systems. He mentioned the

importance of having concerted EWS plans and also measures to monitor the performance of these plans in terms of both capacities and capabilities.

Bottom-up monitoring is also an important tool to track the results of TB-EWS.

According to Dr. Muzzafar Ahmed, former member, NDMA of India, there is a need to bring about cohesion in the fragmented TB-EWS in India. In a session on Health and Education, Dr. Ahmed opined that EWS for a range of sectors and life-lines remains scattered in India. Thus, it is important to pick up these disparate pieces and glue them together to form a bigger and better picture of EWS in the country.

Loss and damage without EWS can be ended, and there are efforts in this directions made in South Asia, but they are uneven. The hotspots of disaster impacts due to the lack of robust TB-EWS are well known. It is time to take concrete action to reduce the nature and extent of loss at these hotspots.

There is no regional profile of TB-EWS in South Asia. What is needed, is a South Asia Disaster Report (SADR) that reviews the past ten years' efforts on TB-EWS in South Asia. This overarching report could focus on the impact of trans-boundary disasters on crops, irrigation, soil erosion, landslides across South Asia as some examples.

Cost of lack of TB-EWS is yet to be quantified in human suffering and also economic losses. Hans Guttman, ADPC, chaired the session on Inclusive Disaster Management where the economic cost of not having EWS on the citizens was

pointed out as a major gap in the Asia Pacific region.

Another gap identified was the lower standards of TB-EWS delivery in South Asia. There is a need to improve these standards in region by incorporating better technology and managerial capabilities.

We need to know far more about those who are inside the households that suffer loss and damage due to lack of TB-EWS. This includes women, children, and disabled. Professor Tso-Chien Pan, Singapore, drew the Asia Pacific picture of catastrophic losses and their impact on infrastructure investment. TB-

EWS can reduce losses suffered by vital infrastructure in Asia Pacific.

In an insightful presentation, Dr. Loyzaga from the Philippines provided the meteorological context for such TB-EWS.

In reflecting on the goals and targets of TB-EWS in the larger Asia-Pacific region, two distinct ideas emerge. One, to reduce the loss and damage from disasters due to lack of TB-EWS to half of its current level by 2020. Two, promote shared EWS by boosting the information flow and outreach of warning to the bottom 40 percent of the affected population across the boundary in both sides. ■

- AIDMI Team

LOCAL LEVEL TB-EWS

Roles of Local Authority in Trans-Boundary Early Flood Warning System: A View

Trans Boundary Early Warning Systems (TB-EWS) represent a new and significant trend in DRR in the region of South Asia. This particular region is ravaged by intense annual flooding from rivers that flow across different countries. This is why a robust system of TB-EWS based on regional cooperation is essential in the region. In the end the most important actor in Trans Boundary Early Flood Warning System (TB EFWS) is the local authority or government: may it be a gram panchayat or a nagar panchayat or district authority located on the national border.

Drawing from the view of ongoing TB EFWS work of Christian Aid (CA); Practical Action (PA); Oxfam; Asian Disaster Preparedness Center (ADPC); Lutheran World Relief (LWR); and International Centre for Integrated Mountain Development (ICIMOD) the following five action

areas are recommended to accelerate and widespread TB-EWS in South Asia. The following four action areas are recommended for towns and villages to be prepared for floods from across the borders.

1. Understand local needs to target resources effectively, foster participation, and increase accountability of EFWS.
2. Have a leadership role in developing and implementing local strategies to implement TB EFWS.
3. Drive national development from the bottom up by building EFWS in cities and villages.
4. Bring together key stakeholders and provide a platform to engage them.
5. Act locally to address Trans Boundary challenges and manage the impact of Trans Boundary phenomena at local level (climate change mitigation and adaptation, EFWS).

Civil society and economic cooperation organisations are needed to contribute in the localization of TB EFWS Agendas, implementing local agencies in cities and villages to reach local and Trans Boundary goals. Context specific interventions that are rooted in the region's plural cultures are essential to this localization agenda as well. Local democracy and local leadership are vital tools to drive forward local agendas in a way that is rooted in the cultural, climatic, economic, political environmental, and economic realities of cities and villages.

The following are some ways in which local governments and leaders can increase their stake and role in TB-EWS.

1. Policy Shaping

The first intervention that can improve the participation of

local leadership and communities in TB-EWS is through policies and consultations. In South Asia, it has often been observed that many laws and policies do not reflect the grassroots reality. In order to include the perspectives of local leaders and communities in the TB-EWS it is important to include their perspectives in the planning and policy setting perspectives. Thus, adopting an approach that integrates TB EFWS through policy consultation, development of communication tools and strategies for and with local governments and their associations, and contribute to Trans Boundary cooperation is a first step towards inclusion.

2. Awareness Campaign

TB-EWFS is a relatively new concept which needs to be properly explained to the local communities, governments and leadership before they can readily embrace this practice. In order to do so, massive awareness building campaigns that reach out to local governments and leadership about the benefits of the TB-EWFS should be undertaken. Communicate and reach out to wider local governments and their stakeholders on the importance of TB EFWS.

3. Capacity and Capability Building

Awareness generation campaign should be followed by capacity and capability building campaigns. Once enough goodwill about the benefits of TB-EWFS is generated, the local governments and leadership should be trained in the various technology and tools of TB-EWFS. Thus, enabling local authorities, governments to use

TB EFWS tools and learn from best practices is the ideal way forward. May it be tools or skills or pedagogy.

4. Establishing Linkages and Networks

The idea of TB-EWS is rooted in cooperation and information sharing. This cooperation should permeate from the regional to the local level through the establishment of linkages and networks. Thus, there is a need to promote exchange through village-to-village and city-to-city Trans Boundary cooperation. This can

be accomplished through the exchange of data or technical staff or action plans.

Trans Boundary Early warning systems (TB-EWS) empowers individuals and communities threatened by hazards to act in sufficient time and in an appropriate manner so as to reduce the possibility of injury, loss of life, and damage to property and environment across borders. By adopting the above mentioned practices, the role of local authorities and governments can be significantly increased in TB-EWS in the region of South Asia. ■

- AIDMI

NEW IDEAS

New Ideas for Trans-Boundary Early Warning System in Asia

The Asia-Pacific region is the most disaster prone region in the world. As lives and livelihoods in this region face newer hazards and risks, it is time to test newer and alternate ideas in the field of Trans Boundary Early Warning System (TB-EWS). For instance, it is time to apply the concept of justice to all the TB-EWS programming and goal setting in Asia. Similarly, evolving a new and context driven vocabulary of risk and resilience that helps at-risk communities in Asia to better understand and manage their risk profile is also a necessity. Turning to design led interventions that utilize art for EWS purposes could also work well in Asia.

The loss and damage suffered by artisans in the wake of disaster also needs to be added in the loss and damage estimates when TB-EWS fails. Newer components like disaster risk in ecological hotspots

and lower river basins in Asia need more attention within the broad theme of ecosystem based TB-EWS. In this respect, greater collaboration and cooperation between regional networks like SAARC and ASEAN can lead to the desired change.

