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Resilient India - Disaster Free India



World Health Organization
India



**National Programme on
“Climate Change & Health Sector Resilience”
26-28 June 2019
Ambedkar International Centre, New Delhi**



Organized by
Centre for Excellence on Climate Resilience
National Institute of Disaster Management, (Ministry of Home Affairs)
Govt. of India

In collaboration with
Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
GIZ (German Cooperation), India Office
and
World Health Organization, India Office

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FOREWORD

Climate change is one of the most pressing challenges to humanity. It has implications on the social, environmental and health aspects of the human community. Effects of climate change and related disasters on businesses due to effect on health and safety, as well as effect on health business/services are equally important. However, the emphasis on these aspects at policy planning and ground actions in India has been relatively insignificant. This calls for systematic interventions to address knowledge and capacity gaps. National Action Plan on Climate Change (NAPCC) to address the Paris Climate Agreement and other related obligations also calls for integration with Sendai Framework of DRR and the Sustainable Development Goals, also calls for strengthening the State Climate Change Cells, and DST Supported Centres/Projects as well.

Recently the new Climate Change Mission on Health has been set on to address these issues. NIDM (EDCRM Division) is designated as a Centre of Excellence under the Mission. Besides, DST-GOI has launched an ambitious programme called CAP-RES (Climate Adaptive Planning for Resilience and Sustainability), where Department of Agriculture & Farmers Welfare, WHO, UNEP, UNDP, GIZ, GGGI, NIHFW, NCDC, JNU, ICRC, IRC, etc. have come forward for cooperation.

The aim of the workshop was to develop a roadmap focusing on addressing the climate related health impacts and promoting knowledge and experience sharing through case studies, discussing policies, research & capacity issues and understanding the approaches & tools for assessments and planning.

Drawing the highlights and key recommendations from the speakers and discussants, I am happy to present this report after conducting a successful event with valuable insights and recommendations from many eminent speakers and discussants. I am sure that the contents of this report will be useful in future.

Manoj Kumar Bindal

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National Programme on “Climate Change & Health Sector Resilience” 26-28 June 2019

1 Background:

Climate change is one of the most pressing challenges to humanity. Right from impacting the global cycles, food & water security and biodiversity to hampering human health and well being, climate change is affecting our entire existence. It is also a major driver of disaster risk and vulnerability. In the last two decades, the impacts of natural disasters have been devastating, affecting over 4 billion people, including killing more than 1 million, and causing around \$2.9 trillion in economic losses (World Bank, 2019).¹

Effects of climate change on public health coupled with the impacts of extreme events and hydro-meteorological disasters on health and related resource systems is a key concern for resilience development and disaster response preparedness. Effects of climate change and related disasters on businesses due to effect on health and safety, as well as the effects on health business/services are equally important. The direct damage costs to health (i.e. excluding costs in health-determining sectors such as agriculture and water and sanitation), is estimated to be between USD 2-4 billion/year by 2030 (WHO, 2018).²

The emphasis on the aspects of health at policy planning and ground actions in India has been relatively insignificant. Thus, there is a need to identify and understand the existing knowledge gaps and implement systematic interventions to address these gaps. The Climate Change Mission on Health was set up recently to address these issues and NIDM (ECDRM Division) is designated as a Centre of Excellence under this mission. To highlight and discuss upon the challenges of climate change and its adverse impacts on human health, NIDM (Centre of Excellence on Climate Resilience) jointly with GIZ Germany and WHO Country office of India, organised a National Programme on “Climate Change & Health Sector Resilience” from 26-28 June 2019 at Dr. Ambedkar International Centre, New Delhi.

2 Objective:

The programme was organized with a dual aim to a) promote knowledge and experience sharing through case studies, discussing policy, research & capacity issues and understanding the approaches & tools for assessments and planning; and b) delineate a roadmap for addressing climate change related health implications w.r.t. disasters, extreme events and other associated safety/health issues.

¹ World Bank 2019. Nature-based Solutions: a Cost-effective Approach for Disaster Risk and Water Resource Management. Retrieved from <https://www.worldbank.org/en/topic/disasterriskmanagement/brief/nature-based-solutions-cost-effective-approach-for-disaster-risk-and-water-resource-management>.

² World Health Organization 2018. Climate Change and Health. Retrieved from <https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health>.

3 Participation:

The programme had representation from across the country. Ms. Preeti Sudan, Secretary Ministry of Health and Family Welfare (MoHFW) inaugurated the programme with her speech. Dignitaries from Department of Science and Technology (DST), State Disaster Management Authority (SDMA) Sikkim, National Disaster Management Authority (NDMA), GIZ, WHO and NIDM were also present for the inaugural session. Professionals, scientists and faculty from 16 state & UTs, senior officers from departments of Medical Health, Water & Sanitation, AYUSH, Disaster Management Authority, Climate Change Cell and other Central Public Health related Institutions attended and took active participation in the respective sessions throughout the workshop.

4 Key discussion points:

The different sessions of the workshop focused on ponderous discussions on the following sections:

- Climate change and implications for health (Human and animal health, health resources, health services, etc.)
- Issues of climate change projections, forecasting and early warning w.r.t. weather and events/processes
- Climate change implications for WASH, occupational, environmental and industrial health & safety (fire, accidents, injuries), environmental emergencies, disaster waste, etc.
- Climate change programmes and health programmes in India and opportunities for mainstreaming/ integration, and green growth opportunities in health sector
- Climate change results in disasters (risk and vulnerability), HRA, HIA, PDNA, and implications on health (including disaster related illnesses)
- Health Sector Businesses (health services – Medical/ AYUSH, and allied sectors): Impact of climate change and related disasters, Preparedness and Response strategies
- Health Adaptation (to Climate change) Plan, w.r.t. disaster related implications, and synergies with National Action Plan on Climate Change and SAPCCs.




5 Session wise discussions:

The programme was organised in a workshop/symposium mode. Experts and researchers/professionals in relevant field from international/national institutions and independent experts were invited as resource persons/facilitators. The programme was a three day long workshop which had six sessions.

