

**CENTRE FOR SCIENCE AND TECHNOLOGY OF THE NON-ALIGNED  
AND OTHER DEVELOPING COUNTRIES  
(NAM S&T CENTRE)**

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**INTERNATIONAL ROUNDTABLE**

ON

**IMPACTS OF EXTREME NATURAL EVENTS: SCIENCE & TECHNOLOGY FOR  
MITIGATION (IRENE)**

**COLOMBO, SRI LANKA  
13-15 DECEMBER 2017**

**BRIEF REPORT**

The global change in climate is leading to the alterations in frequency, intensity, spatial extent and duration of weather and climate extremes. These climate extremes impact severely on both human and ecosystems including economic losses, sectors such as tourism and agriculture, urban settlements, small island states, etc. Global demographic trends suggest that more people are living in areas vulnerable to the sudden onset of natural disasters even as scientists predict that the frequency and intensity of these disasters are likely to increase as a result of the effects of climate change. This state of affairs requires nothing short of a technological revolution to address extreme natural patterns like