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Photo: AIDMI.

Transformation: Initiatives Towards Resilience

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Transformation: Initiatives Towards Resilience

Can cutting edge innovations that integrate disaster risk reduction with climate change adaptation transform our views on risk from the standpoint of individuals, institutions and investments that shape resilience?

This issue of Southasiadisasters.net offers an unusual range of such examples from India, prevalent not only in this country but all across South Asia.

AIDMI's two decades of work in South Asia has shown that "Uncertainty" is an opportunity for transformation. Dr. Lyla Mehta of IDS, drawing from her ongoing field work on Climate Change, Uncertainty and Transformation in the desert of Kutch and delta areas of Sunderbans, has often mentioned that transformation is a bottom up process where marginal voices, more specifically poor women's voices, are central. This issue also highlights an institutional effort in the desert of Kutch to transform the lives of the locals by the Gujarat Institute of Desert Ecology (GUIDE), reported by Dr. V. Vijay Kumar and Dr. Anjan Kumar Prusty.

Risk is never insular, it is always compounded by underlying vulnerabilities, which if not addressed in time can precipitate into disasters. AIDMI has found this reality in over 23 evaluations and reviews of risk and resilience projects in South Asia. Dr. Lars Otto of IDS, who is also working on the Climate Change, Uncertainty and Transformation project, opines that a way to approach transformation is through landscape analysis which is a first step towards transformation.

Dr. Aliza Pradhan and Dr. R.V. Bhavani from Chennai share M.S. Swaminathan Research Foundation's (MSSRF) work that shows that the risks faced in agriculture are linked with the risks faced in coastal areas. Agriculture and farmers are a key to any coastal transformation towards resilience. Dr. Rajib Prakash Baruah from Assam State Disaster Management Authority (ASDMA), Guwahati, shares a way to approach the landscape of risk: mock drills. Such drills address a wide range of risks and measure the capacity of a system to respond to their impact.

Through AIDMI's work in over 56 cities it has been found that any transformation of a city is multidisciplinary by its very nature. Cities are many Things, many places, spread across different times. All versions of the city co-exist in collaboration as well as in conflict. Dr. Parthsarthy of IIT, in his work on Climate Change, Uncertainty and Transformation in coastal areas around Mumbai often argues that livelihoods are central to making transformation benefit the economy, ecology, and cities.

Dr. Nasir Javed, shares what does it take to transform cities and their livability across Pakistan. Karachi is picking up heatwave planning from cities in India, but in the process Karachi is transforming both, the way city is planned and the way risk is perceived in such planning. Yolande Wright of DFID UK at a panel on Future of Urban Humanitarian Response at Royal Institute of British Architects said in June 2017.

Shri Kamal Kishore, Member, National Disaster Management Authority (NDMA), India, in his preface to South Asia Disaster Report 2016 of Duryog Nivaran underlines Building Back Batter (BBB) as a transformative idea to be utilized for sustainable recovery and reconstruction. Bhavesh Sodagar from Mandvi shares with us the BBB in Kutch after 2001 earthquake in a candid manner: what changed, what did not, and what can still change to make Kutch resilient.

Shri Ramesh of Ministry of Earth Science has repeatedly indicated to look at transformative processes taking place in the Indian Meteorological Department (IMD) in terms of it reaching out to its data users more directly, either during droughts or floods or heatwaves. Dr. M. Mohapatra, IMD details some of these achievements, and also the efforts that went into them. Peter Walton of Oxford University warns us that institutions do not transform if there is no widespread awareness of risk among all stakeholders. The higher the degree of awareness and articulation of risk among the stakeholders, the more likely is the institutional transformation.

So how do we know if transformation is taking place? Or at least we are in the direction of moving towards transformation? One, when we listen to local and bottom up voices with care and respect; two, in cities, when we focus on livelihoods and jobs for the majority of its people; three, when established institutions reach out to its primary stakeholders; and four, when we do not look at the entire landscape of risk instead of lone parts.

