



REPORT

Science & Technology Research- Policy-Practice Interface for Climate Risk Management

IMPLEMENTING PRIME MINISTER'S AGENDA 10 ON DISASTER RISK MANAGEMENT – ITEM 05 LEVERAGING SCIENCE & TECHNOLOGY



Resilient India : Disaster free India

National Institute of Disaster Management

Ministry of Home Affairs, Government of India



SPRINGER NATURE



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Science & Technology Research-Policy-Practice Interface for Climate Risk Management

Under CAP-RES (DST-GOI Project)
25-27 AUGUST, 2020

Organized by

National Institute of Disaster Management (Ministry of Home Affairs) and
Department of Science & Technology (DST), Government of India



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Deutscher Bundesrat
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Zusammenarbeit
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Science & Technology Research- Policy-Practice Interface for Climate Risk Management

Proceedings

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The document can be downloaded from <http://www.nidm.gov.in>

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MESSAGE

Over the last few decades, global temperatures have been rising. There is a clear evidence of climate change due to increased anthropogenic activities. Climate is one of the most important factors influencing our day to day life. The causes of climate change can be attributed to increasing human activities ranging from fossil fuel combustion, biomass burning, changes in land cover and land use etc. Most anthropogenic activities release Greenhouse Gases into the atmosphere.

Impact of climate change on Agriculture has been on the rise recently. Extreme weather events such as high intensity storms, sea surges, delayed monsoon, early monsoon withdrawal and long intervals between rain spells has lead to heavy loss of agricultural lands and livestock. This in turn has lead to a decline in agricultural productivity, health issues and threat to food security for millions. The developing countries use more labor-intensive methods and are located in lower latitudes, which are more susceptible to the effects of climate change. Vulnerability due to natural disasters is often compounded by man-made disasters, such as fire, landslide, urban heat wave, chemical hazards etc. But with increasing knowledge and awareness regarding various disasters now clearly there is a paradigm shift from relief and rescue approach to creating awareness, infrastructure and building resilience approach. Which in future will help achieve the sustainable goals.

In this regard, implementation of science and technology like AI etc. are inevitable to achieve disaster risk reduction and bring disaster resilience in all sectors and states. Especially the implementation should be at the grass root level. Along with this the new knowledge gained by situational analysis, past and existing knowledge should be incorporated in the policies. This conference has vividly brought out this issues and come up with a roadmap for future.

(Akhilesh Gupta)



मे. ज. मनोज कुमार बिन्दल वी एस एम
कार्यकारी निदेशक

Maj Gen Manoj Kumar Bindal VSM
Executive Director

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FOREWORD

Disaster management is witnessing its turning point in the back drop of Sendai Framework for disaster risk reduction during 2015 to 2030. There has been a paradigm shift in Disaster Management from response and relief to prevention and mitigation centric approach. It calls for a holistic framework of disaster resilience at different level. Planning and implementing disaster risk reduction requires mainstreaming pathways and appropriate tools. This transition from Hugo Framework of Action (HFA) to Sendai Framework for DRR has brought in the core forecast of achieving specific goals, integration of climate change adaptation, environment disaster linkages and mainstreaming across the sectors of development. While experiences of the Hugo Framework of Action have to be tested further with improvement, planning and intervention period has to be intensified at National, Sub-National and local levels enabling an environment of resilience building.

While inaugurating the second Asian ministerial conference on Disaster Risk Reduction (AMCDRR) in 2016, Honorable Prime Minister Shri Narendra Modi highlighted a 10 point agenda roadmap on disaster risk management. That concisely encompass issues tools and approaches to address almost all critical challenges in achieving sustainable development objectives focusing on local disaster management systems, academic capacity building, and harnessing technological advances. The PM's 10 point agenda enables synergies of Sendai Framework, Paris Climate Agreement and Sustainable Development Goals. In India's roadmap on disaster risk management point 5 envisages the features which have been discussed in this International Conference.

In a disaster prone country like India, it is important to ensure that people have rapid access to information, encourages preventive measures and enables quick response to protect life and livelihoods, minimize risk and enhance the efficiency in disaster risk management. The use of technology may emerge as a key in planning sustainable disaster resilient infrastructure and system. Technology plays a crucial role in disaster mapping, vulnerability assessment, disaster response as well as disaster preparedness. Climate change adaptation demands successful science policy interface that can enhance the translation of climate scenarios to adaptation policies. Keeping this in mind, this conference was organised to get insights about the challenges, needs, ways and means to put policy interventions into practices from experts of various fields to ensure the last mile connectivity.

(Manoj Kumar Bindal)

आपदा प्रबंधन महाविचार: पूरा भारत भागीदार



Prof. Anil K Gupta
Project Director, CAP-RES
Professor & Head
Division of Environment,
Climate & Disaster Risk Management



राष्ट्रीय आपदा प्रबंधन संस्थान
National Institute of Disaster Management
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ABOUT THE CONFERENCE

Climate Adaptive Planning for Resilience and Sustainable Development in Multi-Hazard Environment (CAP-RES) is envisaged under the National Knowledge Mission on Climate Change (NKMCC) and funded by Department of Science & Technology (DST), Govt. It is an umbrella project that aims at science-practice-policy interface and promotes value addition to programme sub-areas of the mission. CAP-RES widens the scope capacity development and include a whole range of actors.

The three-day conference on Science & Technology Research-Policy-Practice Interface on Climate Risk Mitigation was an effort towards identifying the commitment of academic and scientific community towards implementing item 5 of PM Agenda 10, i.e leveraging S&T for Disaster Risk Management.

Through the thematic sessions, the conference promoted knowledge sharing among broad range of stakeholders. This initiative helped in developing a knowledge network, and a roadmap for concerted coordinated planning and actions for resilience and sustainability through climatic adaptive planning processes. It also helped in enhancing the understanding on risk assessments and private sector's contributions to risk assessments for incorporating risk assessment into action, risk sensitive investment and will help in sharing of best practices related to inclusion of DRR into Business Continuity Plans. I hope the conference report inclusive of all key statements by the senior and learned speakers will be very insightful to the readers and will be very useful in future.

(Anil Kumar Gupta)
Conference Convenor

About the Organizers

National Institute of Disaster Management (NIDM)

National Institute of Disaster Management is a statutory organization under the Ministry of Home Affairs, Government of India, mandated under the Disaster Management Act 2005 to be the apex institution with a vision to play the role of a premier institute in India and the region for capacity building, training, research, documentation and policy advocacy on all areas of disaster management in India.

NIDM has a dedicated centre on Environment, Climatic, Disaster Risk Management (ECDRM) which has been designated as a Centre of Excellence on Climate Resilience (CECR) by the Ministry of Health and Family Welfare under the National Action Plan for Climate Change and Human Health (NAPCCHH). The CECR division is implementing four research projects namely: (i) Climate Adaptive Planning for Resilience and Sustainable Development in Multi-hazard Environment (CAP-RES)-funded by DST-Gol; (ii) Health Resilience and Capacity Building (HER-CAP)-supported by WHO India; (iii) Crisis Management Plan to deal with Contamination of Water Bodies (CMP-WB)-supported by the MoEFCC through Central Pollution Control Board and; (iv) Disaster Management Plan for the Ministry of Environment, Forest and Climate Change (NEFCDMP) for MoEFCC. Among others the centre has been credited for preparing the comprehensive National Agriculture Disaster Management Plan (NADMP) for Ministry of Agriculture and Farmers Welfare (Gol) and is also taking up the preparation of Disaster Management Plan for the Ministry of Chemical & Fertilizers (NCPC-DMP) for Ministry of Chemical and Petro-chemicals. For more details visit: nidm.gov.in

Department of Science and Technology (DST)

Department of Science & Technology (DST) was established in May 1971, with the objective of promoting new areas of Science & Technology and to play the role of a nodal department for organising, coordinating and promoting S&T activities in the country. DST has a dedicated division on Climate Change and is implementing two out of eight national missions on Climate Change including National Mission for Sustainable Himalayan Ecosystem (NMSHE) and National Mission on Strategic Knowledge for Climate Change (NMSKCC). For more details visit: dst.gov.in

Deutsche Gesellschaft für Internationale Zusammenarbeit GIZ - GmBH

GIZ India on behalf of Federal Government of Germany and various other partners has been providing support both, at the national level and at the sub-national level in almost all the key aspects of addressing climate change such as SAPCC development and implementation support; creating enabling conditions for accessing climate finance; capacity development, supporting policy dialogues and multi-stakeholder engagement. For more details visit: giz.de/en

Springer Nature

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Federation of Indian Chambers of Commerce and Industry (FICCI)

Established in 1927, FICCI is the largest and oldest apex business organisation in India. A non-government, not-for-profit organisation, FICCI is the voice of India's business and industry. From influencing policy to encouraging debate, engaging with policy makers and civil society, FICCI articulates the views and concerns of industry. FICCI provides a platform for networking and consensus building within and across sectors and is the first port of call for Indian industry, policy makers and the international business community. For more details visit: <http://www.ficci.in/about-us.asp>

Gorakhpur Environmental Action Group (GEAG)

Gorakhpur Environmental Action Group (GEAG) is a voluntary organization working on the issues mainly related to environment ranging from climate change adaptation to sustainable development since 1975. GEAG has been successfully implementing several developmental projects and initiatives aimed at reducing vulnerability and livelihood issues of small and marginal farmers, especially women farmers, based on environmental and ecological principles and gender sensitive participatory approach. For more details visit: <https://geagindia.org/index.php/>

IUCN- Commission on Ecosystem Management (CEM South Asia)

The Commission on Ecosystem Management (CEM) is one of the 6 commissions of IUCN. The South Asian regional network of the IUCN Commission on Ecosystem Management (CEM-SA) is a regional platform of global significance comprised of experts, professionals and emerging leaders (youth) for contributing and sharing knowledge that is helping for up gradation and development of existing knowledge related to the concerns, challenges and prospects of ecosystem management and trans-boundary conservation efforts in the region. For more details visit: iucn.org/commissions/commission-ecosystem-management

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- Shri G.V.V. Sarma, Member Secretary, NDMA, GoI

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 Shri Ashish Kumar Panda, Consultant, ECDRM Division, NIDM
 Convener: Prof. Anil Kumar Gupta, Head-ECDRM Division, NIDM, - Project Director/PI: CAP-RES

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 Dr. Sonal Bindal, Research Associate, CMP-WB, NIDM
 Dr. Anjali Barwal, Research Associate, HER-CAP, NIDM

Background

Globally and in India, there has been a paradigm shift in Disaster Management, from 'response and relief centric' approach to 'prevention-preparedness and mitigation' centric approach', which calls for holistic, integrated and inclusive strategies with effective use of S&T interventions and innovations from across a range of disciplines.

India is prone to multiple disasters, due to its wide range of environmental, geological and developmental variations. Environmental changes, viz. climate change, land-use changes, natural resource degradation, along with the anthropogenic settings, aggravate disasters and people's vulnerability to the disasters impacts. Guidelines and plans pertaining to disaster management at all levels and across sectors are expected to utilize and integrate relevant S&T interventions, research strategies and innovations. It is equally important to integrate ethical and social dimensions into S&T application for effective benefits. During disasters, both public and private sector end up facing the consequences.

To keep pace with growing climate change and effectively build the resilience towards the future disasters and implement the Disaster Risk Reduction and save the resources we need to have disruptive technology and innovations on carbon neutral green growth along with the already existing traditional and indigenous technology and knowledge.

Themes of the Conference

In the backdrop of the Prime Minister's 10 Point Agenda – Item 05 focuses on Leveraging Technologies and Science for DRR in India, the conference evokes detailed and deliberate discussions on six major themes as follows:

1. **S &T Policy in Indian :** Context of Present and Future: to discuss the S&T related policy regime in India and the anticipated paradigm shift to address present and future developmental needs for achieving SGDs and resilient development.
2. **Path Breaking Research Needs :** to deliberate upon the directions of R&D in Indian institutions and national/international collaborations to address institutional and professional capacity building for solving developmental and environmental challenges.
3. **Role of Industry & Private Sector :** focusses on industry, academia and government partnership and cooperation under different models and issues of industrial transformations for addressing climate and disaster challenges.
4. **Role of Disruptive Technology :** to discuss on the opportunities, challenges, scope and sustainability issues associated with the promotion and applications of high-end transformative S&T across the key domains for development, sustainability and resilience (Artificial Intelligence, robotics, space, chemical and green technology etc).
5. **Climate Resilience and Disaster Safe Development :** to review the recent initiatives and future opportunities of science-policy-practice integration in developmental planning and disaster management framework.
6. **Green Growth and Sustainability Strategies :** focusses on strategic and innovation issues for sustainability integration into DRR along with nature conservation, environment and business sustainability.

Objectives of the Conference

This conference aims at all-inclusive viewpoints and roadmap development through discussion & dialogue on experiences and lessons, gaps and opportunities utilize the range of S&T disciplines and innovations including traditional and local science, and role of institutions for promoting the same. The key objectives of the conference include:

- Provide platform and facilitate dialogue on S&T policy and applications lessons in DRR and identify gaps and opportunities in the current contexts of disaster risk and vulnerability and harnessing potentials of S&T and innovations and related institutions for S&T based DRR promotion
- Developing a road map for inclusive, holistic approach to S&T and innovations promotion in DRR planning and actions at all levels in the country.
- To bring out the importance of the intervention of private organizations in DRR
- Understand the possibilities of new innovation and use of disruptive technology in DRR
- To promote the need for international cooperation for path breaking research for improving DRR and developing a road map for blending the new innovations with the traditional and indigenous knowledge

Expected Outcome

The programme will allow knowledge sharing among experts from government agencies, scientific/ academic/ research institutions, private sector specialists, international researchers and experts and NGOs working in various field along with climate change and disaster management. This initiative will develop a knowledge network, and come up with a road map for concerted coordinated planning and actions for resilience and sustainability through climatic adaptive planning processes. It will also enhance the understanding on risk assessments and private sector's contribution to risk assessments for incorporating risk assessment into action, risk sensitive investment and will help in sharing of best practices related to inclusion of DRR into Business Continuity Plans.

Participation

The programme had representation from India and abroad and was attended by more than 475 participants. Pro-Vice Chancellors, vice-chancellor, directors, departmental heads and professors from esteemed academic universities, colleges and institutes also attended and gave their valuable contributions in different sessions of the workshop. Teachers, research scholars, students, officers, practitioners, environmentalists and conservationists from all over India and abroad attended the workshop and gained substantial knowledge inputs from the programme. The list of the key organizations who attended and participated in the event is attached in the report as Annexure III.

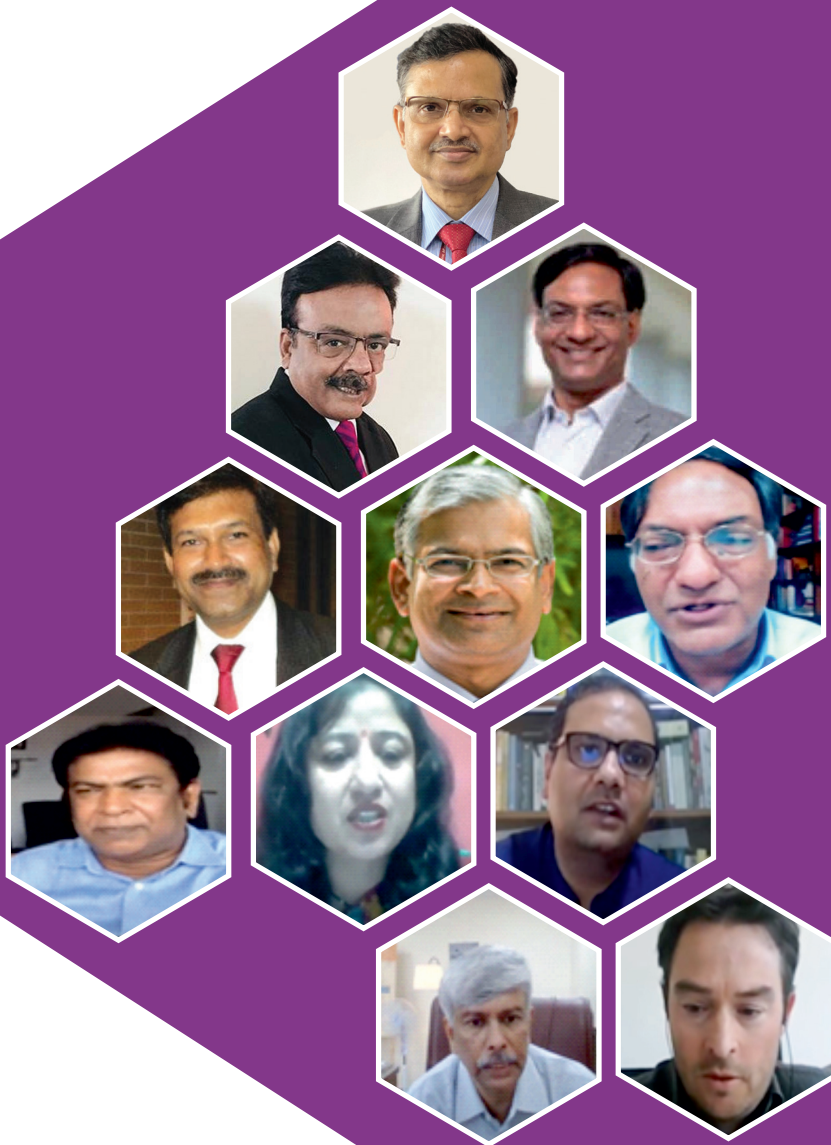
Role of CAP-RES

The symposium aimed to review the state of research and knowledge on the subject, across the key themes of CAP-RES and develop a network mode roadmap for addressing knowledge and capacity gaps in the subject by engaging with the institutions, researchers and experts.

Through the conference, CAP-RES tried to achieve the following:

- To deliberate upon the concepts, case studies, pilots and lessons across the thematic areas
- To review and recognize the status, strengths, gaps and opportunities for research and science-policy-practice interface
- To develop networks of institutions/researchers and experts across key themes for knowledge development and capacity promotion
- To enable and strengthen cooperation with key international and national institutions for co-benefits with CAP-RES
- To enable policy environment, synergy and platform for promoting culture of safety and prevention, in general, and in particular towards the objectives of CAP-RES

SESSION WISE REPORT



Science & Technology
Research- Policy-Practice Interface
for Climate Risk Management

Session 101: Inaugural Session

Day-1: 25th August 2020, 2:00 – 3:20 PM

Keynote Address

- Prof. Ashutosh Sharma, Secretary, DST, Govt. of India

Inaugural Guest

- Shri GVV Sarma, Member Secretary, NDMA, Govt. of India
- Shri Kamal Kishore, Member, NDMA, Govt. of India
- Maj. Gen. Manoj K Bindal, ED, NIDM
- Dr. Akhilesh Gupta, Advisor & Head – Strategic & Large Programmes (SPLICE), DST-Gol
- Mr. Farhad Vania, Portfolio Management Advisor, GIZ India

Conference Convener

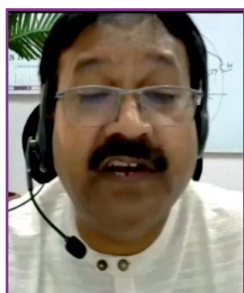
- Prof. Anil K Gupta, Project Director- CAP-RES & Head, ECDRM Division, NIDM

Facilitators

- Shri Ashish K Panda, Consultant & Faculty Member, NIDM

Focal Point

- Dr. Anjali Barwal, Research Associate, NIDM



Prof. Anil K Gupta

Professor & Head, ECDRM Division, PI (CAP-RES), NIDM

Conference Convener

Prof. Gupta welcomed guest of honor, special guest, all other speakers, luminary experts, panelist, facilitators, partnering agencies and participants on behalf of NIDM. He briefed about the CAP-RES programme, funded by DST, Govt. of India, which is about resilience & sustainability. The programme aimed at using S&T and environmental dimensions and also associated strategic issues to utilize its benefits to strengthen disaster risk reduction in the country. He later explained the objectives of the programme. He also highlighted key issues on science & technology, communication, artificial intelligence, nanotechnology etc.

Prof. Gupta has more than 25 years of experience in the field of disaster management, environment and climate resilience. He has been credited for preparation of National and Sectoral Disaster management Plans, Human Resource Capacity Development Plans, National Action Plan for disaster Management.



Major General Manoj Kumar Bindal

Executive Director, NIDM

Inaugural Guest

Major General Bindal welcomed guest of honor, special guest, all speakers, experts, panelist, partnering agencies and all the participants. He also congratulated Prof. Anil K Gupta, convener of the programme and his entire project team for this programme. He mentioned that disaster management is witnessing turning point in the backdrop of Sendai Framework for Disaster Risk Reduction (DRR) 2015-30. For DRR, holistic framework is required at different levels. He further added that policy planning & interventions needs to be intensified at national, sub-national & local levels for enabling the environment of resilient building. He highlighted that PM 10 point agenda enables synergies of Sendai Framework, Paris Climate Agreement & Sustainable Development Goals. In a disaster prone country like India, it is important to ensure that people have rapid access to information & encourages preventive measures & enable the quick response to protect lives & livelihoods. There is a need to minimize sufferings by creating proper awareness, early warning systems

Major General Bindal has commanded Air Defense Regiment & Air Defense Brigade in Kashmir region during counter insurgency operations. He was a staff member of Mountain Brigade deployed in counter insurgency ops and in High Altitude area, an Armored Division deployed in the plains, a Desert Corps and in a Corps HQ in High Altitude Areas. He was the Deputy Director General in Directorate of Army Air Defense. He also served as the Provost Marshall in the United Nations Mission in Mozambique. He has been the Director, Centre for United Nations Peacekeeping (CUNPK) New Delhi.

to enhance the efficiency of DRM. For this, technology plays a crucial role along with the satellite based information. He finally concluded by saying that a climate change adaptation demands a successful science and policy interface that can enhance the translation of climate adaptation to various policies.

Key Takeaways

- Need for intensified policy planning & interventions at national, sub-national & local levels to enable the environment of resilience building.
- Need to ensure that people have rapid access to information, encouraging preventive measures & enabling quick response to protect lives & livelihoods.



Dr. Gupta is heading DST's Climate Change Programme & coordinating two National Missions on Climate Change under NAPCC. He has over 185 research papers in National & International Journals & conference proceedings. Dr. Gupta was a member of the National Coordination Team which drafted NAPCC in 2008. He was the president of Indian Meteorological Society & Association of Agro meteorologists

Dr. Akhilesh Gupta

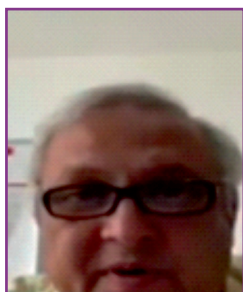
Advisor & Head-SPLICE & Climate Change Programme, DST(GoI) & Former Secretary UGC

Inaugural Guest

Dr. Gupta welcomed all the speakers, experts, panelists and thanked NIDM for conducting this programme. He said that DST has been supporting such initiatives in several leading institutions across the country who is working in the field of capacity building programme in the climate change. He explained that the public awareness, training, community participation is very crucial at this juncture when country itself is facing the impact of various disasters & COVID 19 pandemic. And it is the S&T that has the solution for every problem. So it is very apt of NIDM to choose S&T for conference.