A reorientation of academia through training, education to evolve timely TB-EWS solutions is also required in the region. For instance, the application of financial technology in recovery can be a game-changer. Similarly, piloting business led solutions to address disaster risks like a 'recovery wage' for women and child disaster victims in Asia can also assuage the suffering of the Asia's disaster victims. The Asian Infrastructure and Investment Bank can take a lead in localizing and prioritizing Asia's TB-EWS needs. ■

- Kshitij Gupta

The Success of Community-Based Trans-Boundary Flood Early Warning Systems

Many rivers and tributaries flowing from the mountains and hills of Nepal enter the plains of India forming flat, flood-prone, and partially waterlogged areas. Light to heavy rainfall in the Siwalik Hills of Nepal can cause flash floods and huge losses of lives and livelihoods downstream. Though early warning systems have been developed at the global, regional, and national levels to provide flood information, there are gaps – identified by the Hyogo Protocol and the United Nations Forum Convention on Climate Change (UNFCCC) Special Report on Extreme Events and Disasters (SREX 2012) – in getting this information to communities that are most vulnerable. To address this

challenge, the International Centre for Integrated Mountain Development (ICIMOD) piloted a community-based flood early warning system (CBFEWS), an integrated system of tools and plans in which upstream communities, upon detecting flood risk, disseminate the information to vulnerable downstream communities. This has proved to be an effective preparedness response mechanism that saves lives and livelihoods. In 2014, the Momentum for Change Lighthouse Activity Award honoured ICIMOD and Sustainable Eco Engineering (SEE) – the Kathmandu-based manufacturer of CBFEWS – for their innovative use of information and communications technology.

Why a Community-Based Flood Early Warning System?

The objective of a community-based flood early warning system is to enable local communities to utilise local resources and capacities to prepare and respond to and enhance their resilience to flooding risk. This system is installed in river tributaries with high flood risk. Upstream communities generate flood information using a simple low-cost instrument and disseminate real-time early warning to downstream communities, providing them sufficient lead time for preparedness. The system consists of a transmitter unit, which is placed on the river bank (at a point to which the water level rises when a river floods) and a receiver



unit, which is placed in a house in the nearest village. The house owner, who is the CBFEWS caretaker, will monitor the unit and disseminate information received from the instrument to downstream communities, local government line agencies, and other relevant stakeholders through mobile phone/SMS.

CBFEWS in the Ratu River

Ratu is a trans-boundary river that originates in the Siwalik Hills and flows to the northern extension of the Indo-Gangetic Plain. The trans-boundary nature of the river, shared by India and Nepal, provides an opportunity for cooperation between the two countries at the local level to inform vulnerable communities about flood risk and help them prepare for upcoming danger. A CBFEWS with telemetry is installed at Lalgarh in Bardibas, Mahottari District, Nepal and in Bhitamore, Sitamarhi District in Bihar, India, and jointly implemented by the local communities, partner organisations, and the respective government line agencies, with support from ICIMOD.

The telemetry-based early warning system provides early flood information to 6,685 households with a population of 35,804 in four villages in Mahottari District, Nepal and 12,500 households with a population of 59,600 in six villages in Sitamarhi District, India.

Cross Border Local Level Information Flow

On 31 July 2017, a stakeholders' consultation was conducted in Bardibas and Sarpallo, Nepal.

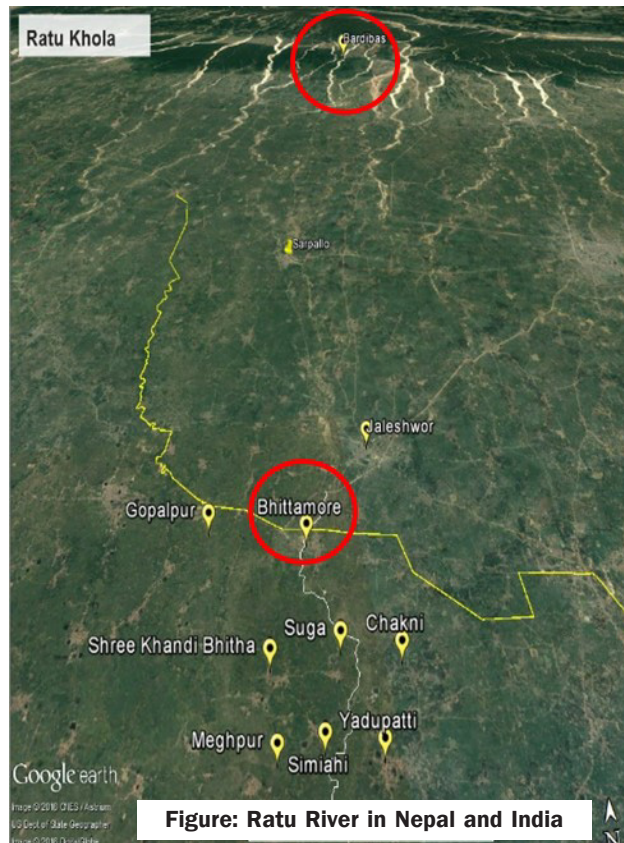


Figure: Ratu River in Nepal and India

The consultation included a discussion on CBFEWS and its significance to downstream vulnerable communities. The level of commitment from local representatives of vulnerable communities, the caretaker from the upstream community, and representatives from district government offices and other organisations working in Ratu to support the implementation and sustainability of the system was encouraging.

The cross-border upstream-downstream interaction of the Ratu River in Sarpallo, Nepal and Bhitamore, India provided an opportunity for the caretakers in the two countries as well as representatives from local communities and partner organisations to exchange knowledge and information. The scoping and risk assessment, installation of the instrument, and mock drills for preparedness were

jointly conducted to enhance the resilience of vulnerable populations. Community members and caretakers in Bardibas and Sarpallo promised to support downstream vulnerable communities in Sitamarhi by sharing information, which will give them time to move to safer, higher ground with their belongings and livestock.

One of the women participants from Bhitamore, Patna, India, said, "We have family relations across the border in Nepal and we are excited to share knowledge and information which benefits both communities."

This bond was further strengthened when the caretakers, representatives from local government line agencies, and vulnerable communities gathered at ICIMOD for a regional hands-on training on community-based flood early warning systems from 11-15 September 2017. During the training, participants from Afghanistan, India, Nepal, and Pakistan shared their experiences and built contacts and communication channels that are vital to the dissemination of early warning, while they gained hands-on experience in instrument installation and maintenance.

Sustainability Matters!

The sustainability of community-based flood early warning systems depends on community ownership and continued financial and technical support for the operation of the system. Taking this into consideration, ICIMOD has involved local government line agencies, local institutions, and community

members in the conceptualisation, risk assessment, scoping, and installation of CBFWS and their regular monitoring. A network of key informants has been established to share and disseminate early warning to relevant stakeholders. The long-term goal is to integrate this system with the annual district disaster management plans to ensure sustainability and ownership at the local level.

Does it work? – Evidence from the field

On 12 Aug 2017, floodwaters from the Ratu River reached Shrikhandi village in the Sitamarhi district of Bihar, India. The people residing in this Indo-Nepal border district were prepared. The early warning system that was set up by ICIMOD-Yugantar-SEE in the Ratu River near Shrikhandi-Bhatta is different from the early warning system operated by the government.