Transformation is by nature multidisciplinary; by definition it combines past with future in the present by operating simultaneously on different systems and concepts. Insurance, markets, and private sector are some of the ingredients that can be leveraged by the humanitarian system to transform cities. We have more data than we have ever had, which gives us an opportunity to compare cities, communities, periods and stages of recovery to make transformation a reality.

Where will the sustained and effective push for such transformation come from? It will come from the thousands of innovations spawned by an empowered citizenry which has achieved access to basic services and from a symbiotic growth of the economy and ecology. ■

- Mihir R. Bhatt

Achievements of IMD in Heatwave Warning

Increasing scientific evidence confirms that anthropogenic activities lead to changes in the global climate system. This includes warmer temperatures, rising sea levels, and potentially more frequent and severe extreme weather events including severe heatwaves, tropical storms, monsoonal heavy rainfall, flood, drought, etc. It has been found that there is a significant warming trend over India in annual mean temperature along with significant increasing trend during different seasons.

Climatologically March, April and May are the summer months in India. Hot winds known as "loo" are the marked feature of summers in northern India. Extremely hot weather is common in India during late spring preceding the onset of the monsoon season in June. During April, the temperature greater than 38°C covers large parts of India with a small pocket of central India having temperature greater than 40°C. During May, the maximum temperature increases and exceeds 40°C over large parts of India covering north–western parts of the country extending towards the Indo–Gangetic plain. During June, though the monsoon currents cool the southern parts of the country, the maximum temperature remains more than 40°C in north–western parts of the country. During summer, most areas of India experience episodes of heat waves (HW). The new definitions used by India Meteorological Department (IMD) for heatwave for inland and coastal stations are given in Table 1.

Using the definition of Heatwave [HW; Definition: When normal Tmax of a station ≥ 40°C, 'HW' if Tmax departure is 4.6°C to 6.4°C and Severe HW (SHW) if Tmax departure ≥ 6.5°C], Past studies indicate that there is an increasing trend in all India Heatwave Days. Many areas of West Rajasthan, Punjab, Haryana, northern parts of East Rajasthan, Madhya Pradesh, Chhattisgarh, Vidarbha, western Uttarakhand, East Uttar Pradesh, western parts of Jharkhand & Bihar, Gangetic West Bengal, northern parts of Odisha, Telangana, Coastal Andhra Pradesh, eastern parts of Rayalaseema and north Tamil Nadu on an average have experienced ≥ 8 HW Days per year.

Table 1: Present Criteria used by IMD for defining Heatwave

Heatwave is considered if maximum temperature (Tmax) of a station reaches at least 40°C or more for Plains, 37°C for coastal stations and at least 30°C or more for Hilly regions.

Based on Departure of Tmax from Normal	Based on Actual Tmax
Heatwave (HW): Departure is 4.5°C to 6.4°C	Heatwave (HW): Actual Tmax ≥ 45°C
Severe Heatwave (SHW): Departure is > 6.4°C	Severe Heatwave (SHW): Actual Tmax ≥ 47°C

There are several meteorological conditions which can be responsible for severe Heatwave conditions over India. It includes (i) Stronger than normal anticyclone leading to subsidence of air, (ii) Clear sky conditions leading to high solar radiation, (iii) Hot air advection from northwest of India, (iv) Formation of intense low pressure system over the Bay of Bengal and consequently weakening the High Pressure Cell affecting moisture incursion over east coast, prevalence of northwesterly wind and hence heatwave conditions, (v) Below normal or subdued thunderstorm activity, (vi) Late setting or cutting off of sea breeze from coastal regions, (vii) Late arrival of southwest monsoon in the region (in the month of June).