5.1 Day 1- 26 June 2019:



Day one focused on ‘Consultative Workshop on Strengthening Health Service Delivery in Changing Climate Context in India’.

<p>5.1.1. Session I: Inaugural Session</p> <p>Dignitaries from Ministry of Health and Family Welfare (MoHFW), DST, NIDM, GIZ</p> <p>Sikkim SDMA and NDMA were present during the inaugural session. The details of the session are as follows.</p> <p>Session Coordinator: Dr. Anil K Gupta, Head - ECDRM, NIDM.</p>	
<p>Welcome Address</p>  <p>Maj. Gen. Manoj Kumar Bindal, ED, NIDM</p>	<ul style="list-style-type: none"> • Over extraction of natural resources reduces the carrying capacity of earth. • Human induced climate change is a major concern leading to issues like crop decline, change in rainfall pattern, occupational hazards, heat strokes and rise in humidity levels across the country. • There is a need to formulate a comprehensive action plan combating the challenges of climate change on health sector.
<p>Key Remarks</p>  <p>Dr. Ashish Chaturvedi, Director (Climate Change), GIZ India</p>	<ul style="list-style-type: none"> • Quoted incident of Anthrax found in Siberia, disease outbreak due to increasing temperature across the world. • Increasing cases of heat wave and rise in temperature is also a global problem • States are developing/revising and operationalising State Action Plan on Climate Change which focuses on health sector.
<p>Inaugural address</p>  <p>Ms. Preeti Sudan, Secretary, MoHFW</p>	<ul style="list-style-type: none"> • Highlighted the seasonality of the diseases in India, pre-monsoon observing dengue and malaria outbreak while in winters most prominent health issue is the respiratory illness. • Pointed out the efforts that have been undertaken by Goo such as anti-diarrhea week and preparedness for Fani cyclone. • She highlighted following solutions to address the challenges: <ul style="list-style-type: none"> ○ Need to conduct vulnerability assessment for health effects ○ Community awareness about vector borne and other diseases ○ Need for creation of pilot models to respond with more preparedness, anticipatory preparation and improved advanced warning systems

<p>Science – Policy issues for Climate Change in India</p>  <p>Dr. Akhilesh Gupta, Advisor - DST & Head – SPLICE / CC Programme</p>	<ol style="list-style-type: none"> 1. DST has a network programme on climate change and health and projects on heat stress, air pollution and vector borne diseases have been initiated 2. In view of newer areas of concern coming up in CC & Health, there is a need to undertake following actions: <ul style="list-style-type: none"> • Establish preparedness plans, including early warning system for vector borne diseases • More focus on climate disasters and ensuing mental health • Inter-institutional collaboration for implementing effective health service delivery • Scientific analysis on relationship between disease vector and its climate transmission window • Capacity building for generating appropriate data for climate change and health evaluation • Installation of early warning system for vector borne diseases and establishment of more research centres like malaria research centres • Awareness of community towards climate change risk preparedness and responding to disasters
<p>Address</p>  <p>Dr. V.K. Sharma, Vice Chairman, Sikkim SDMA</p>	<ul style="list-style-type: none"> • There is a need for research and information dissemination on the influence of climate change induced temperature changes • Need for capacity building and strengthening institutional Mechanisms
<p>Special Address</p>  <p>Shri. Kamal Kishore, Member, NDMA</p>	<p>Shared 5 key points for actions:</p> <ol style="list-style-type: none"> a) Identify climate hotspots that are at a tipping point within the country b) Map and project the changing geography of disasters, related epidemics and assessment ensuing social vulnerabilities and inequalities by 2020 to address the five major disease outbreaks c) Handle secondary disasters, and how the floods and water borne diseases correlate and behave each other's occurrence. There is a need for research and preparedness on secondary impacts of disasters. d) Assess long/ short term impacts on animal health as they being integral part of the human nutrition system e) Focus on basic building blocks of a strong healthcare system that will reduce vulnerability and increase resilience such as a strong nutrition programme, improving building designs to reduce their susceptibility to heat waves etc.

5.1.2. Session-II: Climate change, Epidemiological Transitions, and examples of managing CC health impacts in India.

The session was moderated by Dr. Anil k Gupta (NIDM) and five speakers participated in this session.

<p>Climate change trends and future projections across India</p>  <p>Dr. Sandhya Rao, Sr. Scientist, INRM</p>	<p>Presented the observed trends and climate projections. Key highlights were:</p> <ul style="list-style-type: none"> • Some regions in the country have exceeded their temperature above 2°C w.r.t pre-industrial times thus superseding the temperature cap of the Paris Agreement that is to be attained by 2100 • Post monsoon season is increasingly becoming the hottest time of the year • Trend of decrease in rainy days and increase in temperature leading to more severe droughts • Increase in extreme rainfall events <p>Climate change data till end of century is available in web- portal (www.climatevulnerability.in/). It is jointly developed by GIZ and IIT Delhi.</p>
<p>Epidemiological transitions of climate related diseases across India 1990-2016</p>  <p>Dr. Sumana Bhattacharya, IORA Ecological Solutions</p>	<ul style="list-style-type: none"> • An understanding of disease prevalence and risk factors are necessary to target precise evidence-based health services • A new study in Lancet lead by Indian Council for Medical Research (ICMR) indicates that malnutrition is the top most factors driving disease prevalence in the country since 1990. WASH related diseases are also amongst the list of top 10 diseases. • Incidences of Malaria and other vector borne diseases are increasing • There is a need to identify the climate driver as well so as to develop precise service delivery systems for climate change and health • WHO framework for vulnerability assessment due to climate change can be followed to identify the most vulnerable regions and communities • There is a need to work on district, block and village level plans in vulnerable areas to ensure targeted health service delivery to prepare the community to cope with the impacts of CC.