Unlike previous years, when the flood waters gushed into their homes, this time the people had

moved their cattle and other valuables to safe places. The women and children were prepared to move to safer places. The local administration of the Sursand block and Sitamarhi district had been warned about the impending floods. Thanks to the community-based flood early warning system, they had seven to eight hours of lead time to prepare for the coming flood. This was made possible because local communities and government line agencies were involved - from conceptualisation to implementation - in this initiative. In many ways, technology was given a 'human face'.

Ranjeet Kumar Jha, CBFWS caretaker at Shrikhandi village, had been keeping constant watch on the receiver that was telemetrically linked to the tower at the nearby Ratu River bank. He had been in constant contact with Rajkumar Mahato and Mahendra Karki, the caretakers of the systems at Sarpallo and Badribas in Ratu River, Nepal.

Jha was not only able to inform his own village but also six other adjoining villages, giving them time to prepare and move. This is the beauty of a local-level, cross-border effort using a community-based flood early warning system.

Today, Ranjeet Kumar is very proud to be a caretaker of the instrument, as his information was able to provide sufficient time to vulnerable communities to save themselves and their precious cattle and goods. Ranjeet, his fellow villagers, and communities living downstream who benefited from the early warning information he shared with him have realised that information is power indeed. They hope that this system will be installed in other rivers and save more lives and livelihoods. ■

– **Dr. Neera Shrestha Pradhan**, Senior Water and Adaptation Specialist, International Centre for Integrated Mountain Development (ICIMOD), Nepal, and **Sanjay Pandey**, Executive Director, Yugantar, Bihar, India

CASE STUDY

Reaching the Most Vulnerable Riverine Communities in Mahakali Basin: Community-based Flood Early Warning Systems

Introduction

Mahakali a Himalayan catchment of Ghagra sub basin of the large Ganga Basin, originates from the Trans Himalayan region of Kalapani (>3600 m) and ultimately drains through the Terai plains of Uttar Pradesh. Numerous rivers and streams join the Mahakali from the higher, middle, lower and outer Himalayas.

Out of its total length of about 350 km, Mahakali flows about 223 km along the Uttarakhand-Nepal border. Its northernmost major

tributary on the Indian side is the glacial Dhauliganga (E) or Darma, which meets the Mahakali at Tawaghat. Further downstream at Jauljibi is its confluence with the glacier-sourced Gori Ganga. After Jauljibi the Mahakali exits the alpine region and is joined by the Saryu near Pancheshwar. The latter, mainly a spring-fed river, is the longest tributary of Mahakali. Their confluence is also the site of the proposed multi-purpose Pancheshwar dam. The last important tributary on the Indian side is the spring-fed Ladhiya.

Flood in Mahakali Basin

The Mahakali basin is susceptible to a range of hydro-meteorological and geological conditions that contribute to monsoon floods in the region. In addition, poverty and socio-economic disparity is high along the corridor. These hazard and social vulnerability along with poor land use plan, and unplanned urbanisation have aggravated the flood risks (Paudel et al. 2013).

Some of the major causes of floods in Mahakali/Sharda river include heavy rainfall and cloudbursts in the

area, together with glacial melting, heavy land erosion, slides and mass movements in saturated fragile geology. Heavily loaded water flow triggers further devastation. More losses have been observed in unprotected areas and low-level settlements. Failure or opening of water bodies such as dams and barrages adds to the floods and devastation (Feasibility of TBFWEWS study, Oxfam, 2017).

Need of Early Warning System

The Disaster Preparedness and Response Plan (DPRP, 2018) of Dadeldhura district after historical analysis of the water induced disaster identified Ranoon as one the most disaster-prone watersheds contributing to major flood risk in Dadeldura. Hence, OXFAM conducted a feasibility study of Trans-Boundary Early Warning System of Mahakali basin together with Practical Action Consulting in 2018. The study report has recommended to establish Early Warning system in Rangoon and Tigram area in the Mahakali basin.

The area where the CBFWEWS was established has existing hydrological station at Kainpani and a precipitation station at Jogbuda operated by DHM, however both of them are manual and do not necessarily produce flood early warnings with sufficient lead time for Jogbuda and Simalkhet. Also,

there are precipitation stations at Gaira, Siradi and Simalbada, which are important for EWS in Rangun Khola. In this situation, the CBFWEWS installation was envisioned in Rangoon basin with the lead time is at least 3 hours for flood warning.

Based on the reference of study, ICIMOD with its partner Sustainable Eco Engineering in consultation with DHM and Pasuram municipality established Community Based Flood Early Warning System in Rangoon area. Rural Women's Development and Unity Center (RUWDUC) being a local partner organisation of OXFAM helped in site survey and assessment, selection of site and serving as caretaker.

CBFWEWS at Rangoon

Rangoon basin covers 481 sq. km which is 31% of Dadeldhura district and contributes to 10% of its area in Mahakali basin. The CBFWEWS was installed near Kalakot station to provide early warning system to communities of the Rangoon basin. The CBFWEWS has provided the Early Warning Information to communities to ward number 12,5,6 of Pashuram municipality.

On July 12, 2018, a heavy rainfall occurred in the Rangoon area. The sensor at Kalakot used to record 25 cm of water on other days however water level increased after 4 pm

increasing to 58 cm on that day. The information was shared through municipality to Elaka Police station, WEC members of Jogbudha. The information was passed to community including farmers, teachers so that everyone has access to the lifesaving information. The president of Pashuram Municipality Bhim Bahadur Saud expressed his happiness that the technology has helped to display information in board of Municipality and we were able to share the information to those communities timely to save the life of people. Yadab Bogati, the volunteer near the sensor station expressed that he could disseminate the information to the communities and also received phone calls from the WEC members.

The Women from Women Empowerment Center were also engaged in disseminating the flood information. "We informed each household members not to go to riverside, share the information to their family members who are coming through the way from the district headquarter. Everyone was alert and able to save life". The statement was shared by Janaki Singh, a member of Parigau WEC during the recent WEC meeting last week.

Datta Ram Panday, incharge of Illaka Police office Dadeldhura told that the flood data information of Rangoon Khola in the display board has helped a lot to mobilise the security forces to be in alert position and further to the communities. Every year, there used to be 3 to 4 casualties in the Rangoon. The technology has helped us to make us alert.

However there the system has not been able to cover all the population of the Mahakali basin and the project has planned to build on strengthening data compilation and dissemination mechanism in coordination with concerned stakeholders of Nepal and India. ■

- Rajan Subedi,

Team Leader, Trans-boundary Rivers of South Asia (TROSA), Oxfam, Nepal



Installation of Sensor in the Kalakot area.

Regional Platform for Multi Hazards Early Warning System and Improved Community Resilience to Natural Disasters in South Asia



Disasters have no boundaries. And therefore early warning of upcoming natural disasters should not be bound to any geo-political borders.

The workshop titled, "Regional Collaboration Workshop on Community Based Trans-Boundary Early Warning Communication, Flood Resilience, System and Knowledge Dissemination" was held in Delhi on September 7, 2018.

Committed group of academicians, policy-practitioners, government officials, and civil society organisations from India, Nepal, Bangladesh and Afghanistan participated in the workshop and shaped the collaboration.