IMD is constantly engaged in providing forecast products and early warning for hot weather conditions at different spatial and temporal scales. Since 2016, forecasts on different time scale during the hot weather season (March to June) including heatwaves are being issued by the India Meteorological Department for the first time. At present the forecast is issued at different time scales stating from Now casting (few hour) at city level, short to medium range (up to 5 days) at district levels, extended range (up to 4 weeks) at meteorological sub-division level and long range forecast (seasonal outlook on maximum temperature and heat wave) in sub-divisional scale. There has been significant improvement in heatwave warning up to 5 days lead period in recent two years with the introduction of high resolution

global model for short to medium range forecasting. Also there has been significant improvement in extended range (up to two weeks) and season (up to 3 months) forecast of maximum temperature and heat wave in 2016 and 2017 with the introduction of coupled Climate Forecasting System (CFS) model.

Daily a special bulletin is prepared indicating past heat conditions in the country and the forecast and warning on heatwave for next five days in both text and graphics form. The warning on heatwave is disseminated to general public and disaster managers at national and state level through IMD headquarter and state level Meteorological and Regional Meteorological Centres. For warning dissemination, a special web page has been created for the dissemination of heatwave information from IMD website (www.imd.gov.in). The press and electronic media are briefed twice a day daily. The special press release on heatwave condition during next two weeks is issued on weekly basis. In addition, the heatwave bulletin is also issued to various stakeholders like health, surface transport, municipal corporations, power sector, etc. by different offices. In 2017, it is also being disseminated to medical practitioners through India Medical Association.

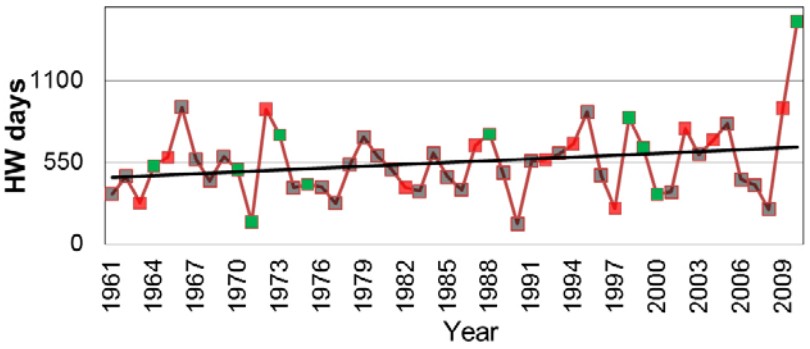

Fig. All India Heat Wave Days from 1961 to 2010.

This accurate and higher lead period warning on heatwave by IMD along with the preparedness and response measures of state and central level disaster management agencies and major roles played by NGOs and press and electronic media have resulted in reduction in loss of life by almost 50% in 2016 compared to 2017. Further, the death toll has been restricted to less than 100 in 2017 summer season (by the end of April). ■

– Dr. M. Mohapatra, Scientist,
India Meteorological Department,
New Delhi

TRANSFORMATION FOR SMART CITIES

Heatwave and Cities: How Karachi Leads

In June 2015, Karachi, known as the "City of Lights", was hit by a scorching heatwave which took more than 1200 precious lives within 4–5 days. Though the inhabitants of Karachi are fairly used to of higher temperatures, but in 2015 temperatures in Karachi broke records for that city as the highest maximum temperature during the 2015 heatwave occurred on June 20, reaching 44.8°C[1]. But the notable phenomenon during the 2015 event was the high humidity, causing the heat index to exceed ambient temperatures by about 7°–12°C[2] as well as absence of relief period of minimum temperature which did not go below 30°C.

Totally unaware of such phenomenon before and without any planning, about 15 Million Population of this city was looking for rapid emergency response from the Government and other organisations. Being the strongest economic hub of Pakistan, this city demands for immediate steps by the administration, stakeholders and community in order to streamline the system and respond effectively in case of any such event in future.