Key Takeaways

- Need for public awareness, training, community participation is very crucial when country is facing the impact of various disasters & COVID 19 pandemic.
- Science & Technology that has the solution for every problem.



Mr. Vania oversees GIZ India's portfolio development. He closely works with Dept. of Economic Affairs, Ministry of Finance (GoI) and other line ministries: including state agencies, donor agencies, training, research & academic institutions and CSOs. He has over 15 years of experience with projects of CSR, forest, wildlife conservation, environmental management & social development.

Mr. Farhad Vania

Senior Portfolio Manager, GIZ India

Inaugural Guest

Mr. Vania spoke that India and Germany both have a long standing cooperation in many different sectors. Energy & environment, economic development, social security, urban development are part of the agreement between Govt. of India & Govt. of Germany for bilateral cooperation between both countries. He explained how climate change increasingly becomes a global problem & how it undermines the achievements of SDGs and other development goals of the individual countries. If it is not addressed or mitigated in a way that can be perceived by the general public, all the efforts of the government or agencies will be undermined. He mentioned that India has been ranked at number fifth in the Global Climate Risk Index 2020 by a Germany based company called 'German Watch'. He further said that adaptation mitigation measures may

not be enough to manage the impact of climate change & climate science, so there is a urgent need to implement effective climate risk assessment & management approaches in order to minimize and address the losses & damage to the people of our country. There is need to strengthen the research & technological innovations, advancements, planning into the climate risk approaches.

Key Takeaways

- Need of adaptation mitigation measures to manage the impact of climate change & climate science.
- Urgent need to implement effective climate risk assessment & management approaches in order to minimize and address the losses & damage to the people of our country.
- Need to strengthen the research & technological innovations, advancements, planning into the climate risk approaches.



Shri Kamal Kishore

Member, NDMA, Govt. of India

Inaugural Guest

Shri Kishore explained that optimizing the use of S&T for reducing disaster risk, saving lives, livelihoods, economic impacts are the priority of NDMA. He congratulated NIDM & its partners for organizing this programme. He laid down five key points for developing S&T agenda for DRM in the country. His first point was the need of having a sharp problem definition to get the priority problem to be solved. Second point was intersection of different disciplines unless we become comfortable with working across disciplines. His third point was the need to develop a notion of global public good whatever application we are developing in the area of DRM that should be made widely applicable. Forth point was technical & scientific institutions really have to start adopting local areas. E.g. universities of coastal areas should have the best expertise on coastal hazards, universities of hilly region should have the best expertise on landslides etc. His fifth point was to have a dialogue and fostering the information between users and producers of scientific information is needed.

Shri Kishore has worked on DRR and recovery issues for over 22 years at the local, national, regional and global levels. Prior to NDMA, he worked with the UNDP for 13 years in Delhi, Geneva and New York. He has supported post-disaster recovery through strategic advice, needs assessments, programme development, and coordination after major disasters in Bangladesh, India, Indonesia, Iran, Myanmar, Pakistan, Philippines and Sri Lanka.

Key Takeaways

- Need of having a sharp problem definition to get the priority problem to be solved.
- Need of having a multi-disciplinary approach for DRM.
- Need to rise above a narrow interest to advance the notion of global public good.
- There is a need to maximize the use of existing S&T with dialogues between users & producers of scientific information.



Shri G. V. V. Sarma

Member Secretary, NDMA, Govt. of India

Shri Sarma joined Indian Administrative Service in 1986 and has served as Collector & District Magistrate in the districts of Nayagarh and Jharsuguda. He has served as Member Secretary to the Task Force constituted by Gol to review the DM Act, 2005. He had the opportunity to work in Supercyclone of 1999 in Odisha and the coordination tasks related to floods of 2013 in Uttarakhand, Phailin cyclone of 2013, September 2014 floods in J & K and Hudhud cyclone of 2014.

Inaugural Guest

Shri Sarma briefed that Ministry of Environment, Forest & Climate Change is the nodal ministry for the chemical disasters. Similarly, Ministry of Earth Sciences is the nodal ministry for earthquake, Ministry of Mines is the nodal ministry for the landslides, in terms of actual handholding, and supporting state government and in terms of identifying the hazard prone areas and taking up specific structural & non-structural mitigation measures. More work needs to be done in terms of outreach by the S&T institutions. He emphasized that there is a need of more flexible higher education sector in our country so that R&D organizations will work hand in hand with disaster managers.

Key Takeaways

- More work needs to be done in terms of outreach by the S&T institutions.
- Need of more flexible higher education sector in our country so that R&D organizations will work hand in hand with disaster managers.



Prof. Ashutosh Sharma

Secretary, Dept. of Science & Technology, Govt. of India

Keynote Address

Prof. Sharma spoke on how disasters are related to the climate. Every little change in the average temperature would lead to higher frequency of extreme events. S&T and implementable policy are the two strong pillars of addressing any problem. He said that DST is in the middle of formulating a new policy on S&T Innovation 2020, having main principle of the policy is that how do we get knowledge creators and knowledge consumers to work together. He further spoke that India has very good strength of the researchers, institutions and is currently at number 3 in publishing research papers. He said that India is not the part of the problem in terms of cumulative emissions which drive to climate change, but certainly we have to be a part of the solution. But India is at the number 5 in terms of vulnerability disasters. So there is need to put all the action in place now before any disaster or climate change event happens. He concluded

Prof. Sharma obtained B.Tech Degree from IIT Kanpur in 1982, Master's degree from Pennsylvania State University in 1984 and Ph.D. in Chemical Engineering from the Buffalo State University. Prof. Sharma's research contributions are highly interdisciplinary. He is an elected Fellow of The Indian National Science Academy, The Indian National Academy of Engineering, The World Academy of Sciences (TWAS) & the Asia-Pacific Academy of Materials. He has been on the editorial boards of several national and international reputed journals.

his talk by saying that DST drives two missions in the area of climate change on disseminating

relevant and understandable information for people who live in Himalayan region and developing relevant technologies, human resources, start-ups and innovations to make use of the knowledge to generate socio-economic opportunities.

Key Takeaways

- Need to pull all actions in place now before any disaster or climate change event occurs.
- Need to develop human resources, start-ups & innovations to make use of knowledge to generate socio-economic opportunities.
- Collaborative work for knowledge creators and consumers to work together.

Special Panel Discussion Session 102: S&T Policy in India, Context of Present and Future

Day-1: 25th August 2020, 3:20 – 4:25 PM

Session Chairperson

- Dr. Arabinda Mitra, Scientific Secretary, Office of PSA to GoI

Moderator

- Dr. Akhilesh Gupta, Advisor & Head, SPLICE & Climate Change Programme, DST, GoI

Distinguished Panelists

- Prof. Sudhir Jain, Director, IIT Gandhinagar
- Prof. Rajib Shaw, Chairman, UN-DRR S&T Advisory Group
- Prof. S P Singh, Former Vice Chancellor, HNB Garhwal University
- Ms. Amrita Mukherjee, STIP-YPP Fellow, DST (GoI)

Conference Convener

- Prof. Anil K Gupta, Project Director-CAP-RES & Head, ECDRM Division, NIDM

Facilitators

- Shri Chitresh Saraswat, Doctoral Fellow, Australian National University, Canberra, Australia

Focal Point

- Pritha Acharya, Research Fellow, CAP-RES, NIDM



Dr. Arabinda Mitra

Scientific Secretary, Office of PSA, GoI

Chairperson

Dr. Mitra talked about the current challenges in S&T policies in India and highlighted the focus areas for the Science Technology and Innovation policy. He said that the most pressing community challenges have a very technological and scientific dimension, thus S&T led innovations offer a great opportunity to address these multi-faced challenges. He emphasized on the need for ensuring the contemporary policy making mechanisms cross-cutting, overarching and encompassing- making it convincing to both polity and people. The S&T policy mechanisms has to envision the domain specific technology platforms for service delivery for effective R&D knowledge conversions from diverse scientific platform that needs to be put into a technology platform that can be then leveled. Adding to this, he said drafting S&T policies should follow an extensive consultative process where all sections of the society and government should be consulted for

Dr. Mitra has more than 30 plus years of experience in the field of Geology. He played a seminal role in formulating the science strategy of Indian Antarctic Mission. His extensive work brought a paradigm shift in the Indo-American cooperation in S&T & innovation by bridging academic, research & industrial enterprises of both countries. He was appointed as the Scientific Secretary in the Office of the Principal Scientific Adviser to the Government of India in 2018.

evolving a consensus policy. The polity today therefore expects the adoption of the S&T policy paradigm across the value chain which includes startups, private sectors, public sectors in order to unlock the potential by creating a virtuous cycle of production. He then emphasized on the importance of STI in achieving the 2030 agenda for UN SDG, and said that it chose open a new window of opportunity to develop pathways for integrating STI interventions to strengthen efforts towards economy and social development as well as achieving SDGs and build synergies between the both. Dr Mitra then talked about the CDRI (announced by PM in the UN Climate Action Summit in New York) which is an example of international partnership piloted by India in consultation with 35 other countries that will support developed and developing nations to build climate and disaster resilient infrastructure. He concluded his remarks by highlighting the need for DM policies to be holistic and encompassing; i) R&D; ii) knowledge creation; iii) knowledge dissemination; and iv) knowledge application.

Key Takeaways

- Need to include more citizen science in the disaster network.
- Need to develop a collaborative network to support research & publications.
- Need to identify and suitable implement and establish the interlinkages of disasters & ecology.
- Need to developing a relationship between science & social science.



Dr. Akhilesh Gupta

Advisor & Head-SPLICE & Climate Change Programme, DST(GoI) & Former Secretary UGC

Moderator

Dr. Gupta shared a few points, India is now formulating S&T policy encompassing all subject areas and disciplines. He further added it is the first time that such an initiative was important to touch upon every citizen of the country and not just limiting to the academia. This policy is drafted for and by not just only the scientist. A large number of subjects and institutions have been addressed across disaster management and climate change. He talked about two big things where policy is addressing in the context of Disaster Management and capacity building. He said that the capacity building exercise in the country is always being taken as vertical level, but he further added that this policy addressed this issue very prominently, by making training horizontal to mainstream it in every institutions of our country. Secondly most important thing he pointed out was the institutional mechanisms in the country of capacity building is not very appropriate currently. Thus he proposed a national authority of capacity building is the need of the hour.

Dr. Gupta is heading DST's Climate Change Programme & coordinating two National Missions on Climate Change under National Action Plan on Climate Change. His publications include over 185 research papers in National & International Journals & conference proceedings. Dr. Gupta was a member of the National Coordination Team which drafted NAPCC in 2008. He was the president of Indian Meteorological Society & Association of Agro meteorologists

Key Takeaways

- There is a need for policies to be inclusive of a wider section of the society rather than limiting to the academia.
- There is a need to evolve the capacity development activities at horizontal level rather than just being in vertical silos.
- Need to mainstream capacity development at every institutions of our country.
- A national authority to look after the capacity development needs of the country should be focused upon.



Prof. Sudhir Jain

Director, IIT Gandhinagar

Distinguished Panelists

Prof. Jain talked about the needs of seeing Science and Technology policy holistically rather than in silos for climate change or disaster management. He appreciated the suitability of the conference in the backdrop of the current global set of events, as S&T has a very important role to play. Taking a few examples Prof. Jain said that India needs to invest well and judiciously in Science and Technology as it holds immense potential in terms of uplifting the economy of the country. He further added that there is a need to introduce strong fundamentals in youth by inculcating in them critical thinking and nurturing young minds with innovative solutions to address the societal challenges, risk taking approaches, the ethics of conduct etc. Prof. Jain, then highlighted the

Prof. Jain is an internationally reputed scholar of earthquake engineering & recognized as one of the most dynamic educators in India. He is currently serving his third 5-year term as director of the IIT Gandhinagar. He was an elected Fellow of the Indian National Academy of Engineering in 2003, and conferred Padma Shri by the President of India in 2020.

key players for such a system which includes the schools, universities, R&D laboratories, private labs, industries and armed forces as well as the enablers and the funding agencies. He then pointed out that India needs to make good use of the human resources that it has. Prof. Jain said that the university system supported by our school systems and the schools system supported by our society needs to be introspected in order to build a strong S&T base within the country. He then added that the universities should provide a trust where people are empowered, promote innovative approaches, problem solving situations, rather than entirely just teaching students to solve problem and promote leadership qualities. Prof. Jain then talked about the fantastic ideas of the new education policy, the inter-disciplinarity and flexibility in curriculum. However, he also shared his concerns on the readiness to benefit from those policies. For too long S&T has been looked at as isolated events and the repercussions have been many and resulted in promoting isolation of knowledge in itself. Another important point Prof. Jain emphasized was that S&T research should result in impacts rather than increasing credentials.

Key Takeaways

- There is a need to invest more in Science and technology interventions in India.
- India needs to make very good use of its human resources-nurturing young minds.
- There is a need to introspect in the university system.



Prof. Rajib Shaw

Chairman, UN-DRR S&T Advisory Group. Keio University, Japan

Prof. Shaw is associated with the Graduate School of Media & Governance of Keio University, Japan. He is co-founder of Resilience Innovation Knowledge Academy & Co-Chair of the United Nations Asia-Pacific Science Technology Advisory Group (APSTAAG), Coordinating Lead Author IPCC's 6th Assessment report.

Distinguished Panelists

Prof. Shaw spoke about the key areas where Science and Technology policies should focus and how to promote an encouraging environment for the youths in this domain. He emphasized on the need to understand the appropriate mechanisms to support higher education and cutting edge research through policies and institutional support. He also spoke on the need for localization of national and international policies. He highlighted on the need for DRR and CRM to evolve as disciplinary subjects. Adding to this he spoke on the need for universities to encourage startup ecosystems with special focus on application of open data, Disaster Risk Reduction at public goals, citizen science and generating social innovations

Key Takeaways

- Importance of localization of National & International S&T policies.
- S&T policies should aim to strike a balance between governance research and technical research.
- DRR and Climate Risk Management should evolve as disciplinary subjects.
- Developing startup ecosystems-use of open source data, citizen science & social innovations.



Prof. S P Singh

Former Vice Chancellor, HNB Garhwal University

Distinguished Panelists

Prof. Singh spoke about challenges in the research sectors specifically in terms of policy issues lacunae. He said that there is a need to develop a multipronged and multi-scaled policies when it comes to research in field of disaster management and ecology in Indian Himalayas. He pointed out that a researcher should not be credited just by the number of publication they developed which one of the existing loopholes in the existing university systems. In addition he pointed out that the network supporting and linking young the researchers is missing and the university system should make reforms in their structure and policies to develop such kind of a network supporting collaborative research. Prof Singh also shared a very valid point with respect to Indian scientists not writing text books; he said that this has contributed in a negative way in the Indian science and technology

Prof. Singh made pioneering studies on Himalayan vegetation, both terrestrial & aquatic & on applications of ecology to solve environmental problems. Presently, he coordinates multi-site multi partner, multi-disciplinary research on Himalayan Timberline relating to climate change. He had also established partnership between Indian ecologists & Ecological Society of America.

He further spoke on the need to change with time on the issues of science reforms and policies, highlighting the need to develop an interconnected relationship between science and social science.

Key Takeaways

- Need to include more citizen science in the disaster network.
- Need to develop a collaborative network to support research and publications.
- Need to identify and suitable implement and establish the interlinkages of disasters and ecology.
- Need to developing a relationship between science and social science.



Ms. Amrita Mukherjee

STIP-YPP Fellow, DST, Gol

Distinguished Panelists

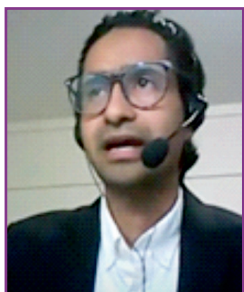
Ms. Mukherjee presented on the 'Role of DRR in Education: An Assessment of the Indian Scenario'. With the presentation she spoke about the work she did focusing on the linkages of the gaps they had identified with the Science Technology and Innovation Policy (STIP) 2020. She gave the overall outlook of her work with respect to the global scenario, how the Indian Vulnerability Profiling has been done. She then gave the contextual referencing of her work to the existing global and national policies starting right from 2005 to 2020. She then spoke about the process carried out for developing the new STIP, she added that a citizen centric and bottom up approach which is evidence driven-with 6 main objectives. Coming to the week-points of the STIP, she said that long term preparedness with respect to community involvement is a weaker area and mitigation in terms

Ms. Mukherjee is currently a STIP fellow at the Young Policy professional Level with DST hosted at IISc Bangalore DST-CPR. She has completed her under-graduation from Miranda House, DU in Political Science & Masters in International Relations from Jadavpur University. She is also the recipient of the Ryoichi Sasakawa Young Leaders Fellowship 2018-19. Her research interests include gender and the society-policy interface of climate change.

of ground level capacity building remains fragmented when implementation and follow-up monitoring is a concerned. She further added that education should be kept at the center for PM Agenda 10, the item no 8 which deals with the idea of social inclusion in the frame of 2019. There is also a need for community based Resilience Building which is context specific and tailored with respect to the vulnerability profile of the area.

Key Takeaways

- Need for involving community for long term preparedness.
- Need to improve implementation and follow-up monitoring when mitigation in terms of ground level capacity building is concerned.
- Education should stay at the center of item no 8 of PM Agenda 10.



Mr. Chitresh Saraswat

Doctoral Fellow, Australian National University, Canberra, Australia

Session Facilitator

Mr. Saraswat is an interdisciplinary researcher and doctoral scholar in the Fenner School of Environment & Society, Australian National University. His research interests span across water governance, innovation and sustainability-transitions. He has over ten years of research and industry experience, both nationally and internationally. He has published several peer-reviewed outputs in international journals and books.

Closing Remarks

Dr. Arabinda Mitra

Doctoral Fellow, Australian National University, Canberra, Australia

Dr. Mitra concluded the session by thanking all the panelists. Summing up the important discussions of the session, he talked about the extensive research that went into formulating the STIP Policy and main concerns raised during the sessions were already been deliberated upon in the policy. Adding to this he said that the policy primarily focuses on two aspects: i) developing a new nurturing arm for new knowledge creation in all areas of science and big domain, establishment of state of art infrastructure, trained, ecocentric & collaborative and partnership based approached; ii) application arm which promotes the valorization of the scientific knowledge for innovation and commercialization of technologies that contributes to the knowledge economy, job creation and welfare of the common citizenry. Availability of appropriate data sets should be at the centre. He emphasized on the need to create a digital data stack on disasters as it has very grave impacts on the life of people and economy as a whole. With this he concluded the session.

Special Panel Discussion Session 103: Path Breaking Research Needs

Day-1: 25th August 2020, 4:25- 6:20PM

Session Chairperson

- Prof. Shailesh Nayak, Director NIAS, Bangalore
- Prof. K. B. Pandeya, Former Chairman, UP Public Service Commission (Co-Chairperson)

Distinguished Panelists

- Prof. Kalachand Sain, Director, Wadia Institute of Himalayan Geology
- Dr. Leena Srivastava, Deputy Director General for Science, IIASA, Austria
- Dr. Kenneth MacClune, Senior Advisor – ISET-International, USA
- Dr. Katja Lasch, Director, DAAD, RO and Director, DWIH New Delhi

Conference Convener

- Prof. Anil K Gupta, Project Director- CAP-RES & Head, ECDRM Division, NIDM

Facilitators

- Mr. Shashikant Chopde, ISET-International, USA
- Mr. Kirtiman Awasthi, GIZ Germany, India

Coordinator

- Dr. Sonal Bindal, Research Associate, CMP-WB CPCB, NIDM



Prof. Shailesh Nayak

Director, National Institute of Advanced Studies (NIAS), Bengaluru

Chairperson

Prof. Nayak had shared his views with us on climate change that is happening and we have been observing the increase in atmosphere temperature, ocean temperature, melting of glaciers, ice sheets, rising of sea level, increase in frequencies of various extreme winds. He also highlighted the impacts of climate change on the infrastructure, environmental assets, natural processes and human health. He stressed on the Indian ocean dipole and the Indian ocean dipole frequency is rising. The western side is getting warmer and bringing a lot of rain. He mentioned that

Prof. Nayak is a fellow of the Indian Academy of Sciences, the National Academy of Sciences, the International Society of Photogrammetric & Remote Sensing and Academician of the International Academy of Astronautics.

the shift pelagic fish is significantly seen. He emphasized upon the need of identifying different kind of issues (climatic services) to combat the impacts of climate change for a long term solution. He further emphasized that there is a concern about the fisheries, glaciers, and monsoon due to climate change. He also appreciated the efforts of NIDM in building capacity in the field of climate change with path breaking research needs.

Key Takeaways

- Cause of climate change and its impact on atmosphere and other subjects is disastrous in nature to both fauna and flora.
- Effect of climate change on aquatic life especially on pelagic fish is seen.
- There is a need for inter-disciplinary studies to identify the various climate change risk factors.
- There is a need for path breaking research for creating new opportunities enhancing disaster resilience and risk reduction.



Prof. K B Pandeya

Former Vice-Chancellor Mahatma Gandhi Chitrakoot Gramodaya Vishwavidyalaya Chitrakoot (M.P.), Former Chairman, UP Public Service Commission

Chairperson

Prof. Pandeya addressed on various disasters that India face every year and why is less research conducted on floods and drought. They are so significant for rural communities. He also spoke on path-breaking approach that what after research is conducted before doing research on that problem must be addressed. He stressed the problems faced by farmers because of climate change, who has no idea about the climate change and its impact. The real problem is because post research applicability is limited. He mentioned issues related to fog and its impact on local people. He also spoke that disasters

Prof. Pandeya is a fellow of the National Academy of Sciences and has been President of Indian Chemical Society. He was awarded INSA-Slovak Academy of Sciences exchange visitor ship to work at Slovak Technical University, Bratislava. His present research interest is natural and synthetic -glucosidase inhibitors with antihyperglycemic properties.

are due of climatic change and such projects must be promoted. He emphasized the need of outcome of research to share with the local people in order to mitigate disasters. There should be no gap between knowledge creators and knowledge consumers.

Key Takeaways

- Research on hazards is very important.
- No gap between knowledge creators and knowledge consumers.
- Outcome of data/research should be given to the local people.
- Projects should be made on different hazards because of climatic change.



Prof. Kalachand Sain

Director at Wadia Institute of Himalayan Geology, Dehradun

Distinguished Panelists

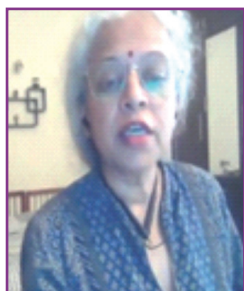
Prof. Sain talked about the Geo-hazards that India is facing because of location of Himalayas in its northern side. He stressed that natural events cannot be avoided, but it is possible to understand the causal factors to reduce the impact of disasters. He talked about the Himalayas aspect and stressed the link between the surface and sub surface process, and that link would provide lot of information in understanding the science that are related to hazards, mitigation etc. He stressed on impacts of climate change on glacier, cause of flash floods, landslides, which are very common in Himalayan region and anthropogenic factors that can be mitigated in case of landslides. He emphasized on hazard related issues and S&T has

Prof. Sain is the Vice-President of Indian Geophysical Union; Congress Director of Federation of Indian geosciences Association; Member of Indian National Gas Hydrates Program (2000 onward); Alternate Delegate of AAPG House of Delegates (2015-2017), He has served as a Guest Editor in 3 special issues on gas-hydrates in 'Marine & Petroleum Geology'

to be done in a meticulous way and need to identify some specific institute which can deliver specific disaster related issues. He said that in order to understand various hazards specifically regionally or hazard based zones need to be identified and institutions must be given responsibility specifically.