5.1.3. Panel Discussion: Existing mechanisms to address climate related health challenges.

Session two was followed by a panel discussion on examples of managing health hazards including heat stress, Nutritional Vulnerabilities, Vector borne diseases, Water Borne Diseases, Respiratory diseases, Mental Health, Cardiovascular diseases and Adverse birth outcomes. The panellists for the session included scientists and professionals from medical and public health background.



Dr. Mahaveer
Golechha

Indian Institute of Public
Health, Gandhi Nagar

Climate change and heat stress

He presented a Southeast Asia's first Heat Action Plan developed for the city of Ahmedabad – Major interventions included:

- Hotspot mapping
- Early Warning System
- Inter-Agency coordination
- Capacity building of medical professionals, communities etc.

Impact:

Significant reduction in deaths, improved night temperature. Based on its success, it is being replicated in other areas such as Aurangabad.



Dr. Harshal Ramesh
Salve
Centre for Community
Medicine, AIIMS

Climate Change and Nutrition

He presented key solutions to address malnutrition issues in the country:

- Adopting a sustainable, resilient, nutrition sensitive agriculture system – beyond cereal based production
- Improved access to maternal and child care
- Social protection schemes to incorporate gender concerns
- Community participation is essential for wide implementation of the programme




Prof. S K Dash
Secretary, Indian
Meteorological Society




- Lack of data in health has hindered understanding of climate change and health issues
- There is a need to develop a network program to generate health data across the country to curb the heat stress and vector borne diseases.

<p>Key conclusion from discussion in session -II</p>	<ul style="list-style-type: none"> ➤ Institutional innovation is needed in implementing adaptation actions and getting climate resilient. MoHFW, MoEFCC, NIDM etc. should provide a ‘<i>Standard Operating Procedures</i>’ (SOPs) to address climate change and health issues. ➤ There is a need to look into the positive impacts of Poshan Abhiyan, Janani Suraksha Yojana (JSY), Jan Shikshan Sansthan (JSS), Ayushman Bharat, Mid-Day meal programmes etc. and these schemes need to be further strengthened to build climate change resilience amongst the climate vulnerable communities. ➤ There is a need for training programmes of scientists, doctors and institutions to integrate climate change in health perspectives and improve data collection and utilization.
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5.1.4. Session III: Vulnerability Assessment Framework for strengthening targeted service delivery.

Dr. Indrani Phulkan was the moderator for this session and the following points were discussed. This session focused on vulnerability assessment frameworks for strengthening targeted service delivery. During the discussions, it was emphasized on the development of a framework that has scope for an institutional mechanism where the sectors work hand in hand rather than in silos.

<p>Addressing climate change and health concerns under state action plan on climate change (2.0)</p>  <p>Mr. Kirtiman Awasthi, GIZ India</p>	<ul style="list-style-type: none"> ● In the revised SAPCC, health sector has emerged as priority them. ● States have indicated adaptation actions which includes: vaccine development for water/vector diseases, integrate climate change in health planning, strengthening institutional structures etc.
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<p>Assessment of Vulnerability due to CC – Strengthening Health Service Delivery</p>  <p>Dr. Sumana Bhattacharya, IORA Ecological Solutions</p>	<ul style="list-style-type: none"> • Presented the WHO framework for vulnerability assessment • Highlighted an example on how the vulnerability assessment was carried out at a national level identifying vulnerable communities
<p>Key conclusion from <i>discussion</i> in session –III</p>	<ul style="list-style-type: none"> ➤ SAPCC should include implementable actions addressing health sector concerns. ➤ Lessons from adaptation strategies being implemented at national level needs to pan out at the sub- jurisdictional level as well.
<p>5.1.5. Session IV: Towards Climate-Resilient Health Service Delivery programmes of the government</p> <p>The session was moderated by Dr. SK Dash from IMD. Climate service the early warning systems and communications were the focus points of the discussions for this session.</p>	
<p>Panel discussion</p>  <p>Dr. Dhariwal, National Vector Borne Disease Control Programme</p>  <p>Dr. Chandra Bhushan, Centre for Science & Environment</p>	<ul style="list-style-type: none"> • Data on diseases is available in Integrated Disease Surveillance Programme (IDSP) website. • Findings from climate model data needs to be combined with community’s traditional knowledge
<p>Key conclusions</p>	<ul style="list-style-type: none"> ➤ There is a need for institutional strengthening to collect data




from session –IV	<p>across government, private sector at city and village levels.</p> <p>➤ Research on disease and climate relationship needs to be established for planning and implementing targeted interventions.</p>
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5.2 Day 2- 27 June 2019:

Primary emphasis of Day two was to discuss on the ‘Climate Change & Environmental Issues: Implications for Disasters – Risk Reduction, Adaptation & Preparedness and Cross Cutting Issues’. During the first half of the day presentations and discussions took place on various cross cutting themes of climate change and allied environmental issues, while during the second half of the day break out sessions for the participants were organized.

5.2.1. Session V: Climate Change & Environmental Issues: Implications for Disasters – Risk Reduction, Adaptation, Preparedness and Cross Cutting Issues

<p>Changing Rainfall Patterns in India: Understanding Climate Change</p>  <p>Dr. Manish Goyal, Assoc. Prof. IIT Mumbai</p>	<p>Key points discussed:</p> <ul style="list-style-type: none"> • In India, a vast country with multifaceted geography, the effects of climate change on rainfall patterns differ substantially among different regions and cannot be generalized. • Still, there is a lacuna in interdisciplinary amalgamation of the knowledge of climate change impacts on rainfall patterns. • Reliance on historical climate conditions will no longer be tenable since climate change generates conditions well outside past parameters for current and future planning.
<p>Waste management Issues in Disaster Management and Contexts of Climate Change</p>  <p>Ms Bindu Agarwal, Jt. Advisor, India Red Cross</p>	<p>Key points discussed:</p> <p>She presented interesting arguments on waste management challenges and issues after a disaster has occurred. Understanding and defining disaster waste</p> <ul style="list-style-type: none"> • Typical disaster waste issues and their impacts • Relation between climate change and disaster • Pre disaster urban challenges • Post disaster waste management