This collaborative platform is facilitated by Asian Disaster Preparedness Centre (ADPC) in Bangkok; International Centre for Integrated Mountain Development (ICIMOD) in Kathmandu; Aga Khan Agency for Habitat in Kabul; All India Disaster Mitigation Institute (AIDMI) in Ahmedabad; Christian Aid (CAID) in Delhi, Oxfam India in

Kolkata; Indraprastha Institute of Information Technology, Delhi (IIITD).

Mr. MQ Haiddari, Deputy Minister for Disaster Management and Humanitarian Affairs, Afghanistan, emphasised that collaboration is one of the major milestones in addressing the bottlenecks of cross border and trans-boundary mechanism of Early Warning System to save lives. "Such trans-boundary early warning systems will further improve human endowment, remove constraints for better jobs, and women and poor will continue to protect livelihoods and assets" said Mr. Animesh of Oxfam.

"The collaboration builds on Asian Regional Plan of Asian Ministerial Conference on Disaster Risk Reduction 2018 held in Ulaanbaatar", indicated Ram Kishan of Christian Aid.

"At least one out of three lives can be saved in the border areas by effective early warning system in

South Asia", argued Mihir R. Bhatt of AIDMI.

"This collaboration would create a model for engagement of multi stakeholders to establish the multi hazards Early Warning System (EWS) across South Asia", said Atiq Kainan Ahmed of ADPC.

Kamal Kishore, member of National Disaster Management Authority, India, stressed, "that the trans-boundary early warning system should factor in risk mapping and preparedness at the local level, and be effectively communicated to the last vulnerable individual in South Asia".

The TB-EWS collaboration will consolidate and contribute to ongoing local and national EWS efforts, as suggested by ICIMOD based on its work in Himalayas.

Lives must be saved, and now with digital technology and what is called "Big Data" more lives can be saved in South Asia with collaborative early warnings. ■

– Mihir R. Bhatt

Delhi Declaration on Regional Platform

Having participated in the "Regional Cooperation and Institutional Co-ordination for an Early Warning System (EWS) and improved Community Resilience to Natural Disasters in South Asia", we emphasise the importance of until Early Warning System in South Asia and declare the following:

Preamble:

In spite of some of the best forecasting systems and alert systems in South Asia, loss life due to disasters are on rise on continuous basis and emphasis the need of robust EWS, at not only country level but also across the boundary of the country. Governments are aiming for zero casualty approach and effective end-to-end early warning system. Death reports and losses of life calls for multi stakeholder engagement along with the government to support the early warning system from national to community level. Poor or inadequate systems for warning dissemination often leave many people stranded or marooned. Gaps in Early Warning System are more skewed in the last mile. Trans-boundary data sharing on river flooding, weather pattern and climate change impact is often marred by lengthy protocols and done without contextual amendment in those protocols. When it comes to sharing of critical and life-saving information, it should flow freely across boundaries. This Regional platform can play a critical role to connect the country information sharing through multiple engagement of the stakeholders.

Recognising that:

South Asia is exposed to a variety of hazards due to the geo-climatic characteristics of the region. Among all the major natural disasters, floods count the greatest number of

damages and destructions over the years. The highest and most concentrated flood risk can be found around the foot-hills and the flood-plains along the Himalayan belt, along with nearly all of low-lying Bangladesh and many coastal areas in the region.

Recalling:

The Sendai framework for Disaster Risk Reduction (2015 – 2030), which suggests that addressing underlying disaster risk factors through disaster risk-informed public and private investments is more cost-effective than primary reliance on post-disaster response and recovery, and contributes to sustainable development. Early Warning System (EWS) is one such risk-mitigating tool.

Call for:

Until the end of 2020, we express commitment to, in collaboration with national and local authorities, private sector, international and non-government organisations, and other stakeholders and resolve to:

1. Principle areas of collaboration

- Established institutional mechanism as Regional Platform to work with different agencies

and stakeholders to create the best and well established knowledge pool on EWS to support the South Asian EWS systems.

- Develop policy briefs Analyse cross border policy gaps for data or information sharing to suggest the policy recommendation to strengthen the cross border EWS systems with the organisation involved in the advocacy network at the regional level.
- Organise annual workshops on rotation basis to take the stoke of work of regional platform as well as add new ideas and innovation to support the regional process of EWS.
- Be part of Regional and Global processes of DM, DRR to share or advocate for strong understanding about EWS in different forum and framework.
- Publish reports on EWS.
- Undertake a review of our commitments in 2020 to ensure consistency with the global disaster risk reduction framework.
- Develop the roster of the best practices and practitioners of EWS to support the South Asia EWS process with government and non-government initiatives.

Place: New Delhi

Date: September 7, 2018

Signatures:				
SN	NAME	DESIGNATION	ORGANISATION	Signature
1	MIHIR BHATTI	DIRECTOR	AIDFIE	
2	RAN KISHAN	REGIONAL HUMANITARIAN CO-ORDINATOR	CTM/CHANG	
3	ATIQ KAINAN AHMED	SENIOR PROGRAM MANAGER	ASIAN DEVELOPMENT BANK	
4	M.G. HAIDARI	DEPUTY MINISTER AND MIA	AND MIA	
5	Anil K. Sinha	Sr. Advisor	Independent	
6	Ranu Bhogal	Director	Oxfam India	
7	P.B. SUTIT	Asst. Prof.	MITD	
8	Bined Parajuli	Hydrologist	UNEP Nepal	
9	Dinesh Mishra	Civil Engr.	UNEP Nepal	
10	Sanjay Pandey	Ex. Director	Yugandis	
11	NM Prusty	Director - Disaster Management	WAT	
12	Neera Shrestha Pradhan	Specialist	ICIMOD	

Filling the Gap: Spaces that Protect and Nurture Children in Emergencies



There are widespread gaps that exist in our society's capacity to find spaces that protect and nurture children after an emergency. This emergency may be caused by an extreme natural phenomenon like floods or precipitated by humankind's own mistakes like conflicts and strife.

To address this widening gap, a state level workshop was organised by the Assam State Disaster Management Authority (ASDMA) and United Nations International Children's Emergency Fund (UNICEF), Assam on November 14, 2018 in Guwahati, Assam, India.

The event titled, "Workshop on Children in Emergencies: Developing State Level Guidelines for Child Friendly Spaces in Emergencies under National School Safety Policy" explored a wide range of possible ways to fill in this gap at the state level with local resources and local public and private capabilities.

Over 60 participants from key authorities and civil society of Assam joined the workshop. Many of the participants brought field level flood or conflict or landslide related experiences in addressing

children's need for Child Friendly Spaces (CFS).

Shri Rajesh Prasad, CEO, ASDMA, underlined the need to urgently find ways to fill in this gap of CFS in Assam, and find ways that not only build on existing capacities of key departments and state authorities but also draw lessons from civil society experiences in starting and running in Assam and beyond.

Ms. Chhaya Kunwar of UNICEF, Assam, pointed out that children of Assam should not only be viewed as victims of such emergencies but also as leaders capable of establishing and running Child Friendly Spaces (CFS) if they are suitably empowered. Each emergency offers opportunities to children to be prepared and build resilience.