Key Takeaways

- Need to identify a particular institute that can provide specific disaster-related issues.
- It is important to recognize and assign organizations clear responsibility in order to understand different risks, specifically regional or hazard-based zone areas to help in hotspots development and risk reduction.



Dr. Leena Srivastava

Deputy Director General for Science of the International Institute for Applied Systems Analysis (IIASA)

Distinguished Panelists

Dr. Srivastava talked about the needs of research policy for growth and development in 2020. Policies should be accompanied by strategic approach to research. She stressed climate change and disasters issues are inter-connected with the rest of the economy and social systems. She talked about how the events climate changes are converted into climate impacts. Usually, 1st orders come from natural systems and 2nd order from the social system. She emphasized the need for scientific inputs and knowledge required to be better prepared for such disastrous events. She addressed key issues like trust in science for strengthening science in India and the use of science-based policy making and community response, trust

Dr. Srivastava has served as the Co-Chair of the Science Advisory Group for the UNSG's Global Climate Action Summit and is, currently, a Co-Chair on the Science Advisory Committee of Future Earth as well as a Member of the Asian Development Bank (ADB) President's Advisory Group on Climate and Sustainable Development, among others.

in science is going to be crucial. She talked about strengthening data system and to move the sphere

of open science. Empowerment of research that needs to be undertaken in India, prioritize funding and research interest of development., public and private sectors to come together and work as one. She emphasized need for systematic approach, to address key vulnerabilities, to take re-look on growth model and she spoke on move to service economy instead of ownership and consumption economy.

Key Takeaways

- It is important to bolster the data infrastructure and widen the field of open science.
- It is important to take a holistic approach, resolving key vulnerabilities, rethinking the growth paradigm, and transitioning to a service economy rather than a consumption economy.



Dr. Kenneth McCune

Senior Staff Scientist at ISET-International

Distinguished Panelists

Dr. McCune spoke on the challenges in terms of climate and DRR for S&T. He spoke on the history of climate issue and how was it started at global level. He emphasized on that there is real disconnect between mechanism and institution of climate change, need demand for climate adaptation. Dr. Kenneth focused on how to work with local stake holders to bring lot of symbolic power. He emphasized on local knowledge is better in form policy making process because true experts on the local condition live at the local level. Dr. Kenneth spoke on future challenges for climate and DR in S&T is in the intersection of climate change,

Dr. McCune has previously worked with the Institute for Arctic and Alpine Research (INSTAAR), and the National Oceanographic and Atmospheric Administration (NOAA) Ken served as ISET-International's Chief Executive Officer for four years.

disaster and public health. He emphasized on bridging the physical and social science, changing our mindsets particularly us. He talked about climate change is that it is transformation and it is providing framework for local condition at local level.

Key Takeaways

- For making policy, local knowledge is important, because true experts reside at the local level.
- Future climate change challenges will add risk in disaster and public health.
- It is important to bridge the gap between physical and social science, as well as changing our mindsets.



Dr. Katja Lasch

Director of the German Centre for Research and Innovation (DWIH) New Delhi and the DAAD Regional Office New Delhi

Distinguished Panelists

Dr. Lasch talked about that the climatic change is societal change and national cooperation is very important. She emphasized on the need of integrated approach in climatic change and climatic integration. This integrated approach has to take 4 levels; level 1 is about fundamental research that is triggering and addressing most significant gaps in knowledge about climate challenge through high quality research. And to prioritize our areas so funding is no sufficient it is never. She spoke about to develop practical competency for the application of climate knowledge and integrate the use of public into use of development. She emphasized on integrating the communities having outreach running workshops

Dr. Lasch has served as the Director of the DAAD Information Centre Bucharest. Currently she is heading the section for „International Research Marketing “within the DAAD headquarter. She is responsible for the location campaign. Research in Germany including the strategic development of the campaign and overseeing the activities in online communication, international events, publications as well as knowledge transfer.

with them, integrated approach and clusters of network. She spoke on the need of integrated approach addressing different levels necessary having strategies.

Key Takeaways

- Need to adapt climate awareness to benefit citizens while also integrating the use of the public.
- Need to link the community outreach programs and seminars with the targeted neighborhoods.
- An integrated approach is needed to involve citizen science.



Mr. Kirtiman Awasthi

Senior Policy Advisor at GIZ India

Facilitator

Mr. Awasthi had facilitated the session and stressed about the climatic science changes that are evolving and continue to evolve in order to understand the different system of its function and dynamics including the climate variable key change and how it is going to impact on different sectors and society at large and such information is essential element of event based up of planning and climate risk mitigation. He emphasized on climate risk management is a challenge because the research outputs in terms of temporal and spatial scale does not match the requirement of discussion makers which has to be locally need based adaptation planning of climate risk management. He spoke on that climatic science is expanding its approach, and the need to further

Mr. Awasthi is climate change & sustainability professional. He has worked with various State Governments on SAPCC, facilitated development & institutionalization of multi-level capacity building programme on adaptation planning & implementation at the State level & mobilized adaptation finance. He is an alumnus of Wageningen University, the Netherlands.

expand to make it consumer oriented and recognize other stake holders. The process from problem identification to solution employment.



Mr. Chopde has 28 years of experience in development sector, specifically in rural & urban development, & water management. He worked extensively on CCA, DRR and urban resilience. Programmes for 16 yrs. He has been nominated to IPCC-TGICA Expert Meeting on Decision-Centered Approaches to the use of Climate Information in 2015.

Mr. Shashikant Chopde

*Senior Research Associate-ISET-USA
Resilient Development Specialist (CC & DRR)*

Facilitator

Mr. Chopde had also facilitated the session with stresses on the discussions leading to the current gaps in S&T,R&D and the priority themes/ areas of S&T,R&D. He also highlighted the need to talk and work upon the key issues in strengthening strategies/ programmes/ plans of S&T R&D. The discussions also resulted in interaction among panelists about the challenges/ barriers to enhancing effective use of S&T, R&D through the path-breaking research needs. The types of partnerships needed foster development and use of S&T, R&D were also discussed.

Special Session

Day-2: 26th August 2020, 2:00 – 2:20 PM

Chief Guest

- Hon'ble Dr. Harsh Vardhan, Minister for S&T & Health & Family Welfare

Patrons

- Prof. Ashutosh Sharma, Secretary, DST, Govt. of India
- Shri GVV Sarma, Member Secretary, NDMA, Govt. of India

Special Presence

- Dr. Deepak B. Phatak, (Padmashree), Professor, IIT Bombay
- Prof. VK Sharma, Exec. Vice Chairmann, Sikkim SDMA & Sr. Professor, IIPA

Chairpersons

- Dr. Akhilesh Gupta, Advisor & Head – Strategic & Large Programmes (SPLICE), DST-Gol
- Maj. Gen. Manoj K Bindal, ED, NIDM

Conference Convener

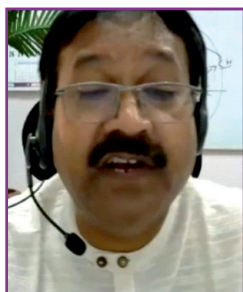
- Prof. Anil K Gupta, Project Director-CAP-RES & Head, ECDRM Division, NIDM

Facilitators

- Shri Ashish K Panda, Consultant & Faculty Member, NIDM

Focal Point

- Dr. Anjali Barwal, Research Associate, NIDM



Prof. Anil K Gupta

Professor & Head, ECDRM Division, PI (CAP-RES), NIDM

Conference Convener

Prof. Gupta briefly gave the proceedings of the previous day's sessions. He then talked about the project CAP-RES-NIDM being the implementing institute- and how it is promoting towards the climate change policy initiatives of DST (Gol) under the NKMCC of NAPCC. Going forward, he gave an overview of all the sessions aligned for day two. He mentioned the session on the use of disruptive technology to transform the entire industry and world and highlighted the sessions taking up presentation of all the deliverables produced under the project CAP-RES. Further he mentioned about the kind of participation the conference is expecting and all of them being

Prof. Gupta has more than 25 years of experience in the field of disaster management, environment and climate resilience. He has been credited for preparation of National and Sectoral Disaster management Plans, Human Resource Capacity Development Plans, National Action Plan for Disaster Management.

from very reputed national and international organization of importance. He also mentioned about the two main outcomes of this conference; a policy document and knowledge compendium including all the knowledge products from the luminary speaker and dignitaries participating in the conference.



Major General Manoj Kumar Bindal

Executive Director, NIDM

Chairperson

Major General Bindal heartily welcomed the Hon'ble Minister of S&T Dr. Harsh Vardhan and highlighted the commitment of the Government towards the PM's 10 point agenda on DRR. He the welcomed Prof. Pathak, Prof. Sharma to the session and Dr. Akhilesh Gupta to the session. He further added that this pandemic has shown that we have to re-orient our thought process towards S&T with respect to DRR and climate resilience. Leveraging the S&T to enhance disaster management efforts is crucial to promote mainstreaming of DRR into landuse policy development by implementation in urban planning, land degradation and non-permanent housing and use of guidelines and follow-up tools informed by demographic and environmental changes. This clearly spells out the need of multiple S&T discipline on board with the framework of disaster risk management. India, which is very disaster prone, it needs to ensure that people have rapid access to information encouraging preventive measures and enabling quick

Major General Bindal has commanded Air Defense Regiment & Air Defense Brigade in Kashmir region during counter insurgency operations. He was a staff member of Mountain Brigade deployed in counter insurgency ops and in High Altitude area, an Armored Division deployed in the plains, a Desert Corps and in a Corps HQ in High Altitude Areas. He was the Deputy Director General in Directorate of Army Air Defense. He also served as the Provost Marshall in the United Nations Mission in Mozambique. He has been the Director, Centre for United Nations Peacekeeping (CUNPK) New Delhi.

response- protecting lives & livelihoods. So the use of technology may emerge in future as a key to sustainable and disaster resilience infrastructure system. Technology thus plays a very crucial role and coupled with satellite based geographical systems and other technological innovations can leverage the impacts to a great extent. Talking about the NAPCC he said that the mission under it taps on the technology advances and applications and the framework of multiple S&T which can be roped in for DRM.

Key Takeaways

- Need to re-orient our thought process towards S&T with respect to DRR and climate resilience.
- Crucial to promote mainstreaming of DRR into landuse policy development implementing urban planning, land degradation & non-permanent housing.
- Need for use of guidelines & follow-up tools informed by demographic & environmental changes.
- Need to ensure that people have rapid access to information encouraging preventive measures & enabling quick response- protecting lives & livelihoods.



Dr. Harsh Vardhan, Union Minister for Health & Family Welfare, Science & Technology and Earth Sciences (GoI), has a long & distinguished record of public service, leaving an indelible mark in all fields of activity undertaken. At the helm of the Ministry of Science & Technology, his focus has been to motivate the country's scientists to come up with new technologies, processes and products that can provide innovative solutions to people's problems.

Dr. Harsh Vardhan

Hon'ble Minister of Science & Technology, Health & Family Welfare and Earth Sciences

Chief Guest

Hon'ble Minister Dr. Harsh Vardhan gave his special address and highlighted the critical role of S&T in climate adaptive planning to help build disaster resilience and the importance of organized efforts from the professionals from S&T field, health professionals as well as disaster management experts. He also highlighted the significance of small behavioral changes which can ultimately help in combating disasters and inculcate environmental consciousness. Dr. Vardhan also congratulated NIDM and DST for their collaborative efforts for taking up the initiative and creating a platform for knowledge sharing among experts from various fields.

Key Takeaways

- Importance of S&T role in climate adaptive planning to help build disaster resilience.
- Significance of small behavioral changes which can ultimately help in combating disasters and inculcate environmental consciousness.
- More organized efforts needed from the experts & professionals from S&T, health and disaster management sector.
- Need of proper strategies to save people from the disasters and to build resilience towards disasters and educating people about the types and nature of the disasters.



Dr. Deepak B Phatak (Padmashree)

Professor, IIT Bombay

Special Presence

Padmashree, Dr. Phatak, spoke about the paradigm shift needed in disaster management in the country with focus on preparation and mitigation rather than response and relief. He also emphasized on the need for innovation in the area of information technology at the time of any disaster.

Dr. Pathak obtained his Bachelor's degree in Electrical Engineering from SGSITS Indore in 1969, & his M Tech and Ph D from IIT Bombay. He has been serving with IIT Bombay since 1971. He has been a consultant & adviser to many organizations on various issues related to Information Technology. On 26th January 2013, he was conferred the Padma Shri award by the Government of India, for his services in Science and Technology. He has been recently honoured by IIT, Powai with 'Jeevan Gaurav' Award.

Key Takeaways

- In all the disasters, the movement of information quickly from the place an action is required to the place the action has taken is very important.
- Concrete action from the experts is required during the current and future disasters.



Prof. V K Sharma

Executive Vice chairman of Sikkim SDMA

Special Presence

Prof. Sharma emphasized on the fact that synergy is needed on multiple levels to meet the ever increasing disaster management need, even convergence of various aspects of science and technology innovations is very important. He also explained how economic loss is increasing considerably every year w.r.t. the disasters.

Prof. Sharma is a senior professor, Disaster Management/Consultant at Indian Institute Of Public Administration; Vice Chairman, Sikkim SDMA, Govt. of Sikkim. He is member of UN ISDR Asia Science, Technology and Academia Advisory Group (2015-2020). He is currently engaged in few research projects on Capacity Building in Climate Change Adaptation and Conservation of Biodiversity sponsored by DST, UNDP & MoEF&CC. He has published more than 50 research papers and 12 books in area of disaster management.

Key Takeaways

- Use of S & T for forecasting early warning in other aspect of disaster management.
- New innovations are required in S&T for DRR.
- Synergy is needed on multiple levels to meet the increasing disaster management.



Shri Ashish Panda

Consultant & Faculty Member, NIDM

Session Facilitator

Shri Panda is Faculty, ECDRM Division, at National Institute of Disaster Management, New Delhi. He is a central secretariat service officer. An MBA in disaster management, he is pursuing PhD in climate change field. He has more than 6 years working experience in the disaster management division of MHA. He joined NIDM as faculty member in September 2019 and Looking after the forestry, biodiversity and animal inclusive disaster risk reduction section of ECDRM division of NIDM presently.

Special Panel Discussion Session 104: Role of Industry & Private Sector

Day-2: 26th August 2020, 2:30- 3:30 PM

Session Chairperson

- Shri Nirankar Saxena, Deputy Secretary General, FICCI

Distinguished Panelists

- Prof. U. S. Dixit, Mechanical & Industrial Engg, IIT Guwahati
- Prof. Manju Mohan, Head, Centre for Atmospheric Sciences, IIT Delhi
- Mr. N. Raghu Babu, Project Director, GIZ Germany, India
- Dr. Naren Aggarwal, Editorial Director (Medicine, Biomedical and Life Sciences), Springer India

Conference Convener

- Prof. Anil K Gupta, Project Director-CAP-RES & Head, ECDRM Division, NIDM

Facilitator

- Prof. Suresh Jain, Dean, IIT Tirupati
- Ms. Aakanksha Tyagi, Editor, Springer Nature
- Mr. Sanjeev Kumar, Deputy Director, FICCI

Coordinator

- Shweta Bhardwaj, Research Fellow, CAP-RES, NIDM



Shri Nirankar Saxena

Deputy Secretary General, FICCI

Chairperson

Mr. Saxena talked about science and technology being a prosperity paradox and can be solution to national developmental challenges including poverty and can help in the vertical growth of any country. Investment in S&T in India at present, which is 0.6- 0.7 of the GDP (in last two decades) is a worry but also provide an immense opportunity. Government is exploring ways to mainstream FDI into S&T and looking into ways to create private sector – led initiative on this. Bringing partnership between government institutions like NIDM, NDMA and DST with private sector can bring excellent results which not only benefit that country but would also set out examples for the world on Public Private Partnership. Government initiatives with opportunities for private sector to partner can help in achieving disaster resilient India, they must work in mission-mode manner where we can have missions on various disasters. Harness of S&T at

Mr. Saxena heads the BISNET, ATA & UN TIR Carnet, Innovation, Science & Technology Commercialization, UN Arise DRR & Disaster Management, IT & Telecom at FICCI & manages multiple project portfolios. His key responsibilities include networking with leading senior Government officials, industrialists' & the diplomatic corps in India as well as the visiting foreign dignitaries. He has been elected Board Member of UNISDR Private Sector Alliance for Disaster Resilient Societies (ARISE).

present is facing challenges pertaining to funding/ grant. Providing best possible funding support under private public partnership is critical for harnessing the full potential of institutions/ organizations working in the domain.

Key Takeaways

- Bringing in public private partnerships for harnessing the full potential of S&T.
- Addressing the financial challenges pertaining to S&T in the country.
- Harnessing the potential of ancient technology.



Dr. Uday Shanker Dixit

Professor, IIT- Guwahati

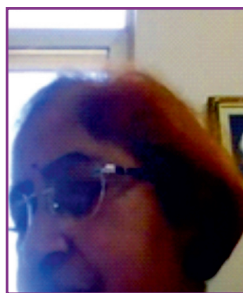
Distinguished Panelists

Dr. Dixit more proactive role is needed from the part of industries, it must move forward from merely providing financing support and must also invest into providing technical support to any initiative that they align with. There is need for participation from the industries. And for this government must also take up initiatives for providing enabling environment for industries which can include tax leverage, incentives, ranking, certification etc. sponsoring and monitoring projects is what is needed from the industries for active participation of industries in leveraging science and technology in the country.

Dr. Dixit received B.E. degree in Mechanical Engineering from erstwhile University of Roorkee (now Indian Institute of Technology Roorkee) in 1987, M.Tech. degree in Mechanical Engineering from Indian Institute of Technology Kanpur in 1993, and Ph.D. in Mechanical Engineering from IIT Kanpur in 1998. Presently, he is active in carrying out collaborative work with industry. His research area includes sustainable engineering and he has published several articles in this area.

Key Takeaways

- Role of private sectors must evolve beyond financial assistance.
- Need to create enabling environment for the industries to foster their active participation in research and development in partnership with public institutions.



Prof. Manju Mohan

Head, Centre for Atmospheric Sciences, IIT-Delhi

Distinguished Panelists

Prof. Mohan mentioned that India has done a wonderful job when it comes to managing disasters particular cyclones through its effective early warning systems; But now extreme weather events are a great problem for the country and these events are exacerbated due to climate change and the global warming. She talked about how academia can help and move forward resolve these issues particularly if we talk through technological perspective (early warning issues). She emphasized that It's a challenging task to do but lot of improvement is possible through industrial and government partnerships. Both them can come together to help meeting up challenges faced by academia in providing solutions for disaster risk management and extreme weather event. She stressed upon that fact there is a need for government and private sectors to support academia and the support that academia expect from government and private partnership is an enabling environment for

Prof. Mohan specializes in Atmospheric Boundary Layer Modeling, Atmospheric Dispersion and Air Quality Assessment, Urban Climate and Science of Extreme Weather & Risk Assessment from Hazardous substances with 40 years of research experience. She is an expert Member of Project Management Committee of ISRO-GBP; Indian National Committee on Climate Change, Ministry of Water Resources; DST Subject Expert Committee on Earth & Atmospheric Sciences (WoS-A) etc and various other committees. She is Fellow, NESI and IEE (India).

academic community to do research with constant support. She mentioned that foremost, Identification of problem and challenges is important after which research work for solution finding and capacity building must be done in continuous mode not just on short term project-mode. She mentioned that there is need for new policies from government and academia where there are fewer constraints on funding and which promotes long-term research capacity.

Key Takeaways

- Growing uncertainties with climatic changes create new challenges for disaster management in the country.
- Short-term project-mode is not suitable for finding solutions of such critical problems.



Mr. N. Raghu Babu

Project Director, GIZ Germany, India

Distinguished Panelists

Mr. Babu while emphasizing on the fact that losses incurred from disasters are huge, stressed upon the ministers' statement that we need to bring radical change in the way we look at disaster risk approach the results of this conference must result in bringing the desired actions. He thrust upon four major areas critically important for Disaster Risk Reduction for industries viz. development and management of DRM infrastructures and services in industrial areas; training and skill development on DRR; web-based information and decision support systems and land-use planning and management of areas around disaster prone industrial cluster. He discussed the case example of Germany where disaster management infrastructure in industrial zones managed by the private sector. The two key strategies that have been adopted in Germany includes: Common disaster management infrastructure/facilities accessible to the entire

Mr. Babu has extensive experience in the areas of International Cooperation, Sustainable Development, Land Use Planning, Urban-Industrial Environmental Management, Capacity Development and Management of Large Programmes/Quality Management. He is currently involved in Indo German Bilateral Development Cooperation in the field of Sustainable Urban and Industrial Development. He is a recipient of Vishisht Vaigyanik Award from the Ministry of Environment & Forests, Government of India.

industrial area, and the skill development and training of personals offered and undertaken by private sector to align the demand for disaster management personals. Also he mentioned that in all these areas there lie huge opportunities for private sector and the government for dealing with disaster management and building community resilience by creating infrastructure, services, investment and employment.

Key Takeaways

- Need to bring radical change in the way we look at disaster risk.
- There lies huge opportunities for public private partnership across critical areas related to industrial safety.



Dr. Naren Aggarwal

Editorial Director (Medicine, Biomedical and Life Sciences), Springer India

Distinguished Panelists

Dr. Aggarwal emphasizes on convergence between technologies and disaster management. He talked about access to such platforms of inviting experts from different sectors- private and public both allow best people to pull in their efforts to bring out the best possible outcome. He mentioned that Publishing houses is contributing to efforts towards this discourse by helping to disseminate information to global readers. He talked about how publishing houses provide tools and technologies; help in collecting the information; and get the information reviewed before it is disseminated to end user. He talked about use these technologies, tools and interfaces that are being created for readers such as scientists, disaster

Dr. Aggarwal is currently responsible for developing titles in Medicine, biomedicine and life sciences. He has been with Springer Nature group since 2011 and has been in the publishing industry for the past two decades. His key areas of responsibilities are to mentor editorial teams in Asia, build partnerships with academic entities and engage with experts in the academia to track the developments in their respective fields.

managers etc., we are able to provide platform and the content for them to access crucial information to work in the field.

Key Takeaways

- Discussion platforms involving multi-stakeholder and experts are critically important for bringing out best possible solutions to any problem.
- Publishing houses have a critical role to play in dissemination of crucial information on the subject matter.