<p>Role of development communication & Media and issues for Women's Health</p>  <p>Ms. Aisha Ghani, Development Communication Specialist</p>	<p>Key points discussed:</p> <p>She shared how communication & media can bring a change in awareness generation when it comes to climate change related health effects for women.</p> <ul style="list-style-type: none"> • Right usage of different mass media • Bridge between the policy making and its implementations. • Key informer to the ground level • Women leadership/responsibility at family level (inform, education, build confidence) • Modes of information/dissemination
<p>Ecosystem Services and Nature Bases Solutions or Health Protection Against Climatic Risks</p>  <p>Ms Pritha Acharya, JRF, CAP-RES project, NIDM</p>	<p>Key points discussed:</p> <p>Highlighted the importance of ecosystem and ecosystem services on the health and well being of a society and thus promoting human well being. Climate change impacts the social and environmental dimensions of health</p> <ul style="list-style-type: none"> • Concepts of biodiversity, ecosystem and ecosystem services • Healthy Ecosystems and ecosystem services as key player of human health • NBS providing resilience against disasters and extreme events • Urban ecosystem and health
<p>Invited Lecture:</p> <p>Air pollution related issues in reference to Climate and Resilience</p>  <p>Prof. Jugal Kishore, Director Professor, VMMC & Safdarjung Hospital</p>	<p>Key points discussed:</p> <ul style="list-style-type: none"> • Real problem is to get data of various parameters of environment pollution and hospital data • Therefore much needed: <ul style="list-style-type: none"> ○ An online system to acquire data on environment pollutants; ○ A process needs to be created; this is essential for any climate change and air pollution health study; • Morbidity/ Mortality association with air pollutants (example particles, ozone levels) for cities like Delhi should be studied on urgent basis. • Developing national level health effect estimates, objective indicators and markers • Formation of a model/ tool for generating estimates for other Indian cities. • Results or the estimates related to health impacts should be translated into policy. • Identify need to revise the outdoor air quality standard based on evidence of effect at concentrations lower than the standard.

5.2.2. Panel Discussion: DRR Integration and Mainstreaming: Adaptation Plan

DRR perspectives for Sectors and Cross-cutting issues



Prof. Santosh Kumar,
NIDM

Key points discussed:

- Inclusiveness for disasters: Human right issues, education Human right issues, nutrition security, education security, food security and health.
- Importance of Micro-research for establishing inclusiveness.
- Micro-research is thus essential for designing and developing interventions and for policy development and implementation.
- Need of cause and affect analysis
- Linking disasters with climate related illnesses.
- Life to dignity: Article 14, 15, 16 and 17-Constitutional Rights.
- Disasters have differential effects for different sectors and people.
- Understanding the need and type of data and analysis required
- Understanding minimum standards.
- Hotspots needs to be identified, prioritized and then interventions needs to be worked upon.

WATSAN and Reference to Disaster Relief / Preparedness and Community Issues



Mr. Vikrant Mahajan,
SPHERE India

Key points discussed:

- Linkage between development, disasters and framework needed.
- Thus integration between SDGs and Sendai Framework and Paris agreement.
- For minimum standards; for the Emergencies and disaster response there are goals given by the World Bank.
- For proper implementation of the adaptive plan, all these frameworks need to be worked upon in an integrative way for localized actions.
- Importance has to be given to disaster adaptive infrastructure and related resources.
- Adaptation measures to be put into action needs to be identified.
- Behavioral changes and change in existing practices needs to be understood.

Climate Change and Human Health: Addressing Knowledge and Capacity gaps (Including Focus on Disaster Risk and Impact Mitigation)

Key points discussed:

1. Addressing knowledge gaps when it comes to health issues related to climate change:
 1. Assembling researches and case studies into a comprehensive repository
 2. Understanding the correlation of
 - (i) Climate change and increased disaster frequency
 - (ii) Climate change and increase in health issues
 - (iii) Natural disaster impacts on health issues



Dr. Anil K Gupta,
NIDM

3. Anthropogenic disasters aggravated by climatic factors/phenomenon and health implications
 4. Examination of high-risk vulnerability analysis, of India based on the prevailing hazard exposure and health risk
 5. Region specific strategies development (based on the type of health risk and severity)
 6. Development of national level Health Adaptation plan w.r.t. disaster related illnesses/health implications
 7. Capacity Building Programmes including Policy level workshops
2. Overview of the Climate Adaptive Planning for Resilience and Sustainable Development in Multi-hazard Environment (CAP-RES) and what way forward for the project:
- Linkages with state institutions and programmes
 - National institutions and their researches/programmes
 - International agencies (cooperation and synergies)
 - People's concerns for inputs and feedback
 - Case studies / Good practices (also failure stories)

5.2.3. Session VI: Breakout Session

Risk and Vulnerability Analysis and Planning Frameworks for health adaptation plan

The sessions for day 2 concluded with the Breakout sessions. The breakout sessions were organized in a very interesting way. Participants were divided into 4 teams based on their dress colour (White, Red, Blue and Grey/brown). They were given a list of questions to ponder and discuss upon as a group and reflect important points of the team discussion on a presentation. The points discussed by the teams were very interesting and identified the gap areas as well as opened new channels for discussions on implementing policies and strategies for combating health implications and climate change.

Each group was given 15 minutes to discuss on following aspects:

- Key issues and contexts for adaptation plan
- Hazard-risk contexts; how climatic events/shocks – extreme events causing disasters are concern to health systems
- Regional issues and hotspots of water and climate related disasters and water/climate related diseases
- What is to be covered in health sector/health system
- What are the other sectors /departments that relate to health sector w.r.t. resilience
- What are contributors of vulnerability health (of people) from climate/disaster contexts
- What are the important programmes of Govt. (Central/State) where integration of health protection from Climate change is possible
- Options for financial strategies
- Other key recommendations

Each team discussed on these points and prepared presentations that were discussed during day 3.