Ms. Aruna Rajoria, Mission Director, Sarva Shikshan Abhiyan, Assam suggested using existing public systems and state-wide structures of Government of Assam to find a way to start filling in such gaps of CFS in a practical manner without any delay.

Shri Pritom Saikia, Commissioner and Secretary, Secondary and Elementary Education, Government

of Assam focused his remarks on using education as a lead sector in reaching out to children in emergencies so that children not only suffer less loss and damage, physical and emotional, but in fact can offer their leadership in making such spaces a reality.

Ms. Mandira Buragohian, ASDMA reminded the participants that climate change impact on Assam's economy and ecology will increase the need for such CFS. Better use of local and operational knowledge can offer opportunities to make CFS effective.

Shri Kripal Jyoti Mazumdar, ASDMA, steered the panel discussion involving Save the Children as well as Rural Development Centre of Assam. Both have set up CFS in Assam across emerging and locations. A local, operational, and realistic view of the challenges and opportunities was shared with the participants.

Shri Mukta Ram Deka, ASDMA, chaired the session to find ways to address this gap through various sectors including health; food and nutrition; WASH; child protection; and education. What is needed in Assam is convergence of these key and other related sectors to fill in this gap.

The AIDMI offered final product and process related inputs from its work on CFS in India and South Asia and congratulated ASDMA and UNICEF in aiming to fill in this widespread gap in India's humanitarian action agenda. India has the capabilities and resources to set up some of the best Child Friendly Spaces after an emergency where instead of victims, children can emerge as leaders in managing their own resilience. ■

– Mihir R. Bhatt

Collective Action Integral to Trans-boundary Risk Governance

The 2017 floods had a devastating impact in India. Nearly 1046 lives were lost. Assam, Bihar and Uttar Pradesh were the worst affected. The deluge however also affected countries including Pakistan, Nepal, Bhutan and Bangladesh with significant loss of lives and assets. Much of it could have definitely been averted with a collective action at the transboundary level. Risks and fragilities in South Asia are intrinsically linked and are getting worsened due to climate change impacts.

It is well-known that countries in the South-Asian region share socio-economic, cultural and demographic similarities. Similarly, many of these countries also share the same underlying causes of vulnerability and are exposed to the similar risks. The geo-climatic factors, water stress, protracted conflict, etc. are just a few of the common threats faced by these countries. These common threats also serve as reminder of the interconnectedness of risk and how the fragilities of one country can affect the whole region adversely, and therefore, why there is a need for collective action approach for transboundary risk governance.

India and Bhutan which comparatively share the shortest land border (after Afghanistan) in the region, have 56 transboundary rivers flowing between them, most of them notorious for devastating monsoon floods. A problem which transcends through all borders rivers including Brahmaputra, Kosi or Sharda to name a few. Other disasters like droughts and famine, earthquakes and cyclones have also been constantly reminding that disasters cannot be restricted by political boundaries and therefore should be managed collectively, not

only during response but in all phases of disaster management.

Oxfam is implementing the Transboundary Rivers of South Asia (TROSA) project in India, Nepal, Bangladesh, and Myanmar to understand and address the challenges related to transboundary rivers, and work together to create conditions to reduce poverty of communities. It envisions that the implementation of the TROSA programme will lead to an increased level of community involvement in the equitable and sustainable water resource management at the local and regional level. Transboundary Dialogues between community, Governments and other stakeholders is a key prerequisite to achieving sustainable solutions at the regional level.

In this endeavor, we have learnt that shared waters can be a good catalyst for peace when different stakeholders consciously come together and make efforts to benefit all, including the most marginalized.

Saralbhangha is one of the transboundary rivers which flows through Sarphang district of Bhutan to Kokrajhar in Assam. The river is a lifeline to many downstream communities who depend on traditional Jamfwi system to irrigate their crops. The river is also the elixir for the flora and fauna of the Ultapani reserve forest. However, it has also led to very devastating floods in recent years.

In 2016, flashfloods in Sarphang district have wreaked havoc in downstream areas in downstream Kokrajhar and Chirang districts. Later in July 2017, the town of Sarphang Bazar was entirely washed away by floodwaters, when the

Sarphang River broke its banks again, cutting off the road to the border crossing town of Gelephu. Many families were left homeless, following continuous heavy rainfall. Flood protection measures in upstream, included creating an embargo on the traditional Jamfwi's by Indian Farmers from Saralpara area of Kokrajhar district of Bodoland put the livelihoods of nearly 15000 farmers at risk.

Oxfam's TROSA partner NERSWN started engaging with different stakeholders for including the All Bodo Student's Union (ABSU) and Bodo Women Forum for Peace and Development (BWFPD) and held a series of consultations with Bhutan India Friendship Association (BIFA). These consultations led to a decision to lobby with the district level authorities of the Royal Kingdom of Bhutan. Consultations with the District Administration in Sarphang led to the decisions in favour of the downstream communities.

This was a very good example, where a transboundary network of CSOs acted as catalyst to bring communities and Governments from across the political boundaries together to discuss and amicably arrive at solutions benefiting all particularly in the downstream. This case had a far flung impacts where it started seeing revival of traditional socio-cultural ties and strong people to people dialogues¹ in the region apart from the revival of traditional jamfwi system supporting downstream farmers.

Oxfam India and NERSWN are now investing on strengthening community based transboundary early warning systems in Saralbhangha and have started establishing community volunteer

1 <https://scroll.in/article/892235/how-villagers-in-bhutan-and-india-came-together-to-resolve-a-water-sharing-tussle>

base in some of the most vulnerable locations in these regions. Role of Transboundary networks like BIFA is very important in bringing both the Governments and communities together. Just like the Indo-Nepal Joint Action Forum (INJAF) which is a transboundary network partner for Oxfam in Sharda river basin.

Oxfam has so far organized five Mahakali Dialogues since January 2018 to provide a platform to the stakeholders from the two countries to understand the risks and identify common areas of addressing some of the most pertinent issues through collective action. Interestingly, communities, CSOs and other stakeholders have time and again reaffirmed the strong socio-cultural ties both the countries enjoy. In all of these platforms, transboundary early warning unanimously emerged as a priority action area on which both the countries should engage. Communities further discussed that the sustainable solutions can be traced beyond early warning to the transboundary risk governance and cited that how a collectively developed risk governance plan at Banbasa that emphasizes on synchronizing the release of 1000 cusecs of water to Nepal, with the farming cycle, monsoons and other factors can significantly avert the risk of flooding and crop loss in the downstream communities.

INJAF has brought together diverse stakeholders from both countries to discuss solutions to some of these problems. A beginning has been made in transboundary early warning systems, where Oxfam Nepal and ICIMOD have piloted a telemetry based warning system in Rangoon basin and Oxfam India has been strengthening the last mile institutions with a strong base of 650 volunteers to support early action in Sharda.

But influencing policies are important to ensure this paradigm shift in risk governance, looking at it from the regional and transboundary perspectives, bringing Governments together to ease protocols and collectively prepare to save lives of the people, irrespective of what polygon of a map they reside in. Government of India invited inputs on the draft national disaster management plan in November 2018. Oxfam India organized a series of consultations² covering 11 districts and 4 states, culminating the findings at the National Consultation in Kerala. All consultations in regions with transboundary significance such as Assam, Bihar and Uttar Pradesh have strongly recommended that the National Plan should be more articulate on the transboundary and regional risk governance. The memorandum submitted to ministry by the CSOs included the following

recommendations on transboundary risk governance.