Mr. Rubaab Sood

Additional Director, FICCI

Distinguished Panelists

Mr. Sood while concluding the session highlighted that the discussions has explicitly emphasized upon the fact that industries have always been interested and excited to collaborate with academia and government on various aspects of economy and social development. He highlighted that in past 5-6 years disaster management has really come to forward as a part of public private partnership. He mentioned as discussed by various panelist having a well defined and precise problem statements is very important to get and source solutions for those problems and that's the defining stage for any innovation challenge. He also stressed upon that these innovations and their research and development not necessarily needs to be state funded, the R&D in area of S&T can be taken up by private sectors.

Mr. Sood holds over 17 years of demonstrated experience of public policy & strategic planning in the area of Disaster Risk Reduction (DRR) & promoting & advocating innovations and technologies for safe, environment-friendly & climate-resilient industrial infrastructure. With deep-rooted contacts both nationally & globally in the field of Entrepreneurship Development & Innovation, combined with time-tested collaborative & negotiation skills.

Key Takeaways

- Well defined problem statement is critical to source solutions.
- Private sector can help in filling funding deficit of S&T research and development in the country.



Ms. Aakanksha Tyagi

Editor, Springer Nature

Session Facilitator

Ms. Tyagi is commission editor with Springer Nature India Pvt. Ltd. She joined Springer in October 2014. She has been responsible for acquiring and developing books in life sciences and environmental sciences from authors and institutes in Asia. She works closely with book authors to develop and refine manuscripts which have long-lasting impact in the scientific and publishing community. She especially welcomes book ideas that brings out latest trends and enhances audiences' academic experience.



Prof. Suresh Jain

Dean, IIT Tirupati

Session Facilitator

Dr. Jain had received his Ph.D. degree in air quality modeling from Civil Engineering Department, IIT Delhi and M.Tech in Environmental Engineering and Management from IIT Kanpur, India. Prof. Jain has more than 16 years' research, teaching and consultancy experience in the area of Environmental Science and Engineering. Prof. Jain is Nodal officer for Andhra Pradesh to work on National Clean Air Programme (NCAP) at the state level, nominated by the MoEF&CC, Govt. of India.



Mr. Sanjeev Kumar

Deputy Director, FICCI

Session Facilitator

A career spanning over 16 years with nearly 8 years with FICCI, Mr. Kumar worked on launching, heading and managing various international projects with government of India & other private partners. In his current assignments, he deals with Policy Advocacy & Government Affairs, dealing with various Ministries & Agencies at various levels. He has been involved in capacity building in Disaster Risk Management on industrial disaster management in the various regions of the country.

Special Panel Discussion Session 105: Role of Disruptive Technology

Day-2: 26th August 2020, 3:00- 4:00 PM

Session Chairperson

- Dr. Sanjeev Varshney, Adviser & Head - International Bilateral Cooperation, DST (GOI)
- Prof. Santosh Kumar, Head – Governance and Inclusive DRR Div. NIDM

Distinguished Panelists

- Dr. Shirish Ravan, Sr. Program Office, UNOOSA, Vienna
- Prof. Rajeev Jain, Pro Vice-chancellor, Puducherry University
- Prof. Payal Arora, Technology & Values, Erasmus University Rotterdam

Conference Convener

- Prof. Anil K Gupta, Project Director- CAP-RES & Head, ECDRM Division, NIDM

Facilitator

- Dr. Manish K Goyal, Associate Professor, IIT Indore
- Prof. P. K. Joshi, Chairperson, SCDR, JNU

Coordinator

- Dr. Sweta Baidya, Research Associate, CAP-RES, NIDM



Dr. Sanjeev Varshney

Adviser & Head - International Bilateral Cooperation, Department of Science & Technology, GOI

Session Chairperson

Dr. Varshney spoke about the Technological advancement and innovation that has created new opportunities by enhancing disaster resilience and risk reduction. He also mentioned that development in this disruptive technology such as Artificial intelligence, big data and innovation in robotics drone technology are transforming many fields including disaster risk reduction. He further explained that rapid spread supportive digital infrastructure devices such as wireless, broadband network smart phone, could computing has created foundation for application of disruptive technology. For Disaster Management he cited the recent example of cyclone Phailin of Orissa and said that it is an example of proper disaster management that has saved millions of life.

Dr. Varshney is Indian Co-Chair, Governing Body, Indo-German Science & Technology Centre, Member in Board of Directors, Global Innovation & Technology Alliance & he is member, Governing Councils: Indo-US Endowment Fund; International Advanced Research Centre of Powder Metallurgy; US India Education Foundation. He is Indian Sherpa for Carnegie Group of Science & Technology Ministers. He is Indian Focal Point for BRICS & Shanghai Cooperation Working Groups on S&T.

Key Takeaways

- Technological advancement & innovation can create new opportunities enhancing DRR & resilience.
- Development in this disruptive technology such as Artificial intelligence are transforming many fields including disaster risk reduction.
- Rapid spread of supportive digital infrastructure devices has created foundation for application of disruptive technology.



Prof. Santosh Kumar

Head – Governance & Inclusive DRR Division NIDM

Session Chairperson

Prof. Santosh Pointed out our dependence on disruptive technology by saying that if there is no disruptive technology we would not have any web based discussion. He expressed his concern regarding the vulnerability and impact of disaster as in Indian scenario one single disaster creates large amount of destruction and large number of people get affected. Giving the example of present situation he said that the Covid-19 has changed the whole scenario of vulnerability, risk assessment and way of working and disruptive technology is a kind of boon for this type of challenges. He explained the necessity to channelize disruptive technology for disaster risk reduction. He further mentioned that main source of disaster is having lesser impact than the follow up disaster which is known as cascading disaster. Like the flood is imposing lesser impact than the landslide followed by that. Thus, he called for better understanding of

Prof. Santosh has done his PhD in economics, Gender and Development, IDS Sussex, Disaster Management, Risk Control and Israel Defense Force, Israel, leadership programme from The World Bank Washington. He held the position of Director, SAARC Disaster Management Centre, former Executive Director, NIDM, Disaster Management Specialist, The World Bank, and Professor & Head Centre for Disaster Management. RIPA, Rajasthan and Deputy Director & Head Centre for Disaster Management, Academy of Administration Nainital.

disruptive technology. He highlighted the need to understand the environmental drivers and how this disruptive technology help in building the inter dependency of one technology to the other like combination of data mapping modeling and partnerships of the technology that could help. Adding to this he also mentioned that disruptive technology can help reduce the compounded risk of successive extreme events, which will help in establishing transparency, accountability and risk management and reduction. Incorporation of corporate and private organization may help in resolving the problems as they have better access to the disruptive technologies. Finally he explained the need for establishing resilience in context of SDG, CCA and Sendai framework and thus Disruptive Technology will help in people's welfare.

Key Takeaways

- In Indian scenario one single disaster creates large amount of destruction and large number of people get affected.
- Disruptive technology is a kind of boon for these challenges.
- Main source of disaster is having lesser impact than the follow up disaster which is known as cascading disaster.
- Disruptive technology can help reduce the compounded risk of successive extreme events.



Dr. Shirish Ravan

Sr. Program Office, UNOOSA, Vienna

Distinguished Panelists

Dr. Ravan has shared his experience that worldwide knowhow of the technology or expertise doesn't matter, but the science and technology research policy interface matters the most. According to him, policy and coordination are the top things those are hindrance for using technology in effectively implementing disaster management and in emergency response. He highlighted that Sendai framework for disaster risk reduction has strongly advocated about the evidence based information through the technology and earth observation technology gives the archives of the area, past information, current information and near future information could be procured and each and every data that are collected through the space technology earth observation is evidence based information.

Ravan works for the UN Office for Outer Space Affairs in Vienna, Austria. He coordinates activities of the United Nations Platform for Space-based Information for Disaster Management & Emergency Response (UN-SPIDER) in Asia & the Pacific. His previous assignments include leading the UN-SPIDER Beijing Office & Illicit Crop Monitoring Programme of the UN Office on Drugs & Crime in Afghanistan.

Citing the example of Nepal he mentioned that this framework is helping the developing countries to strategize their disaster risk reduction in right direction and every country has a right to strategize for disaster risk reduction as per the target E of Sendai framework by 2020. He further informed that the process United nations platform for space based disaster management and emergency response is going to all the countries and offering technical advisory services and missions to help incorporate those technologies in their work. To explain the importance of disruptive technology he said that, out of the 54 identified essential climate variables 30 relies on satellite based information. In his final comments he said that to assess and utilize the updated technology and satellite based data we need to have continuous capacity building and multi hazard technologies and integrated solution have to be used for disaster risk reduction.

Key Takeaways

- Policy & coordination are primary hindrance for using technology to implement DM& emergency response.
- SFDRR has strongly advocated about evidence based information through the technology.
- Sendai framework is helping the developing countries to strategize their DRR in right direction.
- UN platform for space based disaster management and emergency response has offered all countries technical advisory services and missions to help incorporate technologies in their work.



Prof. Rajeev Jain

Pro Vice-chancellor, Puducherry University

Distinguished Panelists

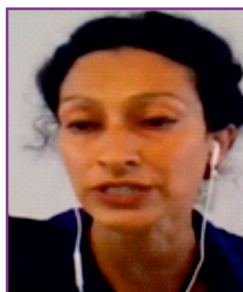
Prof. Jain explained the importance of disruptive technology by saying that disruptive innovations have proved to be a powerful way of thinking about innovation driven growth and Disruptive Technology supersedes and holds the process, product or habit. He further told that, Disruptive Technology is difficult but plays an important role in mitigating disasters and by using disruptive technology if some kind of censor could be invented, which can identify the environmental changes and changes in animal behaviour during the disaster would help in future planning. He also said that Block chain technology has enormous implication in this and could help in identifying the intermediate steps which might have

Prof. Jain worked as Professor of Chemistry, Director Institute of Engineering and Head of Environmental Chemistry at Jiwaji University, Gwalior. He also worked as Dean College Development Council, Dean Science Faculty and Head, Chemistry Department. At present he is working as Director at Pondicherry University

driven the disaster, especially in case of chemical disaster in industries. Finally he stated that, innovation of chemical censor can help more in this regard.

Key Takeaways

- Disruptive Technology supersedes and holds the process, product or habit.
- Disruptive Technology is difficult but plays an important role in mitigating disasters.
- By using disruptive technology if some kind of censor could be invented, which can identify the environmental changes and changes in animal behaviour during the disaster would help in future planning.



Prof. Payal Arora

Technology & Values, Erasmus University Rotterdam

Distinguished Panelists

Prof. Arora emphasized that, new technologies have a legacy of putting technologies of the centre, whereas, disruption along with disaster risk management is often absorbed by majority who are actually poor people. She further emphasized that, these poor people are at the front line in absorbing any kind of disaster risk and these risks multiply when proper access to data regarding the disaster and the problems faced by this people is absent. Therefore, she suggested rethinking about the background issues of disruptive technologies and naming it as "humane technology" to remind us that this technology is for human dimension. She further explained that today not only the technological novelty is needed but

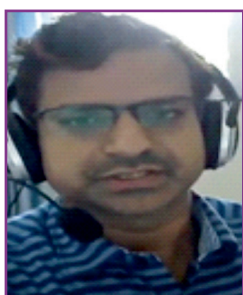
Prof. Arora is a Digital Anthropologist & Professor at Erasmus University Rotterdam, a TEDx speaker, and an award-winning Author of several books, including 'The Next Billion Users' with Harvard Press. Forbes named her the "next billion champion" and the right kind of person to reform tech. She is based in Amsterdam.

Institutional governance is also necessary, therefore institutional reform and innovation is also needed as novelty of innovation. She highlighted the importance of Nationalization of data to shift from data ownership to data governance, which will strengthen the global cumulative effort towards building

disaster resilience. She also mentioned that to implement AI technology successfully in disaster risk reduction we need quality data as we have data deficit of the population that we are trying to cater to. Thus she concluded saying that we need to create humane redressal system for speedy ways to receive information of the problems from the affected people.

Key Takeaways

- Disruption along with DRM is often absorbed by majority who are actually poor people.
- Rethinking background issues of disruptive technologies & naming it “humane technology” to remind us that this technology is for human dimension.
- Institutional reform and innovation is also needed as novelty of innovation.
- To implement AI technology successfully in disaster risk reduction we need quality data

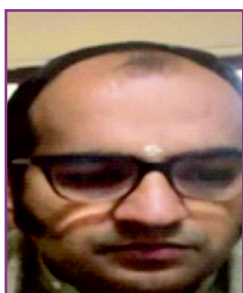


Dr. Manish K Goyal

Associate Professor, IIT Indore

Session Facilitator

Dr. Goyal is an Associate Professor in the Discipline of Civil Engineering, Indian Institute of Technology, Indore. His contribution fetched him Recipient of American Society of Civil Engineers (ASCE's) Environmental and Water Resources Institute (EWRI) Visiting International Fellowship (VIF) -2019, Prof R J Garde Research Award, India Society of Hydraulics, 2019, Recipient of American Society of Civil Engineers (ASCE)-Best Theoretical-Oriented Paper Award 2018, NVIDIA GPU Research Grant 2018, IEI Young Engineers Award in Civil Engineering Division, 2017-18, Indo-US WARI Fellowship Award (2016), DST –SERB Young Scientist-fast track grant (2015), Inspire Faculty award, 2014, Erasmus Mundus Interweave Award, Europe 2014, JSPS fellowship award, University of Tokyo, Japan (2013) and Canadian Commonwealth Scholarship Award.



Prof. P. K. Joshi

Chairperson, SCDR, JNU

Session Facilitator

Prof. Joshi is Professor in the School of Environmental Sciences and Chairperson, Special Centre for Disaster Research, Jawaharlal Nehru University (JNU), New Delhi. He is Director of Swachha JNU in the university. He is receipt of Indian Academy of Sciences (INSA) and National Academy of Sciences India (NASI) Young Scientist Medals, and National Remote Sensing Award of ISRS/ISRO. He is Fellow of Indian Academy of Environmental Sciences (FIAES), Fellow of Indian Geophysical Union (FIGU) and Fellow of National Academy of Agricultural Sciences (FNAAS). He was visiting faculty to University of Helsinki, Yale School of Forestry and Environmental Studies, University of Freiburg. Recently he was recognized as KTP Visiting Fellow of the University of Technology Sydney, Australia.

Special Panel Discussion Session 106: Climate Resilience & Disaster Safe Development

Day-2: 26th August 2020, 4:00-5:00 PM

Session Chairperson

- Dr. Neeraj Sinha, Advisor (S&T), NITI Aayog, GOI
- Prof. Harshad P. Thakur, Director, NIHF, Ministry of Health and Family Welfare

Distinguished Panelists

- Dr. Ashish Chaturvedi, Director, Climate Change, GIZ Germany, India office
- Dr. Simon Allen, Scientist, Institute for Environmental Sciences, University of Geneva
- Prof. Nirupama Agrawal, Emergency Management, York University Toronto

- Dr. Reinhard Mechler, Program Director – Risk & Resilience, IAASA, Austria
- Dr. Divya Sharma, Executive Director, The Climate Group

Conference Convener

- Prof. Anil K Gupta, Project Director-CAP-RES & Head, ECDRM Division, NIDM

Facilitator

- Prof. Sunil Nautiyal, Head Ecological Economics, ISEC Bangalore

Coordinator

- Dr Sanayanbi Hodam, Research Fellow, NADMP, NIDM



Dr. Neeraj Sinha

Advisor (S&T), NITI Aayog, GOI

Session Chairperson

Dr. Sinha spoke on National Action Plan on Climate change which identified 8 National Missions like National Solar Mission being implemented by Ministry of Renewable Energy, National Enhanced Energy Efficiency under the Ministry of Powers, National Mission on Sustainable Habitat, National Water Mission, National Mission for Sustaining the Himalayan Ecosystem led by the Department of Science and Technology and the PSA office had done a report on the receding of Himalayan Glacier, National Mission of Green India done by MoEFCC, National Mission for Sustainable Agriculture done by MoAFW and National Mission on Strategic Knowledge on Climate Change done by DST. He mentioned that a lot of good work has been done on the subject in

Dr. Sinha recently joined, on deputation, the NITI Aayog as Adviser (S&T) from the Office of the Principal Scientific Advisor to the GOI. He is a Fellow of the Institution of Engineers (India) and a Life Member of the Administrative Staff College of India, Hyderabad. He was awarded the medal of the Materials Research Society of India in Feb, 2018.

the past 12 years. He emphasized on the ninth mission which was informally added to this mission which is known as National Mission on Clean Coal Carbon Technologies-focuses on thermal power generation using available coal. Dr. Neeraj said that all the mentioned missions are focusing on

disaster safe development and climate resilience as well. He also mentioned that, in Niti Aayog there is a different vertical that's handling environmental related issues known as Natural Resources and Environmental Vertical.

Key Takeaways

- Importance of the National Missions namely National Solar Mission , National Enhanced Energy Efficiency, National Mission on Sustainable Habitat, National Water Mission, National Mission for Sustaining the Himalayan Ecosystem, , National Mission of Green India, National Mission for Sustainable Agriculture, National Mission on Strategic Knowledge on Climate Change and National Mission on Clean Coal Carbon Technologies.
- Importance of learning from the past for example lessons learnt from the Tsunami of 2004 disaster has made us learn on how to develop plans, how to develop procedures for predicting tsunamis so accurately.
- Importance to understand the science of what is going on in all the adaptation, mitigation and resilience strategies that we have.



Dr. Harshad P Thakur

Director, National Institute of Health and Family Welfare, Ministry of Health and Family Welfare

Session Chairperson

Dr. Thakur spoke on the present COVID-19 pandemic mentioning about its positive impact on environment and its negative impact like unemployment, migration, etc. He said that it is important to focus on for seeing the manmade and environmental disasters and be prepared for it. He emphasized further on corona pandemic, that it can come from anywhere. He emphasized upon the need of sustainable development and the need to see environment and health which are multidisciplinary subject. Dr. Harshad spoke on the science and innovations that is going on and that the focus of the session should be on how all these innovations and technologies could

Dr. Thakur has completed his MBBS and MD from Seth GS Medical College and KEM Hospital, Mumbai and completed Diploma in Business Management (DBM) from Wellinkar Institute, Mumbai University. He also served as Professor at Tata Institute of Social Sciences for about 19 years and in PSM Department at KEM hospital for almost 7 years.

be taken on ground level. He mentioned that it should be at policy level, programme level, proper implementation and then it should be checked whether they are properly monitored and If they can be further improved upon.

Key Takeaways

- Need of sustainable development and the need to see environment and health because both are multidisciplinary subject.
- Focus should be on how all the innovations and technologies could be taken on ground level.



Dr. Ashish Chaturvedi

Director, Climate Change, GIZ Germany, India office

Distinguished Panelists

Dr. Chaturvedi firstly spoke on the joint initiatives of GIZ with NIDM & mainly about the synergies between the DRR and climate change adaptation agenda for over a decade. He emphasized upon a large part of the discussion on bringing these different agendas together like the DRR agenda, Sendai Framework, Paris Climate Agreement, etc which is about institutional innovations. He spoke on Climate Risk Management Framework which is something that GIZ is introducing jointly with NIDM, University of Geneva and IAASA. He emphasized on this framework mentioning that it was developed to act as an interface between science and policy providing guidance in decision making as well as developed strategic adaptation. He highlighted 4 key recommendations which emerged from this entire process: i) the need to develop a

Dr. Chaturvedi specializes in climate change mitigation and adaptation, waste management, sustainable consumption and production, and environmental policy. His current focus is on policy and knowledge management aspects of climate change. A PhD in Economics from the University of California, Ashish's PhD thesis explored the role of influence activities on democratic policy making processes.

robust understanding of climate and disaster risk which is based on both forward and backward looking risk assessment, ii) the need to incorporate local knowledge and expertise combined with scientific data to develop disaster risk development, iii) the need of dealing with residual risk which is fairly a strong pillar of negotiation in Paris Climate Agreement which is also called as the debate of Loss and Damage and iv) the need of knowledge on how to deal with recoveries from disasters and to address green concerns which necessarily is not limited to only climate adaptation or DRR but also to a greener economy. He emphasized on green recovery package and the need to have a systematic overview of what are the possibilities of green recovery from a disaster. he mentioned that the recovery from a disaster is an opportunity for build back better to also look at the interlinkages between climate adaptation disaster risk reduction and mainstreaming climate risk into the overall developmental and planning recovery.

Key Takeaways

- The need of knowledge on how to deal with recoveries from disasters and to address green concerns which is not necessarily not limited to only climate adaptation or DRR but also to a greener economy.
- The need to incorporate local knowledge and expertise combined with scientific data to develop disaster risk development
- The need to develop a robust understanding of climate and disaster risk which is based on both forward and backward looking risk assessment
- The need of dealing with residual risk which is fairly a strong pillar of negotiation in Paris Climate Agreement which is also called as the debate of Loss and Damage.



Dr. Simon Allen

Scientist at Institute for Environmental Sciences, University of Geneva

Distinguished Panelists

Dr. Allen focused on the importance of considering those natural hazards which are potentially impacting but low likelihood that can happen in the future during risk assessment as a basis of planning. He mentioned that the methodology that they have been using in their recent study were not very good at considering those type of natural hazards and with a lot of uncertainties, there has been a lot of challenges on how to communicate with those uncertainties. He emphasized on why it is important in Himalayan context to think of these surprises in future and said that it's because we know the glaciers have heavily melted he said that we have gone to point where a

Dr. Allen's research focuses on climate impacts and disaster risk in the Indian Himalayan Region. He is currently supporting NDMA in the development of National Guidelines for the Management of Glacial Hazards and Risks. At the international level, he has been engaged in various roles with IPCC since 2009

past is no longer a key to the future and so the tradition of looking to the past to use that as a basis to future doesn't make sense. He further said that in the glacier context particularly, may no longer be valid citing an example of glacier lake outburst flood. He stated that they have started risk assessment of glacial lake outburst flood considering not only the glacial lake that we are seeing now but also using modeling and considering a way of future lake which may form in the future and that there is a lot of uncertainties around if those lakes are actually going to form. He also spoke on the time scales highlighting that we should also be considering large spatial scales in the assessment and ensuring that the information fits into planning. Another point that he touched on was the importance of using local knowledge. Northern India is a part of the assessment because of the best knowledge of the impact which they have been experiencing & also as a part of the solution. So when we are coming out with response strategies, what we saw as an example In the case of moving away from the Himalayas to the coastal areas of Tamil Nadu, was victims of tropical cyclones and droughts. Some of the response strategies that were proving useful were things that the local people has learned from their grandparents and great grandparents, etc. So using traditional farming practices is a way of coping better with impacts of climate change, he added

Key Takeaways

- Importance of considering those natural hazards which are potentially impacting but low likelihood that can happen in the future during risk assessment as a basis of planning.
- Local Knowledge to be integrated while developing DRR framework.
- Risk assessment of glacial lake outburst flood should be encouraged.