5.3 Day 3- 28 June 2019:

Day three was a half day session organized to for presenting the findings and discussions of the breakout sessions that took in day two. All the four teams were given 15 minutes to present their findings.

Strategy, Structure and Contents of Health Adaptation Plan w.r.t. disaster related illnesses	
<p>Group Red</p> <p>Members: Dr. Ravi Prakash Sharma Mr. Yogesh Sharma Ms. Ananya Tewari Dr. Alka Sharma Dr. R.K. Singh Dr. Surabhi Sethi</p>	<p>Key recommendations/ discussions:</p> <p>Planning:</p> <ul style="list-style-type: none"> ● Data and forecasting: <ul style="list-style-type: none"> ○ Need of solid data; ○ Selecting and forecasting of data with cooperation from IMD and IDS for modelling and forecasting. ● Hotspot mapping: <ul style="list-style-type: none"> ○ Vulnerable areas; ○ Areas contributing to climate change <p>Health Sector Resilience:</p> <ul style="list-style-type: none"> ○ Healthcare planning; ○ Capacity Building; ○ Health Infrastructure
<p>Group Grey/Brown</p> <p>Members: Sh. Gurudas S.T. Desai Dr. Parul Sharma Sh. Rajendra Prasad Dhaundiyal Dr. Sandeep Singh Sh. Mangaldas Gaonkar Dr. Richa Sharma Dr. Aditi Madan</p>	<p>Key recommendations/ discussions:</p> <ul style="list-style-type: none"> ● Capacity building and awareness generation ● Behavioral change ● Rain water harvesting, afforestation ● Resilient hospitals – provision of mobile hospitals ● Climate friendly infrastructure through modified by-laws ● Inter-departmental collaboration while framing plans, schemes and policies ● Political will ● Documentation and sharing of good practices (from national and international cases) ● To be included in educational institutions and curriculum

<p>Group Blue</p> <p>Members: Mr. Tapash Dr. Palden Dr. Mayank Badola Dr. Rahul Batra Dr. Mukesh Dr. Praveen Kumar Dr. Nitin Dr. Sumit Dr. Prem Ranjan</p>	<p>Key recommendations/ discussions:</p> <ul style="list-style-type: none"> • Political commitment • Better inter-sectorial coordination • Appropriate research & sharing of data • Capacity building of all stakeholders • Innovative communication strategies
<p>Group White</p> <p>Members: Dr. Tanu Ms. Bindu Dr. Umang Er. Karanbir Singh Er. Sarbjit Singh Dr. Bramha Binod Dr. R Thamman Dr. Suma BK Dr. Gyanendra</p>	<p>Key recommendations/ discussions:</p> <ul style="list-style-type: none"> • Primary prevention: to scale up action on health determinants for health protection and improvement in the 2030 Agenda for Sustainable Development. • Cross-sectorial action: to act on determinants of health in all policies and in all sectors • Strengthened health sector: to strengthen health sector leadership, governance and coordination roles. • Building support: to build mechanisms for governance, and political and social support • Enhanced evidence and communication: to generate the evidence base on risks and solutions, and to efficiently communicate that information to guide choices and investments. • Monitoring: to guide actions by monitoring progress towards the Sustainable Development Goals. • Enhancement of surveillance system –ISDP in the state to include climate sensitive diseases.

5.3.2. Valedictory session and Vote of Thanks:

Coordinator: Dr Anil K Gupta, Head, ECDRM NIDM



Mr. Manjeet Saluja, NPO
Public Health &
Environment, WHO India
Office



- Climate change affects the social and environmental determinants of health – clean air, safe drinking water, sufficient food and secure shelter.
- Areas with weak health infrastructure – mostly in developing countries – will be the least able to cope without assistance to prepare and respond.
- Climatic conditions strongly affect :
 - Vector borne diseases
 - Water borne diseases
 - Other newly emerging diseases
 - Reemerging diseases like the KFD disease which has hit the southern states of India including Karnataka, Tamil Nadu, Andhra Pradesh and Telangana.
- The linkages between air pollution and climate change have been well established. Together, ambient and household air pollution (HAP) were responsible for 7 million premature deaths in 2016. Of these, more than 5 million deaths were due to Non Communicable Diseases (NCDs) like ischemic heart disease, stroke etc. In 2016, 16% of all NCD deaths between the ages of 30 and 69 years could be attributed to air pollution
- Forecasting models and developing early warning systems on Climate change and human health:
 - IMD’s work has been recognized at a global level on predicting disasters and along with Excellent work from NIDM has been able to zero down calamities when disaster strikes.
 - There is a need to develop similar early warning models for the diseases attributed to Climate change
 - The models need to be area specific, and needs to capture the understanding of the diverse geophysical zone of India.
- More research is needed to identify what is the threshold of rainfall and temperature that may affect the pattern of certain vectors; the lead and the lag time as well as understanding the behavioral changes.



Kirtiman Awasthi,
GIZ India office

He said it was a much needed event to discuss the priority topics. The thrust areas where work needs to be done includes:

- To increase knowledge base in order to develop better warning systems and device adaptation **strategies**.
- Indicators for vulnerability assessment.
- Implementing pilot projects which will demonstrate approaches to be applied to climate change impacts on health.
- There is a need of developing and promoting strong health