One of the biggest lessons learnt from 2015 heatwave was that there is a need of Heatwave Management Plan for the city. A project named, **Supporting Karachi City in Mitigation of Extreme Heat Impacts,** was initiated by CDKN (Climate and Development Knowledge

1 "Chaudhry, "Technical Report on Karachi Heat Wave June 2015."
2 "Herring, S. C., A. Hoell, M. P. Hoerling, J. P. Kossin, C. J. Schreck III, and P. A. Stott, Eds., 2016: Explaining Extreme Events of 2015 from a Climate Perspective. Bull. Amer. Meteor. Soc., 97 (12), S1-S145.

Network) and executed by The Urban Unit (Govt. of Punjab) in collaboration with ESSA Technologies (Canada). This project focuses on building support for Karachi Metropolitan Cooperation, other concerned departments and institutions by providing Heatwave Management Plan and an effective emergency response system for informed decision-making and implementation.

The Urban Unit has collected baseline data that has been converted to GIS data sets, which helped in the assessment of risks in different parts of the city to determine vulnerable areas and designing appropriate mitigation measures. The Heatwave Management Plan for Karachi is in the finalisation phase, having the following features;

- Consistent with international good practices built upon regional cases.
- Materials for public awareness and understanding of potential impacts of extreme heat and options to avoid or reduce the impacts.
- Measures to address short term and long term effects, mitigation and preparedness to lower the severity of impact as well as implementation of actions to respond to extreme-heat events.
- Heat alert mechanism and detailed response actions to be performed by stakeholders in each type of alert.

This project broadly focuses on the development of regional toolkit to promote uptake and replication of heatwave management practices at the regional level.

Heatwaves are the result of climatic changes which results in loss of human life and Karachi suffered same damage in 2015 for the first time at a large scale. 2017 will be the year in which Karachi will have its own Heatwave Management Plan, and this experience of Karachi will lead towards the establishment of Heatwave Management Plans for other cities of Pakistan. Provincial Disaster Management Authority (PDMA) Balochistan has already expressed their interest to conduct the studies and initiate preparation of Heatwave Management Plan taking Karachi as model. Quetta, Sibi, Naseerabad and Zhob Divisions in Balochistan are well known for highest temperatures (48C°–50C°) in Summers and they call for similar attention. ■

– Dr. Nasir Javed, CEO,
Dr. Kiran Farhan, Project Leader,
and
Nasira Ahsan, Senior Research Analyst, Urban Unit Team,
Lahore, Punjab Pakistan

A usual Summer day in Karachi. (Source: The Urban Unit)

Role of GUIDE in Disasters, Natural Resource Management and Habitat Conservation

Gujarat Institute of Desert Ecology (GUIDE), Bhuj-Kutch an autonomous research institution in Gujarat, India has been working on various ecological issues in dry land areas since 1995. With a multi-disciplinary team of researchers, it aims at accomplishing basic and applied ecological issues concerned with dry lands, land degradation, desertification, etc. Nevertheless, its role in studying other allied aspects are also significant. Some of the thematic areas on which GUIDE has provided technical expertise and has been partnering with different line departments in Government of Gujarat and Government of India are described as below:

Land Degradation and Desertification: One of the main focus areas of GUIDE has been studying the process of land degradation. Some of the earlier research works were examining the land degradation issues in Kutch region and beyond. This provided insights into the process of desertification, and thereby the findings facilitated to undertake intensive works on desertification issues. The desertification issues were based on multi-dimensional aspects looking the natural resource capital in totality, wherein people and livelihood options were considered holistically. Thus, various strategies were developed to combat the process of desertification in Kutch and nearby areas.

Grassland Restoration: With an aim of restoring degraded grasslands, GUIDE initiated multi-pronged activities which facilitated improved fodder availability, subsistence economy, and overall progress in economic status of Maldhari community. The restoration exercise, conducted at Banni grasslands in Kutch district, involved application of soil amendments, manure, channelising effective water outflow, thereby improving the soil fertility and restoring soil moisture levels in dry seasons. The grassland development programme was also aimed at providing required habitats to various bustard species such as Lesser Florican. Apart from the above, an attempt was also undertaken to restore village Gauchar lands (CPLR) located in 132 villages in the Kutch district.