1. Identify Scope for Transboundary Risk Analysis and set up mechanisms for disaster management planning at basin level covering upstream and downstream stakeholders.
2. Transboundary Early Warning Mechanisms should be set up.
3. Role sharing between neighboring countries (with action points and agencies responsible)
4. Point to Point contact (DDMA-DDMA or similar with protocols) to be established
5. Transboundary simulation and preparedness exercises to be conducted
6. Transboundary response and recovery coordination mechanism to be set up
7. SAARC Civil Society Network & Collaborations in the Region could be roped in for addressing Transboundary issues
8. Ease of bilateral and regional protocols.

With the increased frequency and intensity of disasters and with changing climate patterns, more and more people in this region will be stressed by disaster impacts. Collective Action from the local to regional level is important to avert the worst of the disasters and countries and communities should come together for a resilient and sustainable future. ■

– Animesh Prakash, TROSA,
Oxfam India

2 <https://www.oxfamindia.org/index.php/press-release-disaster-management-inclusive>



Benefit Sharing in Megna River Basin

Governance based on 'benefit sharing' is more holistic than traditional governance, which has historically been about allocating water. 'Benefit sharing' accounts for all ecosystem services the river basin provides. In the Meghna Basin, these opportunities include improved resilience to flood and erosion, food self-sufficiency and security, conservation of the basin's cultural and ecological diversity, and diversification of trade between Bangladesh and India. IUCN's Building River Dialogue and Governance (BRIDGE) Ganges-Brahmaputra-Meghna (GBM) project has developed a profile and preliminary scoping study on *Benefit sharing opportunities in the Meghna Basin for Bangladesh and India*. ■

Read more at: <https://www.iucn.org/news/asia/201811/new-report-lays-groundwork-benefit-sharing-megna-river-basin>

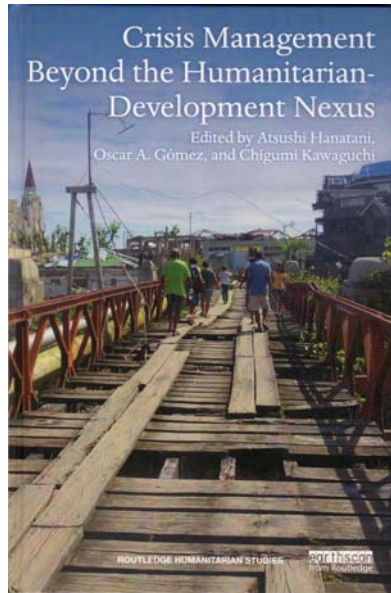
Crisis Management Beyond the Humanitarian-Development Nexus

Natural disasters and man-made conflicts can often precipitate a humanitarian crisis. As the number of people in the world affected by such humanitarian crises increases every year, it is important to understand the underlying causes of crises to manage them better. A new book, titled, 'Crisis Management Beyond the Humanitarian-Development Nexus' is out to help us think about these pressing issues.

The book is edited by able and senior experts of humanitarian and development field. Atsushi Hanatani is Senior Advisor and former Senior Director of the Office for Peacebuilding and Reconstruction. Oscar A. Gomez is Research Fellow. Chigumi Kawaguchi is Research Fellow. All three work at the Japan International Cooperation Agency Research Institute.

Each editor brings a new view of cooperation, research and development. The ongoing national crisis in India, may it be the difficulty in moving towards Circular Economy or taking ahead the process of National Register of Citizens in Assam, the book is of interest as a resource or a background reader.

The book tells us that honest efforts to address one crisis after the other in increasingly complex environments are becoming a norm and not an exception. The Cold War offered an opening to do both, launch the humanitarian and development initiatives beyond borders. And over decades we realised that there is no one but multiple approaches to crisis management, may it be humanitarian or development induced.



However, over the years, armed conflicts have become a shadow to most humanitarian and development initiatives, which was either ignored or considered not important, as explained by the authors Toshiya Hoshimo and Chigumi Kawaguchi. The chapter on Timor - Leste by Yakako Sakobe and Tamaki Honda offers details of why this shadow exists, enlarges, and contracts from time-to-time.

The troops of President Trump may be now moving out of Syria but Ryaji Tateyama offers the readers good reasons to find out if the exit from Syria is as politicised as the entry itself was. Also if there is a crisis then how politics has trumped humanitarian considerations.

The part III of the book focuses on crisis management after a disaster, and two excellent case studies of Honduras after Hurricane Mitch and long term recovery in Indonesia are offered to illustrate the ideas.

As the balance is moving in favour of evidence, and evidence itself is becoming a reality to make policies and conduct research the chapter by Yasuhito Jibika and Yuichi Ono offer qualitative analysis of institutional and political factors influencing crisis management.

The book is of interest to partners of JICA in India, and elsewhere; academic researchers of multi-layer crisis management in Asia Pacific; students of limits of humanitarian action in countries with international humanitarian NGOs; and those who watch the slow and steady collapse of what we all call sustainable development with resignation and hope, both.

Why has the war on air pollution not become a reality in Indian cities? How long will India depend on its army to aid civil authorities in humanitarian crisis? How can rights to relief and recovery be collectively held as India moves to individualisation of families and society? Who will make digital entities accountable to citizens? And do items in junkyard have after life? Those who are likely to think about such questions in India must read this book, not at one stretch, but repeatedly. ■

- Book Review by Brij Chauhan,
local planning team leader, AIDMI.

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Economic Cost of Neglecting Climate Change in Local Planning

A recent landmark report highlights the grim consequences to be faced by the global community if climate change is not urgently addressed. With 55% per cent of the world's population already living in urban areas, the huge economic cost of climate change on local and city authorities will be immense, especially if they do not incorporate climate change into local planning.

On October 8 the Special Report on Global Warming of 1.5°C published by the Intergovernmental Panel on Climate Change (IPCC) states that the 1°C of global warming already incurred is manifesting itself through more extreme weather, rising sea levels and diminishing Arctic sea ice, among other changes. Continuing on a business as usual pathway without serious concerted global efforts to address climate change will only lead to more devastating consequences including human and economic costs.

Based on this report, how should local planning integrate climate change? One thing is clear: Neglecting climate change in local planning would make cities even more vulnerable to the economic costs of extreme weather events such

as floods, drought and ensuing damage to infrastructure and homes, which could easily cost billions of dollars and result in thousands of deaths. In South-East Asia, the Philippines, which is part of the Ring of Fire - a major area in the basin of the Pacific Ocean where many earthquakes and volcanic eruptions occur - unfortunately provides many examples of this.

Typhoon Haiyan which ravaged the country in 2013 resulted in damage estimated at more than USD4.5 billion with the loss of more than 6,300 lives. Five years later, on September 15 this year, the country was devastated by Typhoon Mangkhut with damage estimated at more than USD600 million. Just six weeks later, on October 30, more than 15 people are dead from Typhoon Yutu which, like Mangkhut, also landed in northern Philippines. As a low-carbon emitter per capita, the irony is that the country is facing the consequences of an issue it has not really contributed towards.