	<p>services and delivery systems.</p> <ul style="list-style-type: none"> • Strong infrastructure and institutional mechanisms and ways to metabolizing finance. <p>He then shared about the ongoing projects of GIZ and NIDM. He further emphasized on strengthening the collaboration on adaptation and DRR approaches based on the three global pillars including the Sendai Framework, Sustainable Development Goals and the Paris Climate Agreement. In addition he shared about the projects GIZ is collaboratively doing with MoEF&CC funded by NAPCC which is looking after the impacts of climate change primarily and heat stress over animal species.</p>
 <p>Ms. Akanksha Tyagi, Springer</p>	<p>She shared about the book series that NIDM is planning to launch with Springer- “Green Growth and Disaster Resilience”. This book series was planned keeping in mind a global readership.</p> <p>She then highlighted how important it is to develop a partnership between journals and academic institutions; as such partnerships can bring in a lot. Highlighting the importance of the association, she extended invitations to organizations and institutions present for collaborative work with Springer.</p>
 <p>Maj. Gen. Major Kumar Bindal, ED, NIDM</p>	<p>He talked about the following points:</p> <ul style="list-style-type: none"> • Health adaptation to climate change and the Health Adaptation Plan is a multi-hazard and vast subject. This needs a very high level of modeling and thus needs advanced software. Data availability and collection is an ultimate challenge, thus there is a need to develop a network for exchange of data. A software system/model that will promote interdepartmental data collection as well as help in analysis and projections. • When talking about health data; the focus should be to bring the climate scientist and health scientists at a common platform. So a link needs to be established between diseases with climate change. To begin with, the government hospitals and the government funded hospitals should be considered for such exercises. • The contours of the health adaptation plan are very vast. It thus requires participation of members from all affected ministries and international organizations working in the health sector. The plan should include regional issues as well as the tribal issues and challenges that were highlighted during the session. • Women and Child Development (WCD) is an area, which lacked proper mentioning during the workshop. Thrust should be given to identify community target groups. Moreover, in rural sectors women from various households should be the target groups, as they determine the health of the family. The plan should thus focus on this aspect of women empowerment. <p>He further suggested that there should be a separate session organized to discuss how women can bring the change when it comes to health issues and climate change.</p>

6 Key Learning and way forward:

1. Strengthening knowledge base on climate change and health through:

Research on disease and climate relationship needs to be established for planning and implementing targeted interventions. Assessing Climate Risk and Vulnerability on health sector should focus on:

- Climate change induced mental health issues (e.g. vulnerability of senior citizens)
- Transmission window for vector borne diseases
- Malnutrition issues despite strong schemes like Poshan Abhiyan and mid-day meal
- Secondary impacts of disasters

2. Preparedness towards climate hazard and risks:

It is essential that adaptation strategies need to be planned in response to following climate change issues having impact on health sector:

- Vector borne disease
- Crop decline due to climate induced stress
- Heat strokes
- Rise in humidity levels
- Disruptions and shortening of annual rainfall

3. Institutional strengthening and capacity building through:

- Introducing institutes like Malaria research centres
- There is a need for institutional strengthening to collect data across government, private sector at city and villages levels for effective health service delivery
- Capacity building of the health workers on generating appropriate data for climate change and health evaluation
- Training programs for scientists, doctors and institutions to integrate climate change in health interventions
- Improving health collection and utilization within government to better plan the interventions.

4. Policy Planning and implementation:

- To establish preparedness plans for vector borne diseases.
- To review existing programs and schemes through a climate lens and integrating with climate change adaptation for health sector interventions.
- States in their revised SAPCCs should include implementable actions addressing health sector concerns.
- Pilot demonstrations towards vulnerability assessment of vector borne diseases for potential financing under Govt. of India's National Adaptation Fund on Climate Change.
- To map and project the changing geography of disasters, related epidemics and assess

ensuing social vulnerabilities and inequalities.

7 The outcomes of the workshop were as follows:

- The cross-cutting themes discussed during the programme added to knowledge sharing by drawing lessons from case studies and resilience strategies at various levels.
- Discussions contributed in developing an understanding of the key risks and vulnerabilities, the mitigation options & adaptation frameworks and integration of eco-DRR adaptations for health sector programmes in context of climate change and associated health impacts.
- The recommendations of the workshop would contribute in delineating a roadmap for addressing the implications climate change on health.
- The discussions points and the recommendations from the workshop will be considered in developing the health adaptation plan against climate change induced health impacts.

8 Annexure

8.1 Annexure I: Programme Agenda is given below

DAY 1: Consultative Workshop on Strengthening Health Service Delivery in Changing Climate Context in India

Time	Topic	Responsible
0930 – 1000 hrs	Registration and Tea	All delegates / Workshop team
1000 – 1115 hrs	Session 1: Inaugural Session	
	Introduction and Context	Dr. Anil K Gupta, HoD, ECDRM, NIDM
	Key remarks	Dr. Ashish Chaturvedi, Director (Climate Change), GIZ India
	Welcome address	Maj. Gen. Manoj Kumar. Bindal, ED NIDM
	Science – Policy issues for Climate Change in India	Dr. Akhilesh Gupta, Advisor - DST & Head – SPLICE / CC Programme
	Climate Change and Human Health Perspective	Prof V K Sharma VC, SDMA Sikkim
	Special Address	Mr. Kamal Kishore, Member, NDMA
	Inaugural Address	Ms. Preeti Sudan, Secretary, MoHFW
	Vote of thanks	NIDM / GIZ
1115 – 1130 hrs	Tea Break	
1130 – 1300 hrs	Session 2: Climate change, Epidemiological Transitions, and examples of managing CC health impacts in India (Moderator: Dr. Anil Gupta, HOD-ECDRM, NIDM)	
	Climate change trends and future projections across India	Dr. Sandhya Rao, INRM
	Climate Change impact on health	Dr. Sumana Bhattacharya, IORA Ecological Solutions
	Panel Discussions on examples of managing health hazards <ul style="list-style-type: none"> • Heat stress • Nutritional Vulnerabilities • Vector borne diseases • Water Borne Diseases • Respiratory diseases • Cardiovascular diseases 	Dr. Mahaveer Golechha, Indian Institute of Public Health, Gandhi Nagar Dr. Harshal Ramesh Salve, Centre for Community Medicine, All India Institute of Medical Sciences Prof S K Dash, Indian Meteorological Society
1300-1400 hrs	LUNCH	
1400- 1530 hrs	Session 3: Vulnerability Assessment Framework for strengthening targeted service delivery (Moderator: Dr. Indrani Phulkan, Sr. Advisor, GIZ)	
	Addressing climate change and health concerns under State Action Plan on Climate Change (2.0)	Dr. Kirtiman Awasthi, GIZ
	Examples of national and international Frameworks on CC and Health Vulnerability Assessments	Dr. Sumana Bhattacharya, IORA Ecological Solutions
	Discussions for India Specific vulnerability framework	All