Rann Reclamation: The arid Kutch region has vast stretches of land that are salt marsh habitats, but are often remain unusable due to the hyper-saline conditions. The Greater Rann of Kutch (GRK) and Little Rann of Kutch (LRK) covers an area of 23,310 km2. However, for national security issues, some of the Bytes were required to be made hospitable to enable the BSF soldiers to use it at times of emergency. Thus, two major Bytes covering a total area of 1740hs were reclaimed with the help of financial assistance from MoRD, GoI, New Delhi. The exercise involved, use of soil amendments, and sowing grass seed of the species which are capable to grow under hyper–saline conditions. Additionally, appropriate contour bunds were constructed to facilitate water availability during post-monsoon season. This activity apart from developing green cover, enhanced the biodiversity of the area considerably.

Water Resource Management: Arid zones required to be managed w.r.t. their water resources so as to facilitate ecosystem functioning and provisioning of ecosystem services. Thus, with financial assistance from District Watershed Development Unit (DWDU), GUIDE has been undertaking various programmes to manage water resources and facilitate it's availability for the livestock, human being and the whole ecosystem. This exercise is being carried out in a phased manner. In total 20 watershed projects were competed in Kutch covering an area of 16,688 ha in 18 villages and 3 watershed programme covering an area of 17,761 ha is in progress in 10 villages of Kutch. This exercise involved construction of various structures such as farm bunds, earthen bunds, ponds, check dams along with renovation and deepening of existing ponds in the target villages. Further, at several locations monitoring exercises were also carried out to assess the effectiveness of existing and

functional water resource management structures. The watershed programmes enhanced the quality of land resources and subsequently the socio-economic status of the project villages through enhanced agricultural productivity and other alternative livelihood supports.

Mangrove Restoration

Ever since its inception, GUIDE, has been constantly working on the restoration and reclamation of mangroves along the coastal belt of Gujarat. Total 2000 ha mudflats were reclaimed through mangrove plantation activities with 80 per cent success rate. Proven scientific principle for site selection, seed treatment and post plantation management has been followed in order to ensure that the planted mangroves grow to discharge natural ecosystem functions. Though mostly Avicennia marina has been used as a candidate species, efforts have also been made to plant other mangrove species in order to enhance mangrove biodiversity.

Further, in some areas plantations were undertaken through the local communities which helped in enhancing their capacity building in preparation and maintenance of mangrove nursery, plantation, etc.

Climate Change Issues: Having executed various action and research oriented programmes, GUIDE also undertook several exercises to examine the environmental changes under changing climatic dimensions. Both vulnerability and adaptation were the core issues in such exercises. At the initial stage, Kutch region was covered, and the same exercises is planned to be scaled-up in other neighbouring districts and arid areas.

All these above-listed focal areas led this institution to carry out ecosystem assessment studies in a holistic manner. This is likely to facilitate sustainable natural resource management in arid zones in Kutch and beyond.

Disaster Management

As part of disaster management after 2001 earthquake, GUIDE has undertaken many investigations at the policy and planning level which includes "Gujarat Earthquake Emergency Relief Project Environmentally Sound Management of Rubble and Debris and Water Audits: Sources, Uses and Challenges", "Drought Proofing through Micro level Action Plan for some selected village", "Kutch Sub - state Biodiversity Strategy Action Plan - National Biodiversity Strategy Action Plan (NBSAP), India" and "Grassland Action Plan for Kutch District, Gujarat State. Report Submitted to: Environmental Planning Collaborative, Ahmedabad for UNDP". ■

– Dr. V. Vijay Kumar, Director, *and*
Dr. Anjankumar Prusty,
Senior Scientist Gujarat Institute of Desert Ecology, Bhuj-Kutch, Gujarat

Gujarat Long Term Recovery

In 2001, a destructive earthquake hit Gujarat, especially the Kutch district very badly. The Earth shook for almost two minutes killing thousands of people, razing entire buildings and disrupting livelihoods.