Local planning which incorporates climate change works best within an overarching national plan with an institutional framework for

mainstreaming climate change in national planning. When such a mechanism is in place, all development planning decisions will be made from the perspectives of: What impact will this have on our carbon dioxide emissions; how prepared are we to adapt to its already occurring impacts; how do we compensate for loss and damage which has already occurred; will this lead to resilience from climate change; and; are we incorporating disaster risk reduction measures?

When such thinking exists at the national level it becomes much easier to incorporate them into local planning as well. Having said that, there are many examples, especially in the United State of America, where cities have taken the lead in integrating climate change into local planning in the absence of federal support. Elsewhere, many cities have also come up with climate action plans as well as low-carbon city framework. They realise that excuses such as lack of budget or short-term focus, which ignore these issues, will lead to cities bearing much more in economic costs of climate change-induced damage, which will prevent the very development they aspire for from taking place.

In conclusion, I refer to the IPCC report which states: A number of climate change impacts could be avoided by limiting global warming to 1.5°C. Limiting global warming would also give people and ecosystems more room to adapt and remain below relevant risk thresholds. Limiting global warming to 1.5°C would require "rapid and far-reaching" transitions in land, energy, industry, buildings, transport, and cities. We need to act now! ■

- **Nithi Nesadurai**, Regional Coordinator, Climate Action Network South-East Asia



An aerial view shows the flooded residential area in George Town, Penang, Malaysia.

Kerala Floods Loss and Damage: Some Estimates

Extreme weather events are growing in frequency and intensity globally. According to German watch Report on Climate Risk Index, India, standing as 4th most vulnerable country globally to climate change faces worst impacts in the form of extreme rainfall, floods, drought, cyclones, heatwaves and even dust storms, all year across regions.

The recent floods in Kerala, the worst to hit the state in a century, demonstrate one of the many tragedies due to climate change coupled with poor management and planning, leading to massive loss of lives and damages in kind.

The month of August proved to be a bane to God's own country, Kerala, endowed with an area of 38,800 square kilometres decorated with mountain ranges; third-highest population density in the country; 44 rivers with 61 dams. However, despite warnings from IMD about an expected grim situation, unprecedented rainfall with urban factor combined including faulty dam management saw what was unwitnessed before. The impact-buildings and bridges were washed away, nearly 500 people died, tens of thousands of homes destroyed and several thousand hectares of crops ruined.

Over 10 days of continuous outpour in August resulted in nearly 25 trillion litres of water falling on Kerala. Of the total of 760 mm rainfall received by the state since the beginning of the month of August, close to 75 per cent was received in the eight days itself between August 9 and 17, representing a departure from normal by around 300 per cent for the time period. The predicted rains during this period from August 9 to 15 were 98.5 mm.

The state government which estimated the preliminary losses at Rs. 20,000 crore, later on clarified that the total losses was to the tune of Rs 40,000 crore and finally estimated the total losses equalling to the total annual outlay of the state. While at the height of the floods, in the mid of August, nearly 15 lakh people were put up in more than 3000 relief camps, the figure gradually boiled down to 60 thousand people. By September end nearly 5000 people were lodged in nearly 120 relief camps.

In August alone, the estimated wage losses were worth Rs 4,000 crore. More than one million people are still in relief camps that would take around Rs 300 crore a month to maintain. Its infrastructure has been greatly hit with more than 12,000

kilometres of roads been damaged hindering growth and also speedy relief and rebuilding operation. In the area of agriculture, 57,000 hectares of agriculture crops have been destroyed.

The case of extreme rains and floods result in health hazards too with Kerala being no exception. Stagnant waters in most districts of Kerala led to an increase in the outbreak of waterborne diseases including cholera, leptospirosis and diarrhoea.

The healthcare sector on the whole has recorded losses over \$20m across the state.

Blessed with a wide and beautiful network of lakes, canals, rivers and natural scenic sites, Kerala draws significant amount of tourists every year. However, with the August downpour, tourism sector which accounts for 12 percent of Kerala's economy has also been badly hit. Estimates suggest that there has been more than 80 percent cancellations of tourist bookings during the flood period. A 25 percent drop for the season is expected by industry experts as a whole. In totality, the state's growth rate would be down by one per cent. The biggest question that one is confronted with-could this have been avoided and if yes, how? It would be interesting to see and note how the state and centre responds to rising extreme weather events, which as the recent IPCC, report on 1.5 degree has warned, would only increase in the future. ■

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Floods in Kuttanad: Impact on Livelihoods

The Context

Kuttanad is recognised as a globally important agricultural heritage system and is also part of the largest Ramsar site in India. Once a vast delta (about 900 sq.km) of four rivers - Pamba, Achencovil, Manimala and Meenachil - that originated 60 to 100 kms east from the Western Ghats high mountains, Kuttanad was blessed with frequent flooding. The flood waters brought alluvial sediments that nourished the soil fertility of this below sea-level concave-shaped land, which is also known as the rice bowl of Kerala. Farmers here have been practicing rice cultivation in the fields reclaimed 150 to 200 years ago. Year after year, the farmers of Kuttanad lived through floods and, with changing technologies, adopted new and resilient methods. However, the disasters that struck Kerala due to a cumulative rainfall of 2344.84 mm within a span of 6

weeks, which is 42.17% more than normal, triggered a massive deluge. This turned the rice bowl into a weeping bowl, with an unprecedented impact on the lives, livelihoods and assets of over 150,000 inhabitants of Kuttanad.

Kuttanad and Climate Change

Sea level rise and coastal inundation due to climate change would first be felt in Kuttanad, due to its below sea level geography. Climate change also threatens extreme coastal erosion, which will also adversely impact the backwaters, which are part of the Kuttanad ecosystem. Changes in weather patterns and acidification have already started taking a toll on the life and livelihoods of Kuttanad. Decline and spread of diseases among fish and other aqua fauna, resulting from the increasing water temperature, are increasingly widespread.

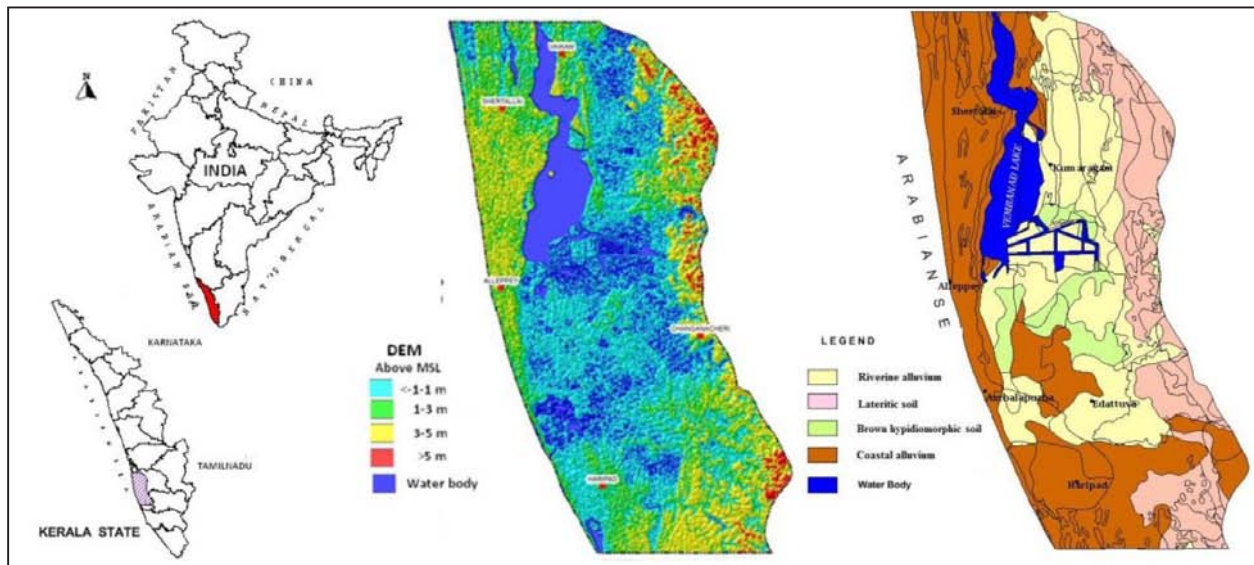
Social and Ecological Determinants of Livelihoods in Kuttanad