1530 – 1545 hrs	Tea Break	
1545 – 1645 hrs	Session 4: Towards Climate-Resilient Health Service Delivery programmes of the government (Moderator: Prof S K Dash, IMS)	
	Panel discussion on means for strengthening national mission service deliveries in the CC context	
	Discussions on	Dr. Dhariwal, National Vector Borne Disease Control Programme
	<ul style="list-style-type: none"> • Big data analytics for Decision • Support System • Improving Health infrastructure • and experts • Support services • Universal health insurance • Any other 	Mr. Chandra Bhushan, Centre for Science and Environment
1645 – 1700 hrs	Conclusion and Way forward	Dr. Anil Gupta, HOD-ECDRM, NIDM

DAY 2: Training Workshop and Exercises

0930-1145	Session 5: Climate Change & Environmental Issues: Implications for Disasters – Risk Reduction, Adaptation, Preparedness and Cross Cutting Issues
	<ul style="list-style-type: none"> • Role of development communications and Media and Issues for Women’s health – By Development Communication Specialist (Ms. Aisha Ghani) • Waste management Issues in Disaster Management and Contexts of Climate Change – India Red Cross (Ms. Bindu Agarwal, Jt. Advisor, Red Cross) • Short Talk by Dr. Manish Goyal, Assoc. Prof. IIT Mumbai on “Changing Rainfall Patterns in India: Understanding Climate Change” • CAP-RES Presentation (Ms. Pritha Acharya, CAP-RES, NIDM): Ecosystem Services and Nature Bases Solutions or Health Protection Against Climatic Risks • Invited Lecture: Prof. Jugal Kishore, Director Professor, VMMC & Safdarjung Hospital:, on Air pollution related issues in reference to Climate and Resilience 1030-1145
1145-1200 hrs	Tea Break
1200-1300	Panel Discussion on DRR Integration and Mainstreaming: Adaptation Plan <ul style="list-style-type: none"> (a) Prof. Santosh Kumar, NIDM (DRR perspectives for Sectors and Cross-cutting issues) (b) Mr. Vikrant Mahajan, SPHERE India (WATSAN and Reference to Disaster Relief / Preparedness and Community Issues) (c) Dr. Anil K Gupta, NIDM (Health Adaptation Plan - Reference to Disaster related illnesses: Approach and Issues)
1300-1400 hrs	LUNCH

	Session 6: Risk and Vulnerability Analysis and Planning Frameworks for health adaptation plan
1400-1530 hrs	<p>Special presentations:</p> <ul style="list-style-type: none"> • Risk and Vulnerability Analysis by Ms. Nidhi Madan (GIZ-India) • Fani preparedness and restoration by Dr. Braja Kishore Brahma (Odisha Govt.) • State Action Plan for Climate Change & Human Health by Dr. Mayank Badola (Uttarakhand Govt.) <p>Breakout sessions:</p> <ul style="list-style-type: none"> • Challenges, opportunities, Pathways & Tools • WASH/ Environmental Health • Disease epidemics and biological disasters • Programmes of health sector/sub-sectors • Social – developmental and communication issues
1530-1545 hrs	Tea Break
1545-16.30 hrs	<p>Recommendations / Group outcomes:</p> <ul style="list-style-type: none"> • Climate change Adaptation in health sector • Coordination with other sectors/sub-sectors • Research and documentation / data needs • Capacity – education & training needs • Financing opportunities/option

DAY 3: Training Workshop and Group Outcomes

0930-1030	Session 7: Strategy, Structure and Contents of Health Adaptation Plan w.r.t. disaster related illnesses	
	Group Presentation Exercises	
	<ul style="list-style-type: none"> • RECAP of Day 1 & 2: GIZ & NIDM 	
	1. Climate change – Health and disasters – Key issues of risk and vulnerability	
	2. Risk mitigation options and adaptation framework	
	3. Cross cutting themes: social, urban, rural, communication issues	
	4. Health sector programmes for integrating adaptation and DRR	
	5. Capacity gaps: needs, research, training, education	
1030-1045 hrs	Tea Break	
1045-1200	Group presentations: 5 groups (each group would be given 10 minutes) followed by Q&A	
1200	Valedictory session Vote of thanks.	Maj. Gen. Manoj K Bindal, ED NIDM Mr. Kirtiman Awasthi, Sr. Advisor, GIZ Mr. Manjeet S Saluja, WHO India

8.2 Annexure II: List of participation is given below

Sl. No.	Name and Designation	State
1.	Dr. Sandeep Singh Medical Officer o/o Civil Surgen, Kaithal, Haryana	Haryana
2.	Dr. Mayank Badola Staff Officer (Assistant Director) Directorate Health & Family Welfare, Danda Lakhond, Opposite I. t. Park, Dehradun, Uttrakhand	Uttrakhand
3.	Dr. T. Paldan Additional Director Health Department, Govt, of Sikkim, Sikkim	Sikkim
4.	Dr. Gyanendra Mishra Dental Surgeon Civil Hospital Rewari, Haryana	Haryana
5.	Sh Gurudas S. T. Desai Dy. Collector Collectorate North Goa, District, Panji Goa	Goa
6.	Dr. Braja Kishore Brahma Special Secretary Health & FW Deptt. Govt. of Orisha, Secretariat Building Bhubaneswer-75001 Odisha	Odisha
7.	Dr. Bhagwan Singh Charan Public Health Specialist 6 th Flore, PH-II, DHS, Karkaadooma Delhi	New Delhi
8.	Sh. Rajendra Prasad Dhaundiyal Sub-Inspector National Institute for Trg. In Search rescue and Disaster Response(NITSRDR), ITBP Sector 26, P.o, Madanpur Panchkula, Haryana	Haryana
9.	Dr. Rahul Kishore Singh State Nodal Officer Disaster Management & Clinical Establishment Act, National Health Mission, Jharkhand Ranchi	Jharkhand
10.	Dr. Basanta Kumar Pradhan Joint Director Directorate Public Health Directorate of Public Health, Heads of Department, Bhubaneswar, Odisha	Odisha
11.	Dr. Suma B. K Programme Officer Ayush Department, Ayush Directorate Dhanavantari Road, Bangalore Karnataka-560009	Karnataka
12.	Ms. Richa Sharma Research Scientist Centre for Environmental Health, Public Health Foundation of India, Plot 47, Sect. 44, Gurgaon, Haryana	Haryana
13.	Sh. Karanbir Singh Executive Engineer	Punjab

	Department of Water Supply and Sanitation, Punjab	
14.	Sh. Yogesh Kumar PHNO Disaster Management Cell, DHS HQ, GNCT of Delhi	Delhi
15.	Ms. Ananya Tewari Senior Research Associate Public Health Foundation of India, Plot No. 47, Sector 44, Gurgaon-122002	Gurgoan
16.	Sh. Binod Kumar Researcher Special Centre for Disaster Research, JNU, New Delhi	New Delhi
17.	Dr. Surabhi Sethi Senior Resident Vardhman Mahavir Medical College and Safdarjung, Hospital, New Delhi-29	New Delhi
18.	Dr. Mukesh Kumar Senior Resident Deptt. Of community Medicine, VMMC, & Safadarjung Hospital, New Delhi-29	New Delhi
19.	Dr. G N Qasba Sr. Advisor Integrated Research and Action for Development, C-80, Shiva Lonk, Malviya Nagar, New Delhi-17	New Delhi
20.	Sh. Prem Ranjan SDM (Bermo) District Adm. Bokaro, Jharkhand	Jharkhand
21.	Dr. Tanu Anand Assistant Professor Hindu Rao Hospital, Delhi	Delhi
22.	Dr. Rakesh Kumar Thamman Reader and HOD (KRIYA SHARIR) Rahiv Gandhi Govt. PG Aurvedic College Paprola, Distt. Kangra, Himachal Pradesh	Himachal Pradesh
23.	Dr. Aditi Madan Consultant Institute of Human Development, Patparganj, Delhi	Delhi
24.	Mr. Mangaldas Budho Gaonkar Dy Collector, DRO Office of the Collectorate Mathany Saldanha Administrative Complex, Margao South Goa	Goa
25.	Dr. Sumit Bakshi Medical Officer Word No. 10, Nahan Mohalla Below GGMS District Rajouri, Jammu & Kashmir	J &K
26.	Dr. Alka Sharma Jt. Director (D.M) Swasthya Bhawan (Directorate of Medical & Health) C-Scheme, Tilak Marg, Jaipur-302001	Jaipur
27.	Dr. Ravi Prakash Sharma Additional Director Medical & Health Department Govt. of Rajasthan, Jaipur	Jaipur
28.	Dr. Umang A. Mishra	Gujarat

	Medical Officer Epidemic Branch Commissioner of Health, Medical, Services & Medical Education, Gandhinagar, Gujarat	
29.	Dr. (Mrs) T. Palden Additional Director Health Care Human Services & Family Welfare, Deptt. Govt of Health Secretariat, Tashiling, Gangtok, Sikkim	Sikkim
30.	Dr. Praveen Kr. Karn State Epidemiologist/ SNO SSU. iDSP, JRHMS, SSU. DSP GVI, Campus, Ranchi Namkum, Ranchi	Ranchi
31.	Sh. Tapash Kumar Saha Roy Special Advisor Indian Red Cross Society, National Headquarters, 1, Red Cross Road, New Delhi-1	New Delhi
32.	Dr. Nitin Pundurang Mahajan Assistant Director Room. No. 10, GRD Floor, DRY LAB Bulding, Environment Health Division, National Centre for Disease Control 22, shamnath Marg, New Delhi -54	New Delhi
33.	Dr. Rahul Batra AMO C/o, DAO, Rewari, Ravi Dass Hostel, Post Office Rewari, Haryana	Haryana
34.	Sarbjit Singh Sub Divisional Engineer Dept. Of Water Supply & Sanitation, Punjab	Punjab
35.	Ms. Bindu Aggarwal Faculty Special Advisor Indian Red Cross Society New Delhi	New Delhi
Organizers and Other		
36.	Sh. Vikram Gurjar	DC (Admin), NIDM
37.	Sh. J. N. Jha	JE, NIDM
38.	Ms. Shweta Bhardwaj	CAP-RES (JRF) NIDM
39.	Ms. Pritha Acharya	CAP-RES (JRF) NIDM
40.	Dr. Sweta Baidya Das	CAP-RES (RA)NIDM
41.	Dr. Rituraj	Assistant Prof. NIDM
42.	Mrs. Santosh Mishra	Training Assistant, NIDM
43.	Mr. Rajiv Kumar	Training Assistant, NIDM
44.	Mr. Aasish	MTS, NIDM
45.	Mr. Kapil	IT, NIDM
46.	Ms. Nidhi Madan	GIZ
47.	Ms. Somya Bhatt	GIZ
48.	Mr. Shiv Narayan Singh	GIZ
49.	Mr. Jai Kr Gaurav	GIZ
50.	Ms. Vijeta Rattani	GIZ
51.	Dr. Indrani Phulkan	GIZ
52.	Ms. Lisa Faller	GIZ
53.	Mr. Rohit Sharma	GIZ
54.	Ms. Sanya Grover	GIZ
55.	Dr. Parul Sharma	IORA Ecological Solutions

8.3 Annexure III: Photographs for the workshop







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