This devastating tragedy not only affected Gujarat but it made everyone in India feel that there was a dire need to upgrade the area of Disaster Management. Military, police, religious organisations along with several national, international organisations as well as individuals got involved in the rescue and relief operations immediately.

The Gujarat Earthquake Recovery is hailed as one of the best recoveries to learn from. Government announced various schemes for the benefit of the affected communities in terms of compensating the losses incurred and imposed new construction norms as well as better town planning. The media played a key role in providing information and awareness to the people on their rights and on various government and NGO schemes which lead to a faster recovery in people's life. However, it is the willpower and characteristics of the local people which made them stand on their own feet so fast to build better cities and towns.

It was Friday, 26th January, 2001 at 8:46 hrs (Indian time) when the earthquake of magnitude 7.9 struck Gujarat. The Kutch district of the state was most severely impacted by this disaster. Dust was everywhere, people running around in confusion, some crying in pain from the injuries they sustained, others weeping from the loss of loved ones, some helping others out and some too stunned by the suddenness of it all could only sit on the streets to mutely stare at the spectacle of death and destruction. I also lost one of my aunts in the Earthquake.

Disaster don't discriminate among the poor, rich, men, women, children, old people and people with disability. This disaster had reduced the wealthy to abject poverty as well, as for the already poor weren't spared of its ire either. The survivors of this catastrophe had immediate needs such as first-aid, shelter, food, Psychological support, etc.

Emergency Situation and Recovery

Rescue operation was started. Mainly it was done by the neighbouring people, Indian Military and some international organisation (equipped with the best of modern equipments). However, the, Indian Military played the major role in saving lives while the police maintained the law and order situation.

After the rescue there was an immediate need for First-Aid, Medical, food, shelter and psychological support. The government immediately deputed the medical doctors and nurses to the affected area. Temporary hospitals were also established by the government. Government, many local and international humanitarian organisations started providing medical facilities including shifting critically injured people to the hospitals in metro cities. Within 24 hours, Indian Red Cross Society with the support of International Federation of Red Cross and Red Crescents Societies and its partners established an earthquake operation camp at Lalan College compound where temporary hospital was established with the support of national and international doctors and nurses.

Photo: Bhavesh Sodagar.

Photo: Bhavesh Sodagar.

Including many, a hospital by Bidada Survodaya Trust supported the earthquake victims in a significant way. Victims who had injuries, were given treatment from the Trust, free of charge. Approximately, 30,000 patients were treated by them and food and temporary shelter was provided to 200,000 earthquake affected people. They made the life of many injured victims by providing them with artificial limbs.

The government announced tax free holidays and hence many industries and new business slowly established which has increased business, job opportunities and in turn, livelihood options. New town planning has completely changed the town and villages. As of today, because of new town planning rules for there have been significant improvements in the infrastructure. The new town planning also had some reverse impact on few people as their houses have become small, etc. Kutch University was established after the earthquake and new colleges such as medical, engineering, etc. were started, which as a result contributed to the improved education system. A state of the art government medical hospital was built which is considered to be one of the finest hospitals in India. The hospital is earthquake resistant. Today there are many industries and improvement of sea port can be seen in Kutch. Many communities migrated from the remote places towards the town and now experience an improved quality of life and livelihood.

There is also a case where an organisation constructed a colony with many row houses for affected communities in a village but no one moved in to that house as those houses were not accommodating their needs. They were not according to their culture and custom. The main reason was that the agencies which built these hospitals had not consulted the locals, which in turn led to their non-popularity among the affected community. These houses are still vacant today.

Overall recovery phase after the disaster went very well due to the strength of local people, the support and contribution of government, religious organisations, national and international humanitarian organisations. However there were many cases of mismanagement and people not getting proper aid. After 10 years I asked a person, what could have the government done better to assist the recovery effort. He replied, "we don't need a lot of help, if government or other organisations can make us stand on our own feet, that's all. The rest we can manage on our own. This is really a powerful statement. ■

– Bhavesh Sodagar, Mandvi - Kutch, Gujarat

Building Climate Resilient Communities in India

The M S Swaminathan Research Foundation (MSSRF)[1] is a not-for-profit organisation set up in 1988 to work for sustainable and equitable rural development. The Foundation's approach is to harness modern science and technology to improve the lives and livelihoods of tribal and rural communities. Towards this end, MSSRF undertakes participatory and anticipatory research for sustainable development in partnership with local communities, leveraging support from other knowledge-based institutions and public and private sector organisations. Climate change is a major cross cutting theme across all initiatives. Headquartered in Chennai, MSSRF works in the States of Tamil Nadu, Kerala, Odisha, Andhra Pradesh, Telengana, Maharashtra, Karnataka and the Union Territory of Puducherry. Its work currently spans 31 districts, 113 blocks and 452 villages across the country, reaching out to nearly 2,00,000 households.

Demonstrating feasibility of FSN approach in terms of increase in area and availability of climate resilient nutrient dense crops. (Photo: FSN, LANSA)

Adoption of climate-smart agriculture practices and soil health management is a major approach adopted to enhance the food and livelihood security of farm households. While soil and water conservation is an effective climate adaptation strategy, Integrated Pest Management and Integrated Nutrient Management reduces the use of chemical fertilizers/pesticides and thereby reduces the emission of green-house gases like nitrous oxide and carbon dioxide. The Foundation has developed training material to create a cadre of community level 'Climate Risk Managers', who can create awareness about climate risks and adaptation measures. Research at the laboratory level focuses on developing crop varieties with resistance/tolerance to a biotic stress conditions including drought. ICT tools are used to provide need-based agro-advisories for horizontal dissemination of knowledge at scale. Women farmers groups in Vidarbha, Maharashtra[2] have been trained on sustainable and climate resilient agriculture practices under the programme for empowerment of women farmers: *Mahila Kisan Sashaktikaran Pariyojana* (MKSP).

Both millets and pulses are being promoted across Tamil Nadu, Odisha and Vidarbha as rain fed and climate resilient crops, under different initiatives. More recently, MSSRF has been working with small, marginal farmers in a cluster of villages in Wardha district, Maharashtra and in Koraput, Odisha to demonstrate feasibility of a Farming System for Nutrition (FSN) approach to address malnutrition under a research programme on Leveraging Agriculture for Nutrition in South Asia (LANSA).[3]

MSSRF has demonstrated effective soil health management interventions focusing on application of bio-inoculants produced by women self help group managed eco-enterprises; enhancing soil organic matter through organic inputs like vermin composting, and enhancing soil carbon sequestration by maintaining continuous plant cover, no tillage and fallow land conversion. It has implemented a bio-industrial watershed programme in Tamil Nadu and Odisha; and partnered in implementing a "ClimaAdapt" Project in the states of Tamil Nadu, Andhra Pradesh and Telengana, focusing on water use efficiency in the context of climate change.

NABARD has recognised MSSRF as a project partner in implementing Adaptation Fund projects of UNFCCC and currently MSSRF is implementing an Adaptation Fund project in Andhra Pradesh. The Foundation's work on sustainable and climate resilient agriculture practices has been recognised at different forums like the Global Humanitarian Water and Food Award[4] and Groundwater Augmentation Award.[5] ■

– Dr. Aliza Pradhan *and*
R. V. Bhavani, MSSRF, Chennai

1 http://www.mssrf.org/
2 http://mssrf-fs-mksp.org/
3 http://www.lansasouthasia.org/
4 http://www.mssrf.org/?q=content/mssrf-placed-2nd-global-waf-award-2014
5 http://www.chennaifirst.in/2014/05/30/farmers-notebook-pulse-panchayat-gains-momentum-in-tamil-nadu/

Harnessing the Strengths and Capabilities of Emergency Responders

Assam, a state bestowed with nature's priceless grandeur on one hand and on the other it gets marred with the onslaughts of flood year after year. Two major rivers of Assam; Brahmaputra and Barak along with their tributaries create flood havoc which brings damages to life and property accompanied with unprecedented miseries to the people of Assam every year. An extremely dynamic monsoon regime combined with unique physiographic setting of the basins has been considered as the single most important cause for frequent occurrence of flood in the state. Assam also falls in the highest rainfall intensity zone in the country. There is a need for a comprehensive plan for disaster preparedness and mitigation. **Assam Disaster Management Manual 2015 has a well laid down procedure for flood management but it is believed that conduct of flood mock drill would help to identify the existing gaps and bringing role clarity among the responders.**

Flood mock drill in Assam.

The Flood Mock drill was conducted by Assam State Disaster Management Authority (ASDMA) in collaboration with the DDMAs and Revenue Circles. The exercise was two days-long preparedness exercise which was conducted in **100 Revenue Circles of 28 districts of Assam in 2016–2017.** The exercise has been conducted in association with a number of government agencies including Fire and ES, SDRF, Health and FW Dept., PHE Department, A.H. and Veterinary, PWD (Roads), Agriculture Department, Food and Civil Supplies Civil Defence Volunteers Social Welfare, Home Guards and former defence personnel as enlisted with Zilla Sainik Welfare Board and Village Land Management and Conservation Committee (VLMCC) members.

Flood Mock Drill in Nalbari district, Assam.

Procedure that was Followed

A half a day long training programme of the officials of the line departments on the *Coordination of response and managing relief operation* was conducted on the opening day of the event. This training was focused on the effective Inter-agency communication/existing Guidelines and norms on disaster management/protocol on flood response, coordination within agencies and communication with the media during any flood (as per Assam DM Manual 2015). The training programme was followed by a **Table-top exercise.** Concerned government officials like Health officials, Police Officials and Circle Officers, SDRF, NDRF (if pre-

positioned in the district), Fire and Police officials etc. practised the simulated scenarios to identify roadblocks in communication and execution of flood response. Focus was on the drill scheduled for the following day.

A major evacuation and relief operation – simulation drill was then conducted on the second day. Village Land Management and Conservation Committee (VLMCC) was consulted in selecting volunteers and venues for the drill in each Village. In one of the flood prone villages of the Revenue Circle 50-100 people was evacuated as a part of the field drill. At the start of the Drill, FLEWS (Flood Early Warning System) alert was disseminated to the Circle Officer. On receipt of the alert, he/she acted as per the SOP given in the Assam DM Manual. A Safe Shelter place /Relief Camp area was already set up in nearby available place. Every single vulnerable person was evacuated by VDP to shelter place and was monitored by local evaluators. Relief Camp was then declared by the Revenue Circle Officer and the Camp In-Charge

maintained records of relief camp inmates and relief material distributed. Medical team was also placed in relief camp. Social Welfare Department/Anganwadi workers, ASHA worker/PHE/ WR Department/A.H. and Veterinary Department responded and provided services in the relief camps. After that, a debriefing session called "Hotwash" was conducted in the last session of the second day after the drill.

This multi-disciplinary training and exercise was aimed to foster the development of skill sets focused on flood management system of the Revenue Circle. Besides, it gave an opportunity for various agencies to work together and practice a multi-disciplinary, coordinated response to a flood situation in the Revenue Circle. ■

– Rajib Prakash Baruah, Assam Secretariat, Dispur, Assam State Disaster Management Authority (ASDMA), Govt. of Assam

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