Dr. Nirupama Agrawal

Professor of Disaster & Emergency Management, York University, Canada

Distinguished Panelists

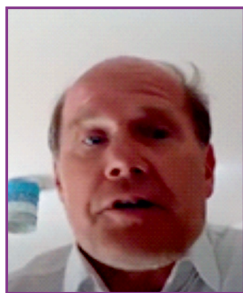
Dr. Agarwal highlighted that when every disasters occur and people talk about sociology, psychology, a lot of logistics, her focus stays mainly on the science behind what is going on, understanding of the science which enhances the overall preparation, mitigation and prevention method. Dr. Nirupama mentioned that risk is a function of livelihood and consequences and consequences can be broken down into exposure, susceptibility and the lack of coping capacity and we can address each of those components to minimize the risk caused by climate change. When we talk about climate risk we must understand about climate variability so that the goal is to minimize the factor that contributes to the vulnerability of people and physical infrastructures. She emphasized on milankovitch cycle that explains long term climate variability based on

Dr. Agarwal was a faculty member with the Applied Disaster & Emergency Studies program at Brandon University. Her broad research interests include natural hazards, disaster risk and vulnerability assessment and management, multi-criteria decision making using fuzzy concept, flood damage analysis including socio-economic impacts, GIS and remote sensing techniques, business continuity planning, and natural disasters in Canada.

earth's rotation around the sun, its tilt and the path. Secondly, she stressed on the perception on how people comply with policies and regulations and that if we do not trust on the decisions made by the authorities, they will not support the mitigation measures or they will not follow them. She mentioned that if people are not actually supporting or not on the right side of the effort then it's not going to work. Thirdly, she talked about coronavirus stating that it will be helpful to tell the public the science behind the virus and how it works and the mechanism of its spreading to avoid misinformation floating around in social media. She suggested that this will minimize the risk. Lastly, she talked about the impacts of coronavirus on the essential workers who doesn't have running water to practice handwash everytime, who doesn't have the means to get their hand sanitized and stated that these people are losing their physical susceptibility and if they lost their jobs, their mental health is also being disturbed.

Key Takeaways

- Importance of understanding the science that enhances the overall preparation, mitigation and prevention.
- Understanding about climate variability so the goal is to minimize the factor that contributes to the vulnerability of people and physical infrastructures.
- Understanding milankovitch cycle that explains long term climate variabilities based on earth's rotation around the sun, its tilt and the path.



Dr. Reinhard Mechler

*Acting Program Director, Risk and Resilience,
International Institute for Applied Systems Analysis*

Distinguished Panelists

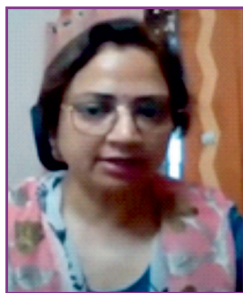
Dr. Mechler talked about comprehensively understanding and managing climate related risk. He stated that comprehensive in that context means to think about slow onset and sudden onset jointly looks like It also means to tackle the multiple climate related as well as socio-economic drivers. He mentioned that climate change impacts are not only driven by climate change but also by exposure and vulnerability and that we should look on how it be taken care of. With the perspective of development centric interventions, it's important to look more into the livelihood of people around. He stated that the most increasing take about the current crisis that we are facing now is about compound risk which means that climate change and also the other risk types also

Dr. Mechler has over 20 years of experience analyzing and addressing socio-economic aspects of disaster and climate change risks. He acted as a lead author on the IPCC's special report on managing the risks of extreme events and disasters to advance climate change adaptation, the 5th assessment report and the report on 1.5°C global warming, and is currently a lead author on the IPCC's 6th assessment report.

needs to be look at strategically. He talked about the research work on 6 steps of comprehensive risk management approach which is the guidance that his Institute is currently working with Indian partners. He mentioned that their work is basically on finding out the key issues, assembling the mathematical tools and experts that can take the approach forward, identifying the risk quantitatively and also qualitatively which is important to understand the perceptions of people and also stakeholders. He stated that they are working on identifying the feasible option ranging from incremental approaches and most importantly on transformational approaches which means switching livelihood like shifting from farming to other branches of the economy or even voluntary migration is also something is a key topic in most of the discussions. He emphasized on the lessons learnt from these research with India mentioning that in India, unfortunately weather and climatic risk have been increasing dramatically over the last few decades. The joint efforts to manage climate risk and also for climate risk adaptation may not be enough. He further said that it's not enough to manage the monotonous risk of climate change. He added that in Tamil Nadu, they identified in the context of cyclone and flood risk, and that received an increasing impacts esp. from small holder farmers in coastal areas of Tamil Nadu. He concluded mentioning that increase in climate related risk also calls for further deliberations to implement more and more transformational actions.

Key Takeaways

- Importance of comprehensively understanding and managing climate related risk.
- Perspectives of development centric interventions, should also look into local livelihoods.
- Farmers moving from incremental approaches to salt tolerant seeds and sea dykes to protect from salinization and impacts on paddy.
- Increase in climate related risk also calls for further deliberations to implement more and more transformational actions.



Dr. Divya Sharma

Executive Director, Climate Group's India office

Distinguished Panelists

Dr. Sharma highlighted about disaster management and that few years back it was considered to be response oriented arena and it gradually shifted in India particularly, towards planning for disaster. She suggested that there is a need to link this early warning system with our planning system. She emphasized on the need to increase resilience now mentioning an example of her own work that they have started looking for a transformative impact of resilience action. She added that a lot of cities are already thinking around what transformation can happen through our activities that are per say in the resilience arena. She stated the more efficient are we in the use of finite resources, the more resilient we become to climate change. She also highlighted that as we grow on in improving our efforts to be more and more resilient and disaster safe, we have

Dr. Sharma is a thought leader, researcher, academician, having experience of 20 years' operating throughout India & internationally within sustainable urban development & climate resilience space. She comes with a PhD in urban climate resilience & Master's in urban development planning. She has been on some prestigious advisory positions on international & national networks for sustainable development & climate change international & national level.

to parallelly build systems that help us work, for example nature based solutions and be efficient in resource use and working towards carbon dioxide use reduction. She highlighted about the flagship campaigns of ty closely with businesses, Energy Production 100 (EP100) which they are working, large businesses and industries to reduce the energy use EB 100 where they work with Government.

Key Takeaways

- Integration of early warning and forecasting in planning system
- Importance of flagship campaigns like Energy Production 100.
- Need to increase resilience and transformative impact of resilience action as well.



Prof. Sunil Nautiyal

Head Ecological Economics, ISEC Bangalore

Session Facilitator

Dr. Nautiyal (AvHF, JSPSF, ZF, FNIE) is working as a Professor at the Centre for Ecological Economics and Natural Resources, Institute for Social and Economic Change, Bangalore. He works to develop an integrated interdisciplinary approach for sustainable landscape development. This includes an operational framework to integrate approaches from ecological & social sciences to assess the impact of policy & behavioural changes linked with natural resource conservation & management & livelihoods of communities in various agro-ecological regions of India. He is a recipient for several national/international prestigious fellowships/awards. He is working in close coordination with the scientists in India, Germany, UK, Australia, Japan, Bangladesh.

Special Panel Discussion Session 107: Green Growth & Sustainability Strategies

Day-3: 27th August 2020, 4:00-5:00 PM

Session Chairperson

- Dr. Akhilesh Gupta, Advisor & Head – SPLICE, DST-GOI
- Dr. Atul Bagai, Country Head – UNEP India Office
- Prof. V. K Sharma, VC, Sikkim SDMA & Sr. Prof. IIPA

Presentations

- Green Growth, Carbon Neutrality and Strategic Instruments – Research Case Studies, Knowledge Compendium, Policy Paper
- Resilient Agriculture – NADMP, Training Toolkit, District Handbook, Policy Paper
- Resilient Health – NHAP/Centre of Excellence on Climate Resilience,

Toolkit, Case studies compendium, Thematic Papers

- Crisis Management to Deal with Water Body Contamination – Research Review

Conference Convener

- Prof. Anil K Gupta, Project Director- CAP-RES & Head, ECDRM Division, NIDM

Facilitator

- Dr. Akhilesh Surjan, Associate Professor, Research & Theme Leader, Humanitarian, Emergency and Disaster Management Studies Program, Charles Darwin University, Australia

Green Growth, Carbon Neutrality and Strategic Instruments

Climate Adaptive Planning for Resilience and Sustainable Development in Multi-hazard Environment (CAP-RES) is envisaged under the National Knowledge Mission on Climate Change (NKMCC) and funded by Department of Science & Technology (DST), GoI. CAP-RES is an umbrella project which tries to establish a science-policy-implementation interface. and promotes value addition to programme sub-areas of the mission. CAP-RES aims at developing capacity building including knowledge and training support system for wider use by related institutions and training centers across sectors and regional context, i.e Indian Himalayan Region, Coastal region and Central-western region. The project CAP-RES focuses on five broad thematic areas which are significantly important for addressing the present and the future climate induced disaster risk. The CAP-RES focuses across five thematic areas which includes:

- Green Growth and DRR,
- Resilient Agriculture System,
- Public Health Resilient,
- Climate Proofing in Disaster Relief & Recovery
- Policy Instruments in DRR.

Resilient Agriculture – National Agriculture Disaster Management Plan

National Institute of Disaster Management (NIDM) has prepared National Agriculture Disaster Management Plan (NADMP) for the Ministry of Agriculture and Farmers' Welfare (MoAFW) in accordance with the National Policy on Disaster Management 2009. The basic purpose of NADMP is to guide all the divisions within the departments (DoACFW and DARE) of Ministry of Agriculture and Farmers' Welfare (MoAFW) to manage the risks of disasters before, during, and after disasters by developing a holistic, proactive, technological driven, and community based strategy through a culture of prevention, mitigation, preparedness and response. This NADMP is designed as a practical guidance document, a work agenda, and a roadmap to include key aspects of disaster risk reduction (DRR) into the sustainable development agenda of agriculture, especially for crop production, sustainable land management and post-harvest management within scopes and mandate of Ministry of Agriculture and Farmer's Welfare.

Resilient Health – National Health Adaptation Plan

National Institute of Disaster Management (NIDM) in collaboration with WHO India has implemented the project "Health Adaptation and Resilience: Advancing Strategic Knowledge and Capacities" (HER-CAP). This project has six deliverables, namely: (i) National Health Adaptation Plan (NHAP), (ii) Training manual, (iii) Two thematic papers, (iv) Compendium of case studies, (v) Directory of experts, institutions and other stakeholders and (vi) Report of the region specific workshops.

Crisis Management to Deal with Water Body Contamination

The Central Pollution Control Board (CPCB), Govt. of India, under the (SECRET) Crisis Management Plan Template (2019), provided by Cabinet secretariat, New Delhi, was been directed to prepare the Crisis Management Plan for Contamination of Water Bodies (CMP-WB) under the directions received from Ministry of Environment and Forest and Climate Change (MoEF&CC). NIDM is working as a nodal agency for providing technical support for the preparation of the plan by CECR-ECDRM division of NIDM under the guidance of Prof. Anil Kumar Gupta.

The project CMP-WB focuses on broad objectives which are significantly important for addressing the present and the future sudden contamination of water-bodies. The Crisis Management Plan for Dealing with Contamination of Water Bodies (CMP-WB) aims to provide a guide for all unexpected incidents of water contamination, preparedness, prevention and recovery. The plan would cover all phases of crisis management, preparedness, alerting, detection and assessment, protection and mitigation, response and situation management, rehabilitation and recovery, along with a capacity building plan and financial strategies.



Dr. Akhilesh Surjan

Associate Professor, Charls Darwin University, Australia

Session Facilitator

Dr. Surjan has successfully engaged with issues of disaster risk reduction, climate change adaptation and urban sustainability for over two decades. He served as - Lead Author for the Fifth Assessment Report of the IPCC and, Contributing Author for the UN's Global Assessment Report on DRR. His professional affiliations includes - UNDP and United Nations University, academic, civil society and government institutions in India, Japan and Australia.

Special Panel Discussion Session 108: Green Growth & Sustainability Strategies

Day-3: 27th August 2020, 2:00-3:15 PM

Session Chairperson

- Shri. Vivek Saxena, Country Representative, IUCN India
- Prof. Chandan Ghosh, Civil & Geo-tech Engineering, Dean, IIT Jammu (Co-Chair)

Distinguished Panelists

- Prof. Haripriya Gundimeda, Department of Humanities and Social Sciences, IIT Bombay
- Dr. Joerg Szarzynski, Co-Head of GLOMOS, UNU-EHS Bonn, Germany
- Dr. Shalini Dhyani, Senior Scientist CSIR NEERI / Regional Chair South-Asia CEM, IUCN
- Dr. Mrityika Basu, Assistant Professor, Graduate School of Global Environmental Studies, Kyoto University, Japan.

- Prof. P. C. Tiwari, Professor and Head of the Department of Geography, Kumaun University

Conference Convener

- Prof. Anil K Gupta, Project Director-CAP-RES & Head, ECDRM Division, NIDM

Facilitator

- Dr. Ritesh Kumar, Director, Wetland International India
- Dr. Rajarshi Dasgupta, IGES, Japan

Coordinator

- Ms. Richa Srivastava, Research Consultant, NADMP, NIDM



Shri Vivek Saxena

Country Representative, IUCN India

Session Chairperson

Shri Saxena spoke about the IUCN and its role in shaping the global conservation agenda, world conservation strategy, 2020 biodiversity conservation negotiation and SDGs. Recently IUCN launched the global standards on NBS. He told that IUCN brings out various knowledge products and one of the flagship products is red listing of the species and conservation action on that. Coming on the session theme, he said in last two decades the impact of natural disaster has been devastating and affected over 4 billion people with 1.3 trillion economic losses. He said, traditionally when we talk about the infra structure solutions we only talk about the grey and hard infrastructure solutions and engineering products to manage disasters. Now the focus is shifting to NBS for water resource management for DRR and CCA. Natural system has long provided menu to protect

Shri Saxena has over 26 years' experience in NRM, environmental issues, protected areas related policy & management issues, fund raising, Hindukush Himalayan Environment issues of Asian sub region of South Asia, multilateral conventions related to UNCCD, CBD, UNFCCC, CITES & CMS, implementation of externally aided EU & JICA projects, forestry research, agroforestry, community forestry, eco-tourism, HR management of IFS Officers, among others.

from natural hazards. He said, natural system also provides additional benefits like mangrove provides coastal protection it can also support fisheries and food security, timber non timber forest products and can act as a significant carbon sink. The key societal challenges when we talk of the NBS through sustainable management and restoration of the ecosystems, they will benefit both biodiversity and human well-being and it needs to be applied around the world. Many countries have adapted NBS based practices.

He talked about how climate change is responsible for natural disasters and economic losses. NBS can help communities to cope up and recover from the disasters. He explained how NBS can be cost effective and no regret solution. He emphasized that we need to invest in NBS which is under explored for DRR. NBS can minimize our vulnerability to our future events. Looking at present scenario, he said that present Covid situation is also related to disruption of the ecosystems services or our disconnect with the nature. It also provides opportunity to us to re look at the scenario. He said, the scope of the NBS is to have nature derived solutions which are inspired and nature based solutions. If we define simply, These are the action to protect sustainably managed and restored natural or modified ecosystems that addresses societal challenges i.e. climate change, food and water security from natural disaster effectively and adaptively. Simultaneously providing human well being and biodiversity benefits. Policy making initiative needs to be strengthened. He wished the deliberation during the session shall be very meaningful and helpful in shaping the future for CA Agenda and various governance actions.

Key Takeaways

- Focus of DM is shifting to NBS for water resource management for DRR and CCA.
- NBS through sustainable management & restoration of the ecosystems, will benefit both biodiversity & human well being.
- NBS can be cost effective & no regret solution.



Prof. Chandan Ghosh

Civil & Geo-tech Engineering, Dean, IIT Jammu

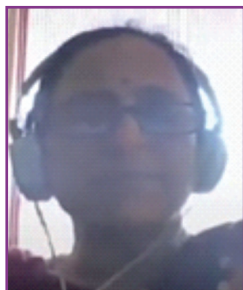
Session Chairperson

Dr. Ghosh talked about how green can help our economy than Science and Technology involved there. He gave short presentation on Landslides and Erosion Control by (Green) Bio-Eng measures. How the green can keep the balance in DRR. He said deep, extensive and penetrating vetiver root system can be helpful and act as bio-nails to the slope against erosion. Water contamination can also be addressed through phyto-remediation where plants can absorb the toxic content and clean the water. He said Road construction and widening is not sustainable in hills and causes more landslides and mitigation measures are costly whereas cut slope can be economically stabilized by vetiver grass. Dr. Ghosh said technology is not accessible in our country and we spent a lot on it. He gave many examples of sustainable practices in the country.

Dr. Ghosh's works is specialized in earthquake geo-technology, reinforced Earth, Seismic Micro-zonation, Ground improvement, Geo-synthetics & Bio-engineering measures for sustainable developments. He has devoted more than 30 years of his career in UG & PG teaching, research guidance, development of teaching tools & training module for engineers, architects, town planners. He has published more than 125 papers.

Key Takeaways

- Vetiver root system can be helpful and act as bio-nails to the slope against erosion.
- Water contamination can also be addressed through phyto-remediation where plants absorb toxic contents.



Prof. Haripriya Gundimeda

Department of Humanities & Social Sciences, IIT Bombay

Distinguished Panelists

Question asked to Prof. Gundimeda was "Do you think a closer collaboration between physical sciences and social sciences will be the basis of sustainability integration in DRR?"

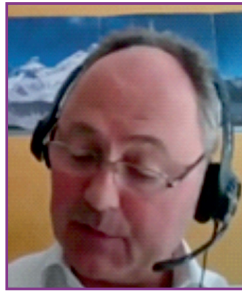
Prof. Gundimeda answered the question, she said we are focusing on Sendai Framework which focus on substantial reduction in DRR. Understanding Disaster Risk is top priority and disasters are not new to India, every year we face various kind of disasters and some of them are man made. She said some disasters are man made and occur due to stringent regulation and we don't put nature in fore-front while decision making. She gave example of Maharashtra

Prof. Gundimeda is a Professor in the Department of Humanities and Social Sciences, at the Indian Institute of Technology Bombay, India. She holds a masters degree in mathematics and a Ph.D. in Development Policy and has been a post-doctoral researcher at University of Gothenburg Sweden and London School of Economics.

and said if disasters are so occurring then it's our short sightness that we are not acting prompt. The transboundary issues are also important for government to understand the make strategy accordingly. She told that Bihar floods are routine affair but the state get only adhoc solutions mostly they focuses on engineering and technological solutions by making barrage, bridges, embankments etc. According to her the role of technology is weak and technological measures are taken without considering and understanding the ecology of that area. For example if they are disturbing the natural flow of the river, they disturb the ecology and chances of more flood increases in that area. She talked about the major civilizations flourished near the river banks as they provide fertile soil but today we have encroached these flood plains and disturbed the nature. She said function of the institutions should be strong and should include community participation. Without undermining the role of technological solution which deals with complex institutional arrangements, embankment can be called mal-solution as technology is not the only solution there should be role of social science also to make it more effective. We need to fix the underlining issues like climate change, human encroachment of flood plains which leads to misuse of natural resources. She said till date no policy has put green growth in forefront, only technology is always talked about. She said we need a joint effort than working in silos. We can bring solution via Green Growth. Put the nature on forefront and put the technology around that to get NBS.

Key Takeaways

- Function of the institutions should be strong & should include community participation.
- Need to fix the underlining issues like climate change, human encroachment of flood plains which leads to misuse of natural resources.
- Need policy to put green growth in forefront



Dr. Joerg Szarzynski

Co-Head of GLOMOS, UNU-EHS Bonn, Germany

Distinguished Panelists

Question asked to Prof. Joerg was "What innovative applications of earth sciences will facilitate sustainability integration in DRR"?

Dr. Szarzynski answered the question saying earth system sciences should be regarded as amalgam of Nature science, social science and engineering capacity, medical sciences and community participation, Traditional Knowledge and ancestral knowledge that we need to consider. He gave small presentation on UNU system saying it's a global think tank and global UN agency. They have International research agenda which are: (i) Environmental vulnerability and ecosystem services; (ii) Global e-Waste monitor report 2020; (iii) Water-Energy-Food Nexus in Africa and Digitalization; (iv) Urban heat: heat stress in cities; (v) Domestic rainwater harvesting (DRWH) and; (vi) Global mountain safeguard research (GLOMOS). UNU invests in technologies in order to

Dr. Szarzynski is an Academic Officer and Head of the Global Mountain Safeguard Research (GLOMOS) at the United Nations University Institute for Environment and Human Security (UNU-EHS), Bonn, Germany. Prof. Szarzynski holds a Ph.D. degree in Physical Geography and Atmospheric Sciences. He has broad expertise in Environmental Change & Sustainable Development Research, Multi-Hazard Early Warning Systems (MHEWS), Disaster Management, Emergency preparedness and response (EP&R).

support DRR. We need to involve political side, Community side and technology side together to gain better results.

Key Takeaways

- UNU system is a global think tank. UNU invests in technologies in order to support DRR.
- Need to involve political side, community side and technology side together to gain better results.



Dr. Shalini Dhyani

Senior Scientist CSIR NEERI/ Regional Chair South-Asia CEM, IUCN

Distinguished Panelists

Question asked to Dr. Shalini What enablers do you see for incorporating Nature-based Solutions in DRR discourse in India?

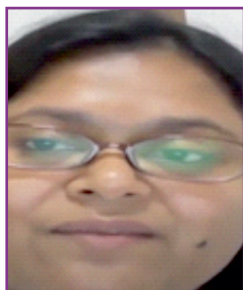
Dr. Dhyani said there has been growing recognition right now using the properties of nature which can help and provide lot of viable cost effective solution. Cities are next hotspots now in terms of disaster risk in India and in many other Asian countries. Not only Himalayan region is affected but urban areas are equally vulnerable now days. She described that NBS was started by EU in 2010 is now thought to be very imp and long term solution. It can help you address lot of issues that are related to climate disasters and with same motivation it addresses many conservation challenges. She talked about endorsement of IUCN

Dr. Dhyani is Senior Scientist with Water Technology & Management Division in CSIR-NEERI, India. She is South Asia Regional Chair for IUCN Commission on Ecosystems Management. She is IPBES Lead Author Global thematic assessment on Sustainable Use of Wild Species. She has more than a decade of experience endorsing the importance of ecosystems and NbS in rural & urban DRM

towards NBS and it's user friendly approach. Effective nature base solution includes effective societal challenges at the same time see the gain from biodiversity and ecosystem can give you, what are the economic viability of the programme and also need empowering and transparent governance process. These are the core need of this approach. It should combine with achievement of primary goal and continuation of process in future as well. NBS is very situation specific and site specific, one size cannot fit to every problem. Like India have different aggro-climatic zones and poses different problems region wise. She emphasized hybridization of traditional and scientific knowledge to design this important thing. financial provision is also an important aspect. When we talk about research there are two imp areas to involve one is community and other is new model of science and research should be involved. She said AI has also an important role in implementation.

Key Takeaways

- NBS is very situation specific & site specific, one size cannot fit to every problem.
- Hybridization of traditional & scientific knowledge & financial provision is crucial to design NBS.
- AI has also an important role in implementation.



Dr. Mrittika Basu

Assistant Professor, Graduate School of Global Environmental Studies, Kyoto University, Japan

Distinguished Panelists

Question asked to Prof. Gundimeda was "Do you
Question asked to Dr. Mrittika was "Conventional
discourses put nature and people in separate boxes.
Can thinking around relational values bridge this gap"?