Historically, the social dimensions of life in Kuttanad have been a hindrance to the techno-economic transformation towards modernity. There existed a repressive caste system in Kuttanad, with the upper castes establishing their economic and social life based on land. The laws of pollution also prevented the lower castes from entering into any craft or trade which demanded transactions with the upper castes. This oppressive form of social discrimination was prevalent in its worst form until the land and social reforms that took place in the late fifties. With the mobilisation of labour by the caste and political organisations, the nature of this relationship indeed also underwent transitions across time.

There are three identifiable topographic features in Kuttanad -



Photo credit: Reena Surendran, Kainakari.



Source: Vinayachandran N (2014). Hydrogeology and Hydrochemistry of the Aquifer Systems of Kuttanad Area, Kerala: Their Role in Understanding the Evolution of Groundwaters, Ph.D. Thesis, CUSAT.

dry land, wet land and water bodies. While most of the human habitations are found on the dry land with varying elevations from 0.5 to 2.5 meters above MSL, wetlands are the water logged paddy fields reclaimed from the backwater extension of Vembanad lake. In 1975, a barrier was constructed at Thanneermukkom to prevent salinity intrusion in the dry season. The original vegetation in these rich alluvial deposits was largely made of luxuriant mangrove and other riparian flora which has severely been depleted. Farming communities of Kuttanad developed techniques of below sea level cultivation, reclaiming shallow parts of the lake. These parts are then protected by bunds built and strengthened by a traditional method called *katta kuthal*, where in thick strong blocks of clay are brought up from 3 to 4 meters below water mark. It was not uncommon that during the South West Monsoon, these bunds would breach and water would flood up the padasekharams (collective of individual holdings of paddy fields). Once the bunds are repaired, pumps locally called *petti* & *para* help dewater the inundated fields. Preparations for the next sowing would then be on their way.

Persisting Problems of Environmental Imbalance

Current snap shots of Kuttanad show a distressing picture – the cost of cultivation has increased many fold, and land use changes depict a decrease in cultivable areas and thereby rice production. This in turn increases dependence on mechanisation and thereby decreases labour requirements, making newer generations shift to non-agricultural sectors. The increase in lease cultivation results in a reckless use of chemical fertiliser and therefore, an increase in the use of pesticides, herbicides and weedicides, causing dearth in the availability of quality seeds. The list of woes doesn't stop here, however. Indeed, the increasing load of organic and inorganic pollutants in the waterbodies add to the stress and induce diseases to both human and other life forms. This dramatically deteriorating environment results in reduced livelihood opportunities for the predominantly farming communities, who are primary resource dependents. The ecological destruction came along the idea of increasing agricultural productivity. In short, among many other reasons, three major modifications were made in the fifties - a spillway at

thottappally, the bund at thanneermukkam and a road connecting National Highway at Alleppey with State Highway (Main Central Road) at Changanassery. In addition to these interventions, the increasing use of HYV seeds, which required high agricultural inputs of chemical fertiliser and pest controlling chemicals, resulted in the inevitable environmental imbalance in Kuttanad. It is in this situation that the August 16th flood hit Kuttanad.

Post disaster recovery and future of livelihoods in Kuttanad

For an ordinary Kuttanad farmer, to make 'disaster mitigation' meaningful, his basic necessities need to be fulfilled. Like all others, he too lost his home, sources of potable water, food, livestock and even his health. He is more vulnerable than ever and so is his family, community and others in the village. Among the goods and services provided by the Kuttanad ecosystem, rice production stands first, followed by the fish wealth. While 37 percent of the rice produced in the State comes from Kuttanad, 65 different species of fish (for example, pearl spots, perchlets and catfishes) and 14 species of shell

fishes (for example, fresh water giant prawns) are found here. There exists a rice-fish rotation that is symbiotic, helping better yield in both. Soon after the rice harvest, thousands of ducks are brought in from near and far, which is also beneficial to both duck rearers and rice farmers. Another post disaster recovery area that needs attention are the coconut gardens - indeed, the garden land also has banana, mango, jack, roots and tubers. A good number of people depend on these for their livelihoods.

The resilient social-ecological environments and institutions that Kuttanad already has could incorporate diverse mechanisms of livelihoods to face post disaster recovery. First and foremost, there is a need to provide fresh water supply followed by shelter. Most of the houses are either damaged or collapsed and temporary *erumadam* (stilt houses built with local materials - coconut leaves, wood and bamboo) need to be built before the Northeast Monsoon sets in by the end of October. Until houses are fully functional, community kitchens could be thought of since the majority of people have lost cooking

gas cylinders during the floods. Restoration of electricity is being worked on, and those who already moved in and repaired their houses have electricity supply. Long term measures should include livelihood enhancement programmes through panchayats and municipalities. They should focus on supplying livestock, helping reclaim paddy lands and restoring them to cultivable lands while keeping in mind soil conservation and proper water management. Climate resilient fodder and feed development should be taken up too.

The Lessons Disaster Managers could learn from this deluge in Kuttanad

The most important lesson is undoubtedly communication. Early warnings would give the people ample time to prepare and face the disaster, particularly since many of them have access only through waterways. Community radio stations, in this regard, are an idea to think about, as they are both affordable and participatory. Capacity building of local governing bodies in environmental monitoring, through water and soil sample analysis, could be taken up

as it should be consistent and continuous. Periodic cross sectional surveys to monitor human health are important. Simple tools could be developed for the community members or local governing bodies to record and monitor the health profile of the people of Kuttanad. Climate resilient agriculture, propagated as part of the National Initiatives in Climate Resilient Agriculture (NICRA) in Muttar by Krishi Vigyan Kendra of Central Plantation Crops Research Institute at Kayamkulam, should finally also be widened in scope, so as to spread and disseminate the programme to entire Kuttanad. Last but not the least, as the Government of Kerala is all set to build back better a nava Keralam, it should be democratic and based on the principles of the UN resolution on Sustainable Development Goals (SDGs), Universal Declaration of Human Rights, aligned with the goals and priorities set out in the Sendai Framework for Disaster Risk Reduction, realise the various components of social justice, and participatory. ■

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