Dr. Basu is an Assistant Professor in the Graduate School of Global Environmental Studies, Kyoto University. She received her PhD in Global Environmental Studies from Kyoto University, Japan. Presently, she is working on relational values and human well-being, especially on ecosystem services, bio philia, nature connectedness and mental health & socio-hydrology.

Dr. Basu talked about her work how she is working towards making rural areas more productive, sustainable, climate resilient and attractive places to live in. Japan's rural areas are majorly vacant which creating lot of pressure on agriculture system there. She talked about the reverse migration in India during this pandemic situation and felt the need of rural transformation. In Japan we are working on the same and revitalization is essential for this transformation

and it goes beyond agriculture as it includes development of non farm opportunities and cutting edge technology for innovation. She said green growth can play major role in rural revitalization. Green growth calls for a focus on qualitative growth rather than measuring the success based on the traditional economic indicators like GDP or economic productivity. She said Green growth is inclusive growth not just economic growth the focus should be given on relational values which are derived through people's interaction, care and sanctity for the nature and it's system. Over the time we have become more prone to technology and losing connect with nature. Due to depopulation, now a days Japan is talking about smart agriculture technology by introducing Artificial Intelligence like robot is doing the entire field work. Smart agricultural technology is combined with relational value with the people to come up with better solution. She suggested to improve inter-connect between human and nature from the very young age to understand the issue better. Young generation should be involved in nature and agriculture conservation practices

Key Takeaways

- Green growth can play major role in rural revitalization.
- AI enabled Smart agricultural technology is combined with relational value with the people to come up with better solution.
- Young generation should be involved in nature and agriculture conservation practices



Prof. P. C. Tiwari

Professor and Head of the Department of Geography, Kumaun University

Distinguished Panelists

Question asked to Dr. Tiwari was “What facets of sustainability sciences do you think are relevant for sustainability integration in DRR planning in the Himalayan Context”?

Prof. & Head of the Department of Geography, Kumaun University, Nainital, Uttarakhand, India. He is one of the Lead Authors of Hindu Kush Himalaya Monitoring and Assessment Programme (HIMAP) of the international Centre for Integrated Mountain Development (ICIMOD), Nepal. Professor Tiwari is also Coordinator Himalayan University Consortium (HUC) at Kumaun University, Nainital; and Nodal Officer Disaster Management, Kumaun University, Nainital.

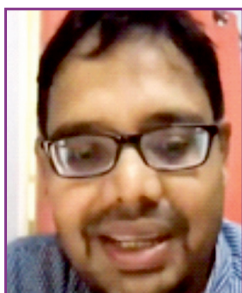
Prof. Tiwari said in his view all sciences contribute towards the development. Integration of CC adaptation in DRR is the requirement of the time and that's how sustainability sciences can contribute toward DRR in Himalayan region. He said most of the disasters in mountain region are climate change induced. The frequency and intensity of these disasters are increasing over the period of time. Overall process of development planning of Himalayan region must include integration of CCA and DRR. So far CCA programmes and DRR programmes are considered as standalone activity that's why they are not able

to deliver required result to the common people at the local level. DRR should be the part of all developmental processes in the Himalayan mountain region and all sector of development particularly PWD, Agriculture, water supply, irrigation and transportation and urban and rural planning should have a DRR component with their overall planning framework and all the developmental departments, the line department at local, regional and state level should integrate together and work in a coordinated manner.

He underlined the point that despite lot of research and investment the DRR things are not getting translated in the real ground the benefits are not reaching to the people at the ground level. Despite lot of investment there are lot of causalities in Himalayan region due to disaster. Its urgent need to integrate DRR and CCA together. He emphasized the need of watershed management programme and how its integration is important at all level. We must have people centric and community oriented DRR management programme. Also there is a need of evolving disaster risk information system and geographical information system which is completely inactive.

Key Takeaways

- Integration of CC adaptation in DRR is the requirement of the time and that's how sustainability sciences can contribute toward DRR in Himalayan region.
- DRR should be the part of all developmental processes in the Himalayan mountain region and all sector of development
- There is a need of evolving disaster risk information system



Dr. Ritesh Kumar

Director, Wetlands International South Asia

Session Facilitator

Dr. Kumar is Director at Wetlands International South Asia. He has been a key advisor to the Ministry of Environment, Forest and Climate Change and several state governments on policy and management aspects of wetlands. In the last two decades, he has led integrated management planning for several wetlands in South Asia region, and coordinated multidisciplinary projects on wetlands assessment, ecosystem services evaluation, water management, sustainable livelihoods, disaster risk reduction and climate change adaptation.



Dr. Rajarshee Dasgupta

Environmental Engineer, IGES, Japan

Session Facilitator

Dr. Dasgupta is an Environmental engineer by training and currently working as Senior Policy Researcher in the Institute for Global Environmental Strategies, Japan. His research interests are in the field of landscape ecology and planning, including Ecosystem-based Disaster Risk Reduction (Eco-DRR), spatial quantification of ecosystem services, land change simulation and environmental scenario analysis, etc. He is working closely with many local governments in South and Southeast Asian countries, in a wide variety of conservation and disaster risk reduction projects. He has also contributed to various IPCC and IPBES assessments.

Closing Remarks

Shri Vivek Saxena

Explaining the importance of session Shri Vivek Saxena thanked all the panelist for bringing wide range of issues in the discussion. He said Science and technology should be for the betterment of the society and it should not harm nature or environment. Technology should be seen as a solution in a right perspective. With these remarks he concluded the session.

Review Session 109: Advisory Committee Meeting & Policy Recommendation Panel

Day-2: 26th August 2020, 3:15-4:40 PM

Distinguished Panelists

- Prof. Anil K Gupta, Former Professor, IIM Ahmedabad
- Prof. SP Singh, Formerly Vice-Chancellor, HNB Garhwal University
- Dr. Akhilesh Gupta, Advisor & Head Strategic & Large Programmes (SPLICE), DST (GoI)
- Dr. G Ravindra Chary, Director, ICAR-CRIDA, Hyderabad
- Dr. K. S. Murali, Executive Director, MS Swaminathan Research Foundation
- Prof. Dilanthi Amararatunga, Chair Global Disaster Resilience Centre, University of Huddersfield, UK
- Prof. Ravi Sinha, Dept. of Civil Engineering, IIT Mumbai
- Prof. V. K. Sharma, Exec. Vice Chairman, Sikkim SDMA & Sr. Professor IIPA
- Prof. Santosh Kumar, Head – Inclusive DRR Division, Former Director SAARC-DMC, ED I/C NIDM
- Prof. J. K. Garg, Professor Emeritus, TERI SAS, Former Dean, USEM, GGSIPU
- Dr. A. Nambi Appadurai, Director & Strategy Head, World Resources Institute, India
- Dr. Suneel Pandey, Director, The Energy and Resources Institute

- Dr. Sanjay Srivastava, Chief of DRR, UN-ESCAP, Bangkok
- Prof. M. S. Nathawat, Director, Institute of Science, IGNOU, Delhi
- Prof. Shiraz A. Wajih, President, Gorakhpur Environmental Action Group, India
- Prof. R K Mall, Dean, Environment and Sustainable Development, BHU Varanasi

Conference Convener

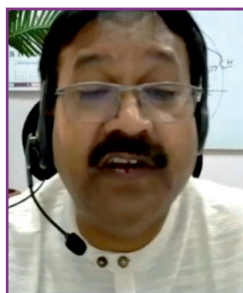
- Prof. Anil K Gupta, Project Director-CAP-RES & Head, ECDRM Division, NIDM

Facilitator

- Dr. Nisha Mendiratta, Advisor & Associate Head- SPLICE, DST (GoI)

Coordinator

- Dr. Sweta Baidya, Research Associate, CAP-RES, NIDM



Prof. Gupta is a visiting faculty, IIM, Ahmedabad and IIT Bombay, CSIR Bhatnagar Fellow, 2018-21, Fellow, NAAS, INSA, & WAAS, Founder, Honey Bee Network, SRISTI, GIAN & NIF. Supporting 60 Innovation Acceleration Labs, UNDP in 78 countries through HBN-UNDP partnership in mapping & tapping solutions/ grassroots innovations; pursue Shodhyatra to learn from resilient communities.

Prof. Anil K. Gupta

CSIR Bhatnagar Fellow, Former Professor, IIM Ahmedabad, VC-National Innovation Foundation, Founder - Honey Bee Network

Distinguished Panelists

Disaster has 2 dimensions: risk and uncertainty. We can develop strategies to mitigate. Traditional knowledge and contemporary knowledge both are important. Data base of the new innovations not only for India but global people. Risk fund under NIDM has to be made. NIDM will convert idea into practice through this. This will bring "Atmanirbharta". Existing guidelines are also not being implemented and the change is not being monitored.



Prof. Singh made pioneering studies on Himalayan vegetation, both terrestrial & aquatic & on applications of ecology to solve environmental problems. Presently, he coordinates multi-site multi partner, multi-disciplinary research on Himalayan Timberline relating to climate change. He had also established partnership between Indian ecologists & Ecological Society of America.

Prof. S. P. Singh

Former, Vice-Chancellor, HNB Garhwal University

Distinguished Panelists

Self reliance: India does not have good journals. We need to establish. We have to be good in publishing more about the Himalayan ecology etc. We started earlier than China but we could not maintain. Ability to develop relationship is unavoidable in the modern world. New jobs could be created in India by recycling. Restoration of landslide areas by afforestation is inevitable. Develop science for recycle. The scale of forest fire is increasing.



Dr. G. Ravindra Chary

Director, ICAR-CRIDA, Hyderabad

Distinguished Panelists

Risk and Vulnerability assessment for climate change has to be more vigorous and come up with innovation. Need to be included in M.Sc. studies to come up with more research. Location specific Emission factor for various land use system is very important. Databases have to be put together to come up with the remedies. Enhancing the adaptive capacities for different stakeholders.

Dr. Chary joined CRIDA in 2002 & his pioneering contributions were topo-sequence based crop planning as per soil-site suitability in 16 micro-watersheds, drought coping agronomic practices, carbon sequestration strategies and district level agriculture contingency plans. Under NICRA, he is involved in action research in adaptation of climate resilient agronomic practices in farmers' fields.



Dr. K. S. Murali

Executive Director, MS Swaminathan Research Foundation

Distinguished Panelists

Developing Grain bank helps in disaster management. Diversified grain bank or seed bank system is there we need to promote. Biotic disasters also need to be considered seriously. Advisory in local level has to be up scaled. Production by mass and mass production is important.

Dr. Murali has over three decades of work as a researcher & program manager in water, climate change adaptation, biodiversity conservation, forestry & the development sector. Projects managed: glacier-fed river basins of Hindu Kush Himalayan Region.



Prof. Dilanthi Amaratunga

Chair Global Disaster Resilience Centre, University of Huddersfield, UK

Distinguished Panelists

Localization of Disaster Science is better to integrate disaster in policies. Disaster resilience in the community level by increasing the local understanding. Potential indigenous knowledge can help in cost reduction. Local knowledge on disaster science has to be used.

Prof. Amaratunga holds the chair in DRM at the University of Huddersfield, UK. Leads: University's Global Disaster Resilience Centre. Member: Steering Committee of UNISDR "Making Cities Resilient" Campaign.



Prof. Ravi Sinha

Dept. of Civil Engineering, IITMumbai

Distinguished Panelists

S&T gaps have to be addressed and community has to play a greater role. Creation of knowledge is never enough but we are doing well in this path. DST is playing important role by funding. Involvement of scientific community in to make things make understandable and communicable to the local people is important. We are creating knowledge but not communicating knowledge. Existing knowledge has to be more usable. Adoption of knowledge through new products and technologies have to be brought in. Private sector is doing well in this field. In Government sector we are lagging behind. For this deeper involvement of repository for knowledge is needed. To capture lessons learned by NIDM has to be done. Innovation ecosystem is weak in India. Start up ecosystem is strong. Innovation based unicorn in

Prof. Sinha is a professor of Civil Engineering at IIT Bombay. He has also served as its Dean of Alumni & Corporate Relations. Prof. Sinha is closely associated with policy-making related to DRM. Prof. Sinha has chaired or served in several government panels. Prof. Sinha is a member of Maharashtra SDMA. He is also the Co-Chairman of National Panel of Experts of Ministry of Road Transport and Highways, Gol.

startup is very less in India that we need to develop. Risk communication Platform has to be prepared jointly by DST and NIDM.



Prof. V. K. Sharma

Exec. Vice Chairman, Sikkim SDMA & Sr. Professor IIPA

Distinguished Panelists

The Government of India is having Climate Change in its missions. Convergence of data and management is needed. He gave example of Agriculture water etc. All the research fields have to be collaborated for different mission. National Policy for Disaster management has to be revised and work in collaboration to keep pace with the changing climate is important.

Prof. Sharma is a senior professor, DM consultant at IIPA Vice Chairman, Sikkim SDMA, Govt. of Sikkim. He is member of UNISDR Asia Science, Technology & Academia Advisory Group (2015-2020). He is currently engaged in few research projects on Capacity Building in CCA & Conservation of Biodiversity sponsored by DST, UNDP & MoEF&CC. He has published more than 50 research papers and 12 books in area of DM.



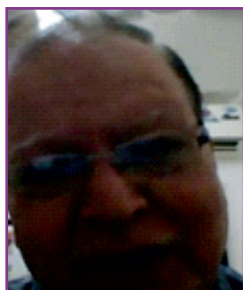
Prof. Santosh has PhD in economics, Gender & Development, IDS Sussex, DM, Risk Control and Israel Defense Force, Israel, leadership programme from The World Bank Washington. He held the position of Director, SAARC Disaster Management Centre, former Executive Director, NIDM, DM Specialist, The World Bank

Prof. Santosh Kumar

Head – Governance and Inclusive DRR Div. NIDM

Distinguished Panelists

Disaster related books are not in our own language. We need to change the disaster knowledge system. Large number of research has to be done for knowledge. Women capacity has to be used for the disaster management. Women leadership in disaster management is needed. Poverty eradication will reduce the disaster proneness. Mentioned PM Agenda 2, 8 & 6 should be implemented. Financing the activity is also important.



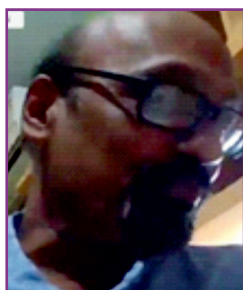
Prof. Garg has 44 plus years of professional experience in the field of use of geospatial techniques for ecosystem analysis & monitoring, natural hazard assessment & zonation, & ecosystem restoration. He worked with Space Applications Centre, (ISRO), Ahmedabad. He was Dean University School of Environment Management, & Director Centre for DM studies in IP University.

Prof. J. K. Garg

Professor Emeritus, TERI SAS, Former Dean, USEM, GGSIPU

Distinguished Panelists

Landscape integrity or Ecosystem integrity is always neglected and we have to talk in various scale. Regional ecosystem integrity has to be established in Himalayan Ecosystem. In resilience building wetlands play important role. To achieve Atmanirbhar Bharat we require coordination at various level. In policies we are missing out the wetlands. Wetlands are first casualty in developmental process.



Dr. Nambi is the India Adaptation Strategy Head for the Climate Resilience Practice & WRI India. He is a CCA specialist with research & project management experience at the national & international levels. Most of his research has focused on CRM CCA in Asia and Africa. He has also worked with M.S. Swaminathan Research Foundation as Director of CC Programme.

Dr. A. Nambi Appadurai

Director & Strategy Head, World Resources Institute

Distinguished Panelists

Dr. Nabmi said that integrating knowledge and adaptation science (AS) is important. Further he said that citizen science also needs to be integrated with Adaptation Science. Incremental adaptation is unavoidable. For food and land use we need entry points.



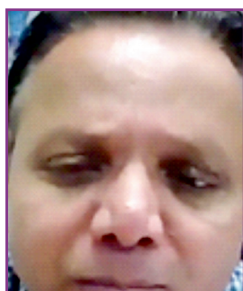
Dr. Suneel Pandey

Director, The Energy and Resources Institute

Distinguished Panelists

Dr. Pandey shared about the low carbon option and resource efficiency has to be emphasized when we are going back to the old normal after Covid situation. Carbon Neutral approach and de-linking ourselves from fossil fuel has great potential to save from disaster. Capacity building for waste management has to be increased.

Dr. Pandey has more than 30 years of consultancy/ research experience in the areas of municipal, industrial & hospital waste management, waste-to-energy, impact assessment, air, water & soil quality monitoring, site assessments, performance evaluation of ETP & institutional strengthening & capacity building.



Dr. Sanjay Srivastava

Chief of DRR, UN-ESCAP, Bangkok

Distinguished Panelists

Being part of the UN, they have gone through all the packages that were announced in India during the COVID pandemic crisis within the nation. Understanding the needs he suggested that NIDM along with DST has to build a case of green recovery from COVID-19, and this case should take into account all the perspectives including economic, social and environmental. Quoting to the recent report of MoES, GoI on climate change in India, he said that it has to be converted in terms of actions, capacity and safe recovery.

Dr. Srivastava is Chief of DRR at UN-ESCAP. He was ESCAP Regional Adviser on DRR from Oct 2009 to June 2014; Head of SAAARC DM Centre – New Delhi from 2007-2008; Deputy Project Director of DM Support Programme at ISRO; Scientist/Engineer at ISRO HQ Bangalore since 1991. He is the recipient of ISRO's Team excellence award in 2008-09 for his contributions towards harnessing space technology applications for the benefits of rural poor.



Prof. M. S. Nathawat

Director, Institute of Science, IGNOU, Delhi

Distinguished Panelists

Prof. Nathawat highlighted to issues of policy and S&T Infrastructure, which he suggested should have an inclusion in the future policies. Climate change creates cascading effects on the physical systems, ecosystems, economics and society. Often interrelated and creating the circumstances for irreversible and undesirable crossing of resource at multiple scales. To access climate risk across domain and in a manner meaningful to decision makers is therefore a major scientific challenge. As scientific and analytical approach to climate challenge requires the inclusion of systematic complexity and the ability to incorporate perhaps normal, unthinkable and non-obvious elements to decision oriented Training. Informed policy making is also needed. He suggested that India should constitute a body which will work on land and water resources are needed.

Prof. Nathawat served as Scientist/ Lecturer, Dept. of Remote Sensing, B.M. Birla Science & Technology Centre, Jaipur during 1985-1993; Senior Scientific Officer & In charge, Dept. of Remote Sensing, B.M. Birla Science & Technology Centre, Jaipur during 1993-1998; Project Director, State NRDMS Centre, Dept. of Science & Technology, Govt. of Haryana during 1998- 2001; & Professor & Head ,Department of RS, BIT, Mesra, Ranchi during April 2011- July 2011



Dr. Shiraz A. Wajih

President, Gorakhpur Environmental Action Group, India

Distinguished Panelists

To start with Prof. Wajih said India is focusing mainly on Atmanirbhar Bharat and one of the primary challenges faced there is the increasing climate risk and disasters. There is thus a need to develop climate risk management strategies. He also highlighted the need to develop 'atmanirbharta' at a local level or panchaiti level, FPO level and CSO level Increasing climate risk is a problem. Climate risk management has become local. Such will lead to ground level atmanirbharta contributing to an 'Atmanirbhar Bharat'. Another very relevant point he shared was the need for climate risk management to become more local that a global phenomenon and it should

Dr. Wajih, has been part of research associated with University. He is President, Gorakhpur Environmental Action Group. He has directed several projects related to issues like Sustainable Livelihoods, NRM, DRR, CCA & livelihood resilience etc. He has more than 70 papers published in national & international journals.

be seen in a geo-ecological process rather than being uniform and solution has to be evolved in local context. To conclude he shared that how the S&T fraternity-as core group-would connect and adopt S&T technologies to solve the current climate and disaster challenges.



Prof. R K Mall

Dean, Environment and Sustainable Development, BHU Varanasi

Distinguished Panelists

Quoting the discussions of the previous days he said that the S&T workforce in India- inclusive of students, professors, practioners, policy makers-is quite large and represents an enormous strength as a domain. Adding to this, he said that there are 12 centres of excellence and there is a need to collaborate all these centres together and NIDM should play the role of a platform in bringing all these organizations, workforce and taskforce together.

Prof. Mall has made seminal contribution in DRR, climate & crop weather modeling & climate change impact on agriculture, water, health by using numerical simulation techniques. Importantly, he has framed several policies for reducing climate & disaster risk in South Asian Countries & also for enhancing environmental sustainability.



Prof. Anil K Gupta

Professor & Head, ECDRM Division, PI (CAP-RES), NIDM

Facilitator

Prof. Gupta, Head, Environment and DRM Division, NIDM Prof. Gupta is working in the area of disaster management, environment and climate resilience for more than 25 years with national, sub-national and business administrations. He has steered international and national projects of policy research - planning and capacity building. He has credit for preparation of National and Sectoral Disaster

Management Plans, Human resource capacity development Plans, National action plan for chemical disaster management, National drought manual, and guided related sub-national planning, climate actions, SDG implementation and pilots.



Dr. Nisha Mendiratta

Advisor & Associate Head – SPLICE, DST-GOI

Facilitator

Dr. Mendiratta is currently working as Adviser & Scientist 'G' in the Department of Science & Technology (DST). She started her professional career in 1990 as Scientist at National Remote Sensing Agency (NRSA), Hyderabad in Department of Space (DoS). She carried out core research in the field of microwave remote sensing applications for soil moisture estimation. She then Joined IIRS, Dehradun as their faculty in 1991. She joined the NCMRWF Programme, currently under Ministry of Earth Sciences, as Senior Scientific Officer during 1992 and worked for medium range weather forecasting and crop weather modeling.

Session 110: Valedictory Session

Day-3: 27th August 2020, 4:45 – 6:00 PM

Valedictory Address

- Hon'ble Shri Nityanand Rai, Minister of State for Home Affairs, GoI

Valedictory Guest

- Shri Sanjeev Kumar Jindal, Joint Secretary (DM), MHA, GoI
- Dr. Jigmet Takpa, Joint Secretary, MoEF& CC, GoI
- Maj. Gen. Manoj K Bindal, ED, NIDM
- Dr. Akhilesh Gupta, Advisor & Head – Strategic & Large Programmes (SPLICE), DST-GoI

Conference Convener

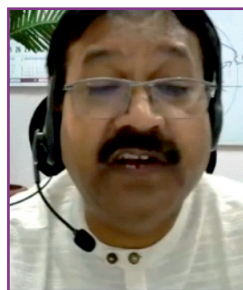
- Prof. Anil K Gupta, Project Director-CAP-RES & Head, ECDRM Division, NIDM

Facilitators

- Ms. Nivedita Mani, Coordinator – Knowledge Management, GEAG
- Shri Ashish K Panda, Consultant & faculty, NIDM

Focal Point

- Dr. Anjali Barwal, Research Associate, NIDM



Prof. Anil K Gupta

Professor & Head, ECDRM Division, PI (CAP-RES), NIDM

Conference Convener

Prof. Gupta welcomed Hon'ble Minister Shri Nityanand Rai and other dignitaries. He mentioned that this 3-days international science & technology conference was organized using the online platform in this new normal jointly by NIDM & DST, Govt. of India in collaboration with other partners. He highlighted about the conference which has been attended by more than 800 delegates across the world covering almost 15 countries. From more than 10 countries, delegates delivered lectures and attended various technical sessions. More than 70 technical institutions participated in various sessions as Chair, Co-Chair, Experts, Panelist and the facilitators. This conference

Prof. Gupta has more than 25 years of experience in the field of disaster management, environment and climate resilience. He has been credited for preparation of National and Sectoral Disaster management Plans, Human Resource Capacity Development Plans, National Action Plan for disaster Management.

had deliberations and recommendations from high level international luminaries particularly in view on PM Agenda & Atmanirbhar Bharat. He further said that NIDM will be coming up with a policy document that how DRM and Climate Risk Management can be strengthened by using S&T and what further directions are required to strengthen S&T related resources as a key outcome.

Key Takeaways

- NIDM will be coming up with a policy document that how DRM & CRM can be strengthened by using S&T & what further directions are required to strengthen S&T related resources as a key outcome



Major General Manoj K Bindal

Executive Director, NIDM

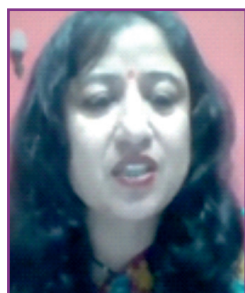
Valedictory Guest

Major General Bindal welcomed Hon'ble Minister Shri Nityanand Rai and other dignitaries. He highlighted more than 100 speakers and panelists participated in this conference from all over the world who talked about DRR, Climate Change Adaptation and its future implementation by using S&T. He spoke that a policy report will be developed highlighting various lessons learned and future directions to be adopted along with the roles & responsibilities in line with PM Agenda point no 5. He also thanked all the participants and speakers for sharing their views and insights.

Major General Bindal has commanded Air Defense Regiment & Air Defense Brigade in Kashmir region during counter insurgency operations. He was a staff member of Mountain Brigade deployed in counter insurgency ops and in High Altitude area, an Armored Division deployed in the plains, a Desert Corps & in a Corps HQ in High Altitude Areas. He was the Deputy Director General in Directorate of Army Air Defense. He also served as the Provost Marshall in the United Nations Mission in Mozambique. He has been the Director, Centre for United Nations Peacekeeping (CUNPK) New Delhi.

Key Takeaways

- A policy report will be developed highlighting various lessons learned and future directions to be adopted along with the roles & responsibilities in line with PM Agenda point no 5.



Dr. Nisha Mendiratta

Advisor & Associate Head, SPLICE Programme, DST

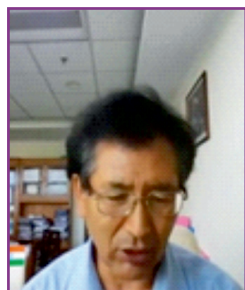
Valedictory Guest

Dr. Mendiratta thanked and welcomed Hon'ble Minister Shri Nityanand Rai, Major General Manoj K Bindal and Prof. Anil K Gupta from NIDM and other dignitaries. On behalf of scientific community, we must entrust our community that we are with them and we will give them package so that their life would become easier by using latest tools of S&T. There is a need to for more such collaborative efforts for promoting and using S&T. She also mentioned the 8 missions of climate change under NAPCC launched by Prime Minister's Council, in which different sectors have been elected, under which different ministries are working together like agriculture, water, urban development, forestry, greenery etc. So, now there is a need of holistic convergence to create a database and device innovative tools to incorporate ideas & prototypes of a common man.

Dr. Mendiratta is currently working as Adviser & Scientist 'G' in the Department of Science & Technology (DST). She started her professional career in 1990 as Scientist at National Remote Sensing Agency (NRSA), Hyderabad in Department of Space (DoS). She carried out core research in the field of microwave remote sensing applications for soil moisture estimation. She then joined IIRS, Dehradun as their faculty in 1991. She joined the NCMRWF Programme, currently under Ministry of Earth Sciences, as Senior Scientific Officer during 1992 & worked for medium range weather forecasting & crop weather modeling.

Key Takeaways

- Need to entrust our community and give them a package so that their life would become easier by using latest tools of S&T.
- There is a need to for more such collaborative efforts for promoting and using S&T.
- There is a need of holistic convergence to create a database and device innovative tools to incorporate ideas & prototypes of a common man.



Dr. Jigmet Takpa

Joint Secretary, Ministry of Environment Forests & Climate Change

Valedictory Guest

Dr. Takpa spoke about the various schemes and programmes of Ministry of Environment, Forest & Climate Change (MoEFCC) which deals with the climate change disaster risk reduction, mitigation and adaptation. He said India is in forefront when it comes to S&T mitigating climate change. He further said India is one of the few countries which have hosted UN Conference on Climate Change, UN Conference on Biodiversity & UN Conference on land degradation. He also spoke that India is going to institute a Centre of Excellence in ICFRE in Dehradun.

Dr. Takpa is an IFS from J&K Cadre & presently serving as JS & heading the Desertification Cell in MoEDCC, Gol. He is also National Focal Point of UNCCD for India. He has been conferred various prestigious awards – the Environmental Hero Award, the State Award for Meritorious Public Service, J&K, the Indira Priyadarshini Vriksha Mitra Award, the Renewtech Award for Best Nodal Agency, and the Gyalwang Drukpa Award. He also figures in the Book of Guinness World Records for the most trees planted simultaneously (2011).

Key Takeaways

- Need for better risk reduction policies, environment and healthy human beings.
- India is going to institute a Centre of Excellence in ICFRE in Dehradun.



Shri Sanjeev Kumar Jindal

Joint Secretary (DM), Ministry of Home Affairs

Valedictory Guest

Shri Jindal spoke on the Sandai Framework and role of S&T for reducing vulnerable disasters and minimizing risks & disasters. He further spoke on the Prime Ministers' 10 point agenda. He emphasized on extensive use of information technology, artificial intelligence for early warning and forecasting systems. S&T is the core of DRR. He also emphasized that there is a need to enhance the collaborations with the business stakeholders at all levels.

Shri Jindal is JS in charge of DM Division in the MHA (GoI), New Delhi. During the last 3 years, he had acquired practical experience in coordinating search & rescue operations during various natural disasters in different states in the country and in providing financial relief to the affected States. He is a career civil servant with over 30 years of rich and varied experience in different Ministries / Departments of Government of India; such as Ministry of Finance, Department of Food & Public Distribution, Department of Industrial, Policy & Promotion, Department of Personnel & Training, Ministry of Food Processing Industries of India.

Key Takeaways

- Need to optimize the application of S&T capacities in the best possible manner.
- Accurate forecasting systems, artificial intelligence systems are required for early warning & forecasting.
- Need to enhance the collaborations with the business stakeholders at all levels.
- Need to explore the multidisciplinary approach for application of S&T & DRR.



Hon'ble Shri Nityanand Rai

Minister of State for Home Affairs, Govt. of India

Valedictory Address

Hon'ble Minister Nityanand Rai thanked and welcomed all the dignitaries of the session. He congratulated NIDM and associated organization for organizing conference on this much needed topic. This conference is timely as at the present scenario, climate induced disasters have increased and the holistic approach for disaster management includes Disaster Risk Reduction. We need to ensure that we do not lose the chance to learn from the past disaster experiences. We need to do new scientific researches to learn the new techniques for disaster risk reduction and should apply the learning for resilience building and reduce the disaster to a negligible level. While citing various disasters those took place in India in recent days he said that, more than 30 types of disasters affects our country. India is facing both the climate induced as well as the human induced

Shri Rai is the current Minister of State for Home Affairs in the Government of India. Shri Rai was interested in social works from student life, started social works in 1982 as a member of ABVP. He was elected for students union President in his college. He won the seat 4 times consecutively in Bihar Assembly. He won the election & became Member of Parliament. He was made BJP Bihar President & after 2019 election he was made State Home Minister in NDA2 cabinet.

disasters. In India disaster reduction goals have been set up which includes number of death, number of affected people, economic damage and loss of property and resources. To fulfill the goals we need to prepare a database soon. Also we need to prepare a budget for disaster risk reduction to provide a green India to the future generations. We need to prepare policies for disaster risk reduction.

Key Takeaways

- We need to make provision for disaster risk reduction budget for greener future.
- Research and policy interventions are inevitable.
- Disaster reduction goals have to be set.
- Proper updated disaster database have to be prepared.

Key Takeaways of the Conference

1. In India, it is important to ensure that people have rapid access to information & preventive measures and need to enable the quick response to protect lives & livelihoods.
2. There is a need to create proper public awareness, early warning systems, training, community participation to enhance the efficiency of Disaster Risk Management to minimize sufferings especially when country is facing the impact of various disasters along with COVID 19 pandemic.
3. Adaptation of mitigation measures are needed to manage the impact of climate change & climate science.
4. Urgent need to implement effective climate risk assessment & management approaches in order to minimize and address the losses & damage to the people of our country.
5. Need to strengthen the research & technological innovations, multidisciplinary approach advancements, planning into the climate risk approaches. There is a need to maximize the use of existing S&T with dialogues between users and producers of scientific information.
6. Need of more flexible higher education sector in our country so that R&D organizations will work hand in hand with disaster managers.
7. Need to develop human resources, start-ups and innovations to make use of the knowledge to generate socio-economic opportunities. Encouraging universities to develop startup ecosystems inculcating the use of open source data, citizen science and social innovations.
8. Need to have a sharp problem definition to get the priority problem to be solved. Need to advance the notion of global public good.
9. Need to include more citizen science in the disaster network, develop a relationship between science and social science and develop a collaborative network to support research and publications.
10. Need to identify, implement and establish the interlinkages of disasters and ecology.
11. need inclusive policies for a wider section of the society rather than limiting to the academia.
12. There is a need to evolve the capacity development activities at horizontal level rather than just being in vertical silos. Also need to mainstream capacity development at every institutions of our country. There is a need to introspect in the university system.
13. A national authority to look after the capacity development needs of the country should be focused upon.
14. There is a need to invest more in Science and technology interventions in India.
15. India needs to make very good use of its human resources in terms of nurturing young minds.
16. Need to localize National & International Science & Technology (S&T) policies. S&T policies should aim to strike a balance between governance research and technical research.
17. DRR and Climate Risk Management should evolve as disciplinary subjects.
18. Need to involve community for long term preparedness and improve implementation and follow-up monitoring when mitigation in terms of ground level capacity building is concerned.
19. There is a need for inter-disciplinary studies and path breaking research to identify the various climate change risk factors for creating new opportunities enhancing.
20. Reducing the gap between knowledge creators and knowledge consumers is important. Outcome of data/research should be given to the local people.
21. Research on hazards is very important. Projects should be made on different climatic change induced hazards.
22. Small behavioral changes can ultimately help in combating disasters and inculcate environmental consciousness.
23. More organized efforts needed from the experts & professionals from Science & Technology

(S&T), health and disaster management sectors.

24. Need proper strategies to save people from the disasters and to build resilience towards disasters and educating people about the types and nature of the disasters.
25. In all the disaster situations (current and future), quick movement of information and concrete action is required from the experts.
26. Use of S&T for forecasting and early warning in disaster management is important.
27. New innovations are required in S&T for Disaster Risk Reduction.
28. Synergy is needed on multiple levels to meet the increasing need of disaster management.
29. Bringing in public private partnerships for harnessing the full potential of Science & Technology and the potential of ancient technology while addressing the financial challenges pertaining to S&T in the country is required.
30. Role of private sectors must evolve beyond financial assistance.
31. Need to create enabling environment for the industries to foster their active participation in research and development in partnership with public institutions.
32. Growing uncertainties with climatic changes create new challenges for disaster management in the country. Short-term project-mode is not suitable for finding solutions of such critical problems.
33. Need to bring radical change in the way we look at disaster risk. There lies huge opportunities for public private partnership across critical areas related to industrial safety. Private sector can help in filling funding deficit of S&T research and development in the country.
34. Discussion platforms involving multi-stakeholder and experts are critically important for bringing out best possible solutions to any problem.
35. Publishing houses have a critical role to play in dissemination of crucial information on the subject matter.
36. Well defined problem statement is critical to source solutions.
37. Technological advancement and innovation can create new opportunities enhancing disaster resilience and risk reduction.
38. Development in disruptive technology such as Artificial intelligence are transforming many fields including disaster risk reduction.
39. Disruptive technology can help reduce the compounded risk of successive extreme events, known as cascading disaster.
40. Policy and coordination are the top things that are hindrance for using technology in effectively in implementing disaster management and in emergency response. Sendai framework for disaster risk reduction has strongly advocated about the evidence based information through the technology.
41. United Nations platform for space based disaster management and emergency response is going to all the countries and offering technical advisory services and missions to help incorporate those technologies in their work.
42. Disruptive innovations have proved to be a powerful way of thinking about innovation driven growth. Disruptive Technology supersedes and holds the process, product or habit.
43. By using disruptive technology if some kind of sensor could be invented, which can identify the environmental changes and changes in animal behavior during the disaster would help in future planning.
44. We need to rethink the background issues of disruptive technologies and name it as "humane technology" to remind us that this technology is for human dimension.
45. To implement AI technology successfully in disaster risk reduction, Institutional reform and innovation and quality data is also needed.

46. Need to make use of the National Missions namely National Solar Mission , National Enhanced Energy Efficiency , National Mission on Sustainable Habitat, National Water Mission, National Mission for Sustaining the Himalayan Ecosystem, , National Mission of Green India, National Mission for Sustainable Agriculture, National Mission on Strategic Knowledge on Climate Change and National Mission on Clean Coal Carbon Technologies.
47. Need to learn from the past for example lessons learnt from the Tsunami of 2004 disaster has made us learn like how to develop plans, how to develop procedures on how to predict tsunamis so accurately.
48. Important to understand the science of what is going on in all the adaptation, mitigation and resilience strategies that we have.
49. Need of sustainable development and need to see environment and health because both are multidisciplinary subject.
50. Focus should be on how all these innovations and technologies could be taken on ground level.
51. Need knowledge on how to deal with recoveries from disasters and to address green concerns which is not necessarily limited to only climate adaptation or DRR but also to a greener economy.
52. Need to incorporate local knowledge and expertise combined with scientific data to develop disaster risk development.
53. Need to develop a robust understanding of climate & disaster risk which is based on both forward & backward looking risk assessment.
54. Need to deal with residual risk which is fairly a strong pillar of negotiation in Paris Climate Agreement which is also called as the debate of Loss and Damage.
55. It is important to consider those natural hazards which are potentially impacting but low likelihood that can happen in the future during risk assessment as a basis of planning.
56. Local knowledge to be integrated while developing DRR framework.
57. Risk assessment of glacial lake outburst flood should be encouraged.
58. Need to understand about climate variability to minimize the factor that contributes to the vulnerability of people and physical infrastructures.
59. Understanding milankovitch cycle that explains long term climate variabilities based on earth's rotation around the sun, its tilt and the path is important.
60. Increase in climate related risk also calls for further deliberations to implement more and more transformational actions.
61. Integration of early warning and forecasting in planning system is important.
62. Need flagship campaigns like Energy Production 100.
63. Need to increase resilience and transformative impact of resilience action as well.
64. Need to entrust our community and give them a package so that their life would become easier by using latest tools of S&T.
65. There is a need for more collaborative efforts for promoting and using S&T.
66. There is a need of holistic convergence to create a database and device innovative tools to incorporate ideas & prototypes of a common man.
67. Need to optimize the application of S&T capacities in the best possible manner.
68. Accurate forecasting systems, artificial intelligence systems are required for early warning and forecasting.
69. Need to enhance the collaborations with the business stakeholders at all levels.
70. Need to explore the multidisciplinary approach for application of S&T and DRR.

Annexure

Annex I : Programme Agenda

DAY 1: 25 August 2020

Opening Session 101

INAUGURAL SESSION 2.00-3.10 PM

- Maj. Gen. Manoj K. Bindal, Executive Director, NIDM
- Dr. Akhilesh Gupta, Advisor, Head-SPLICE, DST-GOI & Former Secretary UGC
- Dr. Farhad Vania, Senior Portfolio Manager, GIZ India
- Shri Kamal Kishore, Member, NDMA, Govt. of India
- Shri G. V. V. Sarma, Member Secretary, NDMA, GOI
- Dr. Ashutosh Sharma, Secretary, Dept. of Science & Technology, GOI (Keynote Address)
- Dr. P. K. Mishra, Principal Secretary to Hon'ble PM (Inaugural Address)
- Dr. Harsh Vardhan, Minister for S&T, & Health & FW (Inaugural Address)

Facilitator: Prof. Anil K. Gupta, Head-ECDRM & PD-CAPRES DST Project, NIDM(Convenor) / Mr. Ashish K Panda, Faculty NIDM

Special Policy Panel 102

S&T POLICY IN INDIA - CONTEXT OF PRESENT & FUTURE 3.15-4.25 PM

- Dr. Arabinda Mitra, Scientific Secretary, Office of PSA to GOI(Chairperson)
- Prof. Sudhir Jain, Director, IIT, Gandhinagar
- Prof. Rajib Shaw (Keio Univ. Japan), Chair, UN-ISDR – S&T Advisory Group
- Prof. S. P. Singh, Formerly Vice-Chancellor, HNB Garhwal University
- Ms. Amrita Mukherjee, STIP-YPP Fellow, Department of Science and Technology, GOI.
- Dr. Akhilesh Gupta, Advisor & Head – SPLICE, Climate Change Program, DST-GOI(Moderator)

Facilitator: Prof. Anil K. Gupta, Head – ECDRM, NIDM / Dr. Chitresh Saraswat, Australian National University, Canberra

Special Panel Discussion Session 103

PATHBREAKING RESEARCH NEEDS 4.30-6.00 PM

- Prof. Shailesh Nayak, Director, NIAS, Bangalore(Chairperson)
- Prof. K. B. Pandeya, Former Chairman, UP Public Service Commission(Co-Chairperson)
- Dr. Leena Srivastava, Deputy Director General for Science, IIASA, Austria
- Dr. Kenneth McCune, Senior Advisor - ISET, USA
- Prof. Kalachand Sain, Director, Wadia Institute of Himalayan Geology
- Dr. Katja Lasch, Director, DAAD, RO and Director, DWIH New Delhi

Facilitator: Mr. Shashikant Chopde, ISET USA, India / Mr. Kirtiman Awasthi, GIZ Germany, India

DAY 2: 26 August 2020

Special Panel Discussion Session 104

ROLE OF INDUSTRY & PRIVATE SECTOR 2.00-3.00 PM

- Shri Nirankar Saxena, Deputy Secretary General, FICCI(Chairperson)
- Prof. U. S. Dixit, Mechanical & Industrial Engg, IIT Guwahati
- Prof. Manju Mohan, Head, Centre for Atmospheric Sciences, IIT Delhi
- Mr. N. Raghu Babu, Project Director, GIZ Germany, India
- Dr. Naren Aggarwal, Editorial Director (Medicine, Biomedical and Life Sciences), Springer India
- Prof. Suresh Jain, Dean (Academic Affairs), IIT Tirupati

Facilitator: Ms. Aakanksha Tyagi, Editor, Springer Nature/Mr. Sanjeev Kumar, Deputy Director, FICCI

Special Panel Discussion Session 105**ROLE OF DISRUPTIVE TECHNOLOGY 3.00-4.00 PM**

- Dr. Sanjeev Varshney, Advisor, Head-International Cooperation, DST-GOI(Chairperson)
- Prof. Santosh Kumar, Head – Governance and Inclusive DRR Div. NIDM (Co-Chairperson)
- Prof. D. Manjunath, Dept. of Computer Engineering, IIT Mumbai
- Dr. Shirish Ravan, Sr. Program Office, UNOOSA, Vienna
- Prof. Rajiv Jain, Pro Vice-chancellor, Puducherry University, President Indian Science Congress-103 Session- Chemical sciences
- Prof. Anil K. Gupta, Department of Geology & Geophysics, IIT Kharagpur
- Prof. Payal Arora, Chair - Technology & Values, Erasmus University Rotterdam

Facilitator: Prof. Manish K. Goyal, IIT Indore/Prof. P. K. Joshi, Chairperson, SCDR, JNU

Special Panel Discussion Session 106**CLIMATE RESILIENCE & DISASTER SAFE DEVELOPMENT 4.00-5.00 PM**

- Dr. Neeraj Sinha, Adviser (S&T), NITI Aayog, GOI (Chairperson)
- Dr. Harshad P. Thakur, Director, NIHF, MoHFW (Chairperson)
- Dr. Ashish Chaturvedi, Director, Climate Change, GIZ Germany, India Office
- Dr. Simon Allen, Scientist, Institute of Environmental Sciences, University of Geneva
- Prof. Nirupama Agrawal, Emergency Management, York University, Toronto
- Dr. Reinhard Mechler, Program Director – Risk & Resilience, IAASA, Austria
- Dr. Divya Sharma, Executive Director, The Climate Group

Facilitator: Prof. Sunil Nautiyal, Head Ecological Economics, ISEC Bangalore

Review Session 107**CAP-RES & Allied Projects - Presentations 5.00-6.00 PM**

Chairpersons: Dr. Akhilesh Gupta, Advisor & Head – SPLICE, DST-GOI

Dr. Atul Bagai, Country Head – UNEP India Office

Prof. Vinod K Sharma, VC, Sikkim SDMA & Sr. Prof IIPA

- Green Growth, Carbon Neutrality and Strategic Instruments – Research Case Studies, Knowledge Compendium, Policy Paper
- Resilient Agriculture – NADMP, Training Toolkit, District Handbook, Policy Paper
- Resilient Health –NHAP/Centre of Excellence on Climate Resilience, Toolkit, Case studies compendium, Thematic Papers
- Crisis Management to Deal with Water Body Contamination – Research Review
- Science & Technology Communication and Policy-Practice Interface - UNCCD COP-14, NBS – IUCN/CEM, UNEP-Environment Emergencies, Industry Participation/FICCI
- Publications – Books, Research Papers, Policy/Technical Papers, Modules, Reports
- Year II & III Activity Planning

Facilitator: Prof. Anil K Gupta, Head – ECDRM & Project Director CAP-RES, NIDM / Prof. Akhilesh Surjan, Charles Darwin University, Australia

DAY 3: 27 August 2020

Special Panel Discussion Session 108**GREEN-GROWTH & SUSTAINABILITY STRATEGIES 2.00-3.10 PM**

- Shri Vivek Saxena, Country Representative, IUCN India(Chairperson)
- Prof. Chandan Ghosh, Civil & Geo-tech Engineering, Dean, IIT Jammu (Co-Chairperson)
- Prof. Haripriya Gundimeda, Department of Humanities and Social Sciences, IIT Bombay
- Dr. Shalini Dhyani, Senior Scientist CSIR NEERI / Regional Chair South-Asia CEM,IUCN
- Dr. Joerg Szarzynski, Co-Head of GLOMOS, UNU-EHS Bonn, Germany
- Dr. Mrityika Basu, Assistant Professor, Graduate School of Global Environmental Studies Kyoto University, Japan.
- Prof. P. C. Tiwari, Professor and Head of the Department of Geography, Kumaun University

Facilitator: Dr. Ritesh Kumar, Director, Wetland International India / Dr. Rajarshi Dasgupta, IGES, Japan

Review Session 109

Advisory Committee Meeting & Policy Recommendations Panel 3.10-4.40 PM

Distinguished Expert Members

- Prof. Anil K. Gupta, CSIR Bhatnagar Fellow, Former Professor, IIM Ahmedabad, VC-National Innovation Foundation, Founder - Honey Bee Network
- Prof. S. P. Singh, Formerly Vice-Chancellor, HNB Garhwal University
- Dr. Akhilesh Gupta, Advisor & Head –SPLICE,DST-GOI
- Maj. Gen. M. K. Bindal, Executive Director, NIDM
- Dr. G. Ravindra Chary, Director, ICAR-CRIDA, Hyderabad
- Dr. K. S. Murali, Executive Director, MS Swaminathan Research Foundation
- Prof. Dilanthi Amaratunga, Chair Global Disaster Resilience Centre, University of Huddersfield, UK
- Prof. Ravi Sinha, Dept. of Civil Engineering, IITMumbai
- Prof. V. K. Sharma, Exec. Vice Chairman, Sikkim SDMA & Sr. Professor IIPA
- Prof. Santosh Kumar, Head – Inclusive DRR Division, Former Director SAARC-DMC, ED I/C NIDM
- Prof. J. K. Garg, Professor Emeritus, TERI SAS, Former Dean, USEM, GGSIPU
- Dr. A. NambiAppadurai, Director & Strategy Head, World Resources Institute, India
- Dr. Suneel Pandey, Director, The Energy and Resources Institute
- Prof. Sujeet Kumar Singh, Director, NCDC, MoHFW, GOI
- Prof. Balram Bhargava, Secretary, DHR & Director General, Indian Council of Medical Research
- Dr. Sanjay Srivastava, Chief of DRR, UN-ESCAP, Bangkok
- Prof. R K Mall, Dean, Environment and Sustainable Development, BHU Varanasi
- Prof. M. S. Nathawat, Director, Institute of Science, IGNOU, Delhi
- Dr. Shiraz A. Wajih, President, Gorakhpur Environmental Action Group, India

Facilitator: Dr. Nisha Mendiratta, Advisor & Associate Head – SPLICE, DST-GOI / Prof. Anil K. Gupta, Project Director, CAP-RES DST Project

Concluding Session 110

VALEDICTORY SESSION 4.45-6.00 PM

- Conference Summary - Prof. Anil K. Gupta, NIDM – Conference Convener
- Maj. Gen. Manoj K. Bindal, Executive Director, NIDM
- Dr. Akhilesh Gupta, Advisor, Head-SPLICE, DST-GOI & Former Secretary UGC
- Dr. Jigmet Takpa, Joint Secretary, Ministry of Environment Forests & CC
- Shri Sanjeev Kumar Jindal, Joint Secretary (DM), Ministry of Home Affairs
- Shri Kamal Kishore, Member, NDMA, Govt. of India (Special Address)
- Shri Nityanand Rai, Minister of State for Home Affairs, Govt. of India (Valedictory Address)

Facilitator: Dr. Ashish Chaturvedi, Director, Climate Change, GIZ Germany, India Office / Shri Ashish K. Panda, Faculty NIDM / Ms. Nivedita Mani, Coordinator- Knowledge Management, GEAG

Annex II : Programme Brochure

TARGET GROUP

The conference will be attended by experts and officials from the Central and State Government and International agencies including UN, NGOs, implementing agencies, academia and research institutes, and professionals in the field of climate and disaster resilience and sustainable development.

EXPECTED OUTCOME

The programme will allow knowledge sharing among broad range of stakeholders. This initiative will develop a knowledge network, and come up with a roadmap for concerted coordinated planning and actions for resilience and sustainability through climatic adaptive planning processes. It will also enhance the understanding on risk assessments and private sector's contribution to risk assessments for incorporating risk assessment into action, risk sensitive investment and will help in sharing of best practices related to inclusion of DRR into Business Continuity Plans.

CALL FOR PARTICIPATION

- For registration submit google registration form latest by 21st August 2020 using the link: <https://forms.gle/RrgmB5jr7KPcCHZ8>
- Participants interested in presenting a paper in the conference may submit abstract using the above link. Abstracts should be related to theme of the conference.
- A certificate will be awarded to participant with attendance in 75% sessions.

There is no registration fee for the event. However, prior registration and confirmation is necessary for participation in the event.

DATE AND VENUE

25th – 27th August 2020,
Time: 2:00 -6:00 PM all three days

Platform: Cisco Webex

PATRONS

Prof. D. P. Singh, Chairman, UGC, India
Prof. Ashutosh Sharma, Secretary, DST, GoI
Shri G. V. V. Sarma, Member-Secretary, NDMA, GoI

ADVISORY COMMITTEE

Dr. V. Thirupugazh, Additional Secretary, NDMA, GoI
Shri Sanjeev K Jindal, Joint Secretary (DM), MHA, GoI
Maj. Gen. Manoj Kumar Bindal, Executive Director, NIDM
Dr. Dieter Mutz, Team Leader, European Union-Resource Efficiency Initiative (EU-REI)
Prof. Sudhir Jain, Director, IIT, Gandhinagar
Dr. Mohamed-El-Khawad, Programme Director (NRM), GIZ, India
Dr. Ilona Porsche, Head-GCF Business Development Unit, GIZ Germany
Dr. Hendrik Jan Bekeidam, WHO Representative-India
Dr. G. Ashok Kumar, Addl. Secretary & Mission Director – Namami Gange, Ministry of Jal Shakti
Dr. Muralee Thummarukudyl, Operations Manager, Crisis Management Br, UNEP Geneva
Dr. Madhav Karki, Global Vice-Chair IUCN CEM, Switzerland

ORGANIZING COMMITTEE

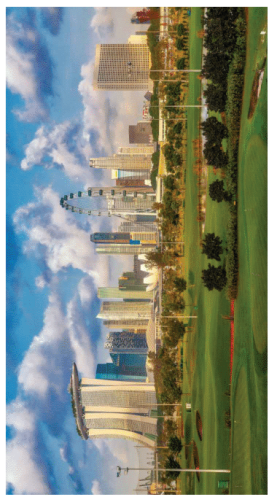
Dr. Akhilesh Gupta, Advisor & Head-SPLICE & Climate Change Programme, DST, GoI (Chair)
Dr. Sanjeev Varshneya, Advisor, DST, GoI
Dr. Nisha Mendiratta, Advisor and Associate Head-SPLICE, DST, GoI
Dr. Naren Aggarwal, Editorial Director, Medicine & Life Sciences, Springer Nature
Prof. Santosh Kumar, Head Inclusive DRR Division, NIDM
Dr. Ashish Chaturvedi, Director- Climate Change, GIZ, India
Shri Ashish Kumar Panda, Consultant, ECDRM Division, NIDM
Prof. Anil Kumar Gupta, Head-ECDRM Division, NIDM
- Project Director/PI: CAP-RES (Convener)

Contact Email: ccdgm.nidm@gmail.com

CONFERENCE ON
S&T Research- Policy-Practice
Interface for Climate Risk Management
Under CAP-RES: DST-GoI Project

Implementing Prime Minister's Agenda 10
– Item 05 Leveraging S&T for DRR

25th – 27th August 2020
Time: 2:00 PM - 6:00 PM



Organized by :

National Institute of Disaster Management
Ministry of Home Affairs, Govt. of India

and

Department of Science and Technology
Government of India, New Delhi

in collaboration with

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH






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**Conference on
S&T Research- Policy-Practice
Interface for Climate Risk Management
Under CAP-RES: DST-GOI Project**

**Implementing Prime Minister's Agenda 10
- Item 05 Leveraging S&T**

**25th-27th August 2020:
@Cisco Webex**

BACKGROUND

Globally and in India, there has been a paradigm shift in Disaster Management, from 'response and relief centric' approach to 'prevention-preparedness and mitigation' centric approach, which calls for holistic, integrated and inclusive strategies with effective use of S&T interventions and innovations from across a range of disciplines.

India is prone to multiple disasters, due to its wide range of environmental, geological and developmental variations. Environmental changes, viz. climate change, land-use changes, natural resource degradation, along with the anthropogenic settings, aggravate disasters and people's vulnerability to the disasters impacts. Guidelines and plans pertaining to disaster management at all levels and across sectors are expected to utilize and integrate relevant S&T interventions, research strategies and innovations. It is equally important to integrate ethical and social dimensions into S&T application for effective benefits. During disasters, both public and private sector end up facing the consequences.

To keep pace with growing climate change and effectively build the resilience towards the future disasters and implement the Disaster Risk Reduction and save the resources we need to have disruptive technology and innovations on carbon neutral green growth along with the already existing traditional and indigenous technology and knowledge.

The Prime Minister's 10 Point Agenda – Item 05 focuses on Leveraging Technologies and Science for DRR in India.

NATIONAL INSTITUTE OF DISASTER MANAGEMENT (NIDM)

The National Institute of Disaster Management (NIDM) is a premier institute of Government of India, under Ministry of Home Affairs, mandated under the Disaster Management Act 2005, for capacity building, training, education, research, policy assistance, documentation, publications, awareness and networking on all aspects of disaster resilience, with activities in and outside the country.

NIDM's Division of Environment, Climate & Disaster Risk Management (ECDRM) has been recognized as Centre for Excellence on Climate Resilience (CECR) under the National Climate Change Mission on Health. ECDRM division is implementing five major research projects including:

- **Climate Adaptive Planning for Resilience and Sustainability Development in Multi-Hazard Environment (CAP-RES):** funded by DST-GOI. The project themes include Green growth, Carbon Neutrality, Resilient Agriculture, Resilient Health, Policy Instruments, through S&T and planning strategies.
- **National Agriculture Disaster Management Plan (NADMP):** focuses on preparing a comprehensive Disaster Management Plan for MoA&FW-GOI that can address the future vulnerabilities and risk of agricultural systems towards disasters in India.
- **Health Adaptation and Resilience: Advancing Strategic Knowledge and Capacities:** supported by World Health Organization (WHO) India.

- The project aims at improving climate change adaptation strategies of healthcare system by addressing knowledge, planning and capacity gaps in healthcare system resilience in India.
- **Crisis Management Plan to deal with Contamination of Water Bodies (CMP-WB):** Supported by the Ministry of Environment, Forests and Climate Change, through Central Pollution Control Board.
- Preparation of **Disaster Management Plan for the Ministry of Environment, Forest and Climate Change (MoEFCC)****
- Preparation of **Disaster Management Plan for the Ministry of Chemical & Fertilizers (MoC&F)****

AIM & OBJECTIVES

This conference aims at all-inclusive viewpoints and roadmap development through discussion & dialogue on experiences and lessons, gaps and opportunities utilize the range of S&T disciplines and innovations including traditional and local science, and role of institutions for promoting the same. The key objectives of the conference include:

- To review the state of research and knowledge across the key themes
- To develop a network mode roadmap for addressing the gaps by engaging different stakeholders.

THEMATIC SESSIONS

1. S&T Policy in Indian Context for CCA, DRR, SDG
2. Path Breaking Research Needs
3. Role of Industry & Private Sector
4. Role of Disruptive Technology
5. Indigenous Technology & Innovations
6. International Science Cooperation

Annex III: List of Partnering Institutions/ Organizers/ Departments

National

Ministries	Institutions	Organizations
• Department of Science & Technology, GoI • National Disaster Management Authority, GoI • Office of Principal Scientific Advisor, GoI • NITI Aayog, GoI, • Ministry of Health & Family Welfare • The Climate Group, • Sikkim State Disaster Management Authority • Ministry of Environment Forests & Climate Change	• HNB Garhwal University • National Institute of Advanced Studies • Wadia Institute of Himalayan Geology • Mahatma Gandhi Chitrkoot University • IIT Gandhinagar • IIT Guwahati • IIT Delhi • IIT Tirupati • IIT Mumbai • IIT Indore • IIT Jammu • Puducherry University • Jawaharlal Nehru University • TERI School of Advanced Studies • Guru Govind Singh Indraprastha University • Banaras Hindu University • Indira Gandhi National Open University	• Federation of Indian Chambers of Commerce & Industry • Council of Scientific & Industrial Research-National Environmental Engineering Research Institute • Honey Bee Network • Indian Council of Agriculture Research - Central Research Institute for Dryland Agriculture • MS Swaminathan Research Foundation • Gorakhpur Environmental Action Group • The Energy and Resources Institute

International

Organizations	Institutions
• Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) India • International Union of Conservation of Nature, India • International Institute for Applied Systems Analysis, Austria • The German Centre for Research and Innovation, New Delhi • Institute for Social and Environmental Transition USA • Springer Nature, India • World Resources Institute, India • United Nations Office for Outer Space Affairs, Vienna • United Nations Economic and Social Commission for Asia and the Pacific, Bangkok • Global Mountain Safeguard Research, Bonn-Germany • United Nations University for Environment & Human Security, Bonn-Germany	• Keio University, Japan • University of Geneva, • York University, Toronto • Erasmus University, Rotterdam • Charles Darwin University, Australia • University of Huddersfield, United Kingdom • Graduate School of Global Environmental Studies, Kyoto University, Japan

Annex IV: List of Participants

S.N.	Name	S.N.	Name	S.N.	Name
1	Mr. Chittimala Nagaraju	33	Ms. Susmita Mandal	66	Dr. Syed Umer Latief
2	Mr. B.R. Balaji	34	Dr. Kaberi Brahma	67	Mr. Bijith B L
3	Ms. Nidhi	35	Ms. Ankita Chatterjee	68	Mr. Mohd Azam
4	Ms. Neetha Rose C D	36	Dr. Bedhas Ujjwal Mandal	69	Ms. Swandana Chakraborty
5	Mr. Yogesh Jaisingh Pardeshi	37	Ms. Nilanjana Chakraborty	70	Mr. Amit Anand
6	Mr. Rajan Kumar	38	Mr. Arindam Ray	71	Mr. Jeet Das
7	Mr. Vivekanand Vijaykumar Kadam	39	Ms. Pallavi Pal	72	Mr. Dibas Mandal
		40	Ms. Susmita Banerjee	73	Ms. Nilanjana singha
8	Mr. Avikalp Mishra	41	Ms. Deepashree Chatterjee	74	Dr. Surender Kaur
9	Dr. Prasamita Sarkar	42	Dr. A. Krishnaveni	75	Ms. Rima Roy
10	Dr. A. Geetha Bhavani	43	Mr. Mohd. Waseem	76	Mr. Pushpendra Kumar Singh
11	Dr. Paramesha J R	44	Dr. Mohammad Saleem	77	Ms. Rima Roy
12	Mr. Arvind Chauhan	45	Ms. Jinia Rahaman	78	Mr. Sachin Kumar
13	Mr. Sharaddeep	46	Dr. Anwesha Haldar	79	Dr. Rajan Chaudhari
14	Mr. Prashant Goklani	47	Mr. Mousumi Das	80	Dr. M. Baharuddin Shah
15	Mr. Barothitesh	48	Dr. Abhrankash Kanungo	81	Mr. Mohd Saad Shamim
16	Mr. Adarsh T	49	Ms. Huma Yaseen	82	Mr. Bouran Awad Hassan Mohammed
17	Mr. Taha Shamim	50	Ms. Dipanwita Paul		
18	Mr. Aadil Khan Ghazi	51	Ms. Sukanya Sen	83	Mr. Iqra Hasan
19	Mrs. Mamta Pandey	52	PPS Dhillon	84	Mr. Aabid Hussain Khann
20	Mr. Bashir Ahmad Dar	53	Ms. Sulagna Biswas	85	Ms. Sahely Mondal
21	Mr. Vignesh B	54	Ms. Pritha Sarkar	86	Mr. Arshad Iftexhar
22	Mr. Manjit Mahanta	55	Mr. Sanjay Maity	87	Ms. Kamalini Dasgupta
23	Mr. Anish Bhai	56	Mr. Krishnankutty Nair NG	88	Ms. Pushpa Pandey
24	Mr. Harbakhsh Singh	57	Ms. Nupur Chowdhury	89	Mr. Praveen Kumar Ekka
25	Mr. Loy Rego	58	Ms. Sunetra Paul	90	Ms. Debrupa Chakraborty
26	Mr. Olakunle Johnson Ajiboye	59	Mr. Karan Mengi	91	Mr. Devendra Singh Parihar
27	Dr. Satish Uttamrao Patil	60	Mr. Bhanu Sahu	92	Dr. Pardeep Kumar Sharma
28	Mr. Krishnanandh	61	Mr. Moutan Roy Chowdhury	93	Dr. Madhumita Ghosh
29	Dr. Dhiraj Kumar Yadav	62	Mr. Irfan Ahmad Bhat	94	Dr. Mohammad Aftab Alam
30	Ms. Kritika	63	Mr. E Bormi S Langshiang	95	Mr. Kamlesh Kumar
31	Mr. Sankamendra Maurya	64	Ms. Meher Kant Verma	96	Dr. Baidyanath Kumar
32	Mr. Vasudevan. K.	65	Dr. Droupiti Yadav	97	Ms. Garima Shukla

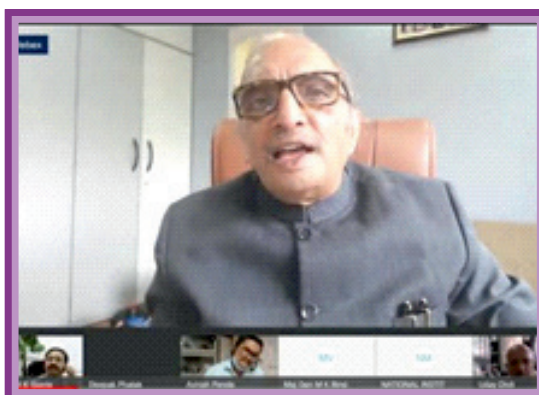
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100	Mr. Arijeet Mishra	136	Ms. Moushila De	172	Dr. Manash Dey
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133	Mr. Rayees Ahmed	169	Ms. S. RASUL MEERA	205	Dr. Sunil Kumar Ojha

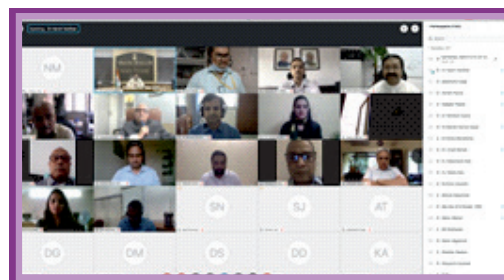
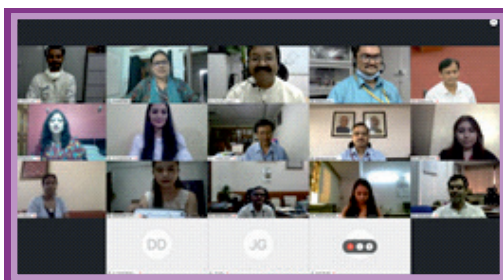
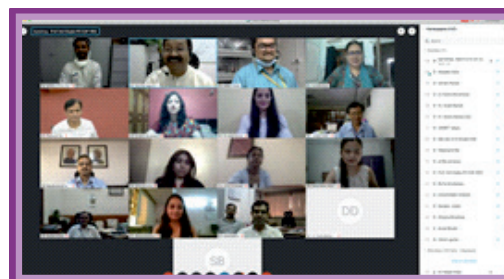
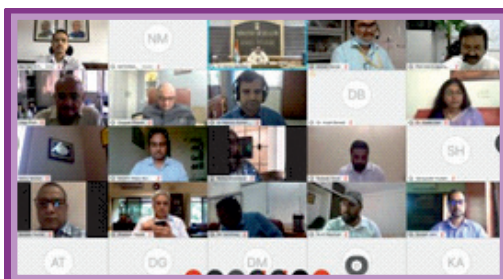
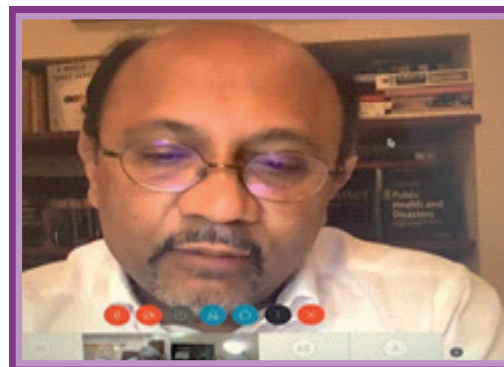
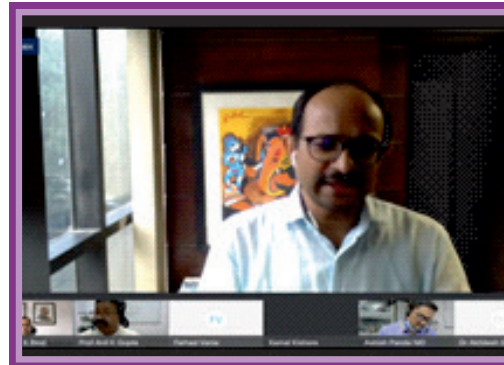
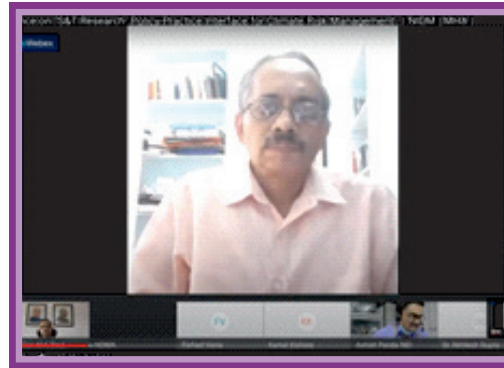
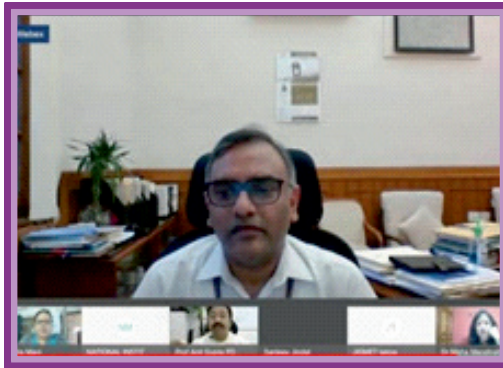
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338	Dr. Rana Pratap Singh	374	Mr. Girish Chandra Mishra	410	Dr Tejindarpal Singh Sachdeva
339	Mr. Rohit	375	Dr. Akshay Kumar	411	Dr. Pradip Dey
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343	Dr. Manisha Singh	379	Dr C PRAKASAM	415	Mr.Nandan Manna
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347	Mr. Manoj Kumar	383	Ms. Shraddha Krishna	419	Dr. Rekha Anil Kumar
348	Dr. Vidhya Venugopal	384	Mr. Pratik Jaiswal	420	Mr. Jaiprakash Pullakudy

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434	Ms. R.Shalini	453	Dr Arif Yaqoob Malik	472	Mr. Sumit Singh
435	Ms. Meenaketan Shee	454	Ms. Chetna	473	Mr. Dilip C S
436	Mr. Rohan Mark Nimmagadda	455	Mr. Mahjabeen Parveen		
437	Dr. Monideepa Mitra	456	Mr. Govind Kumar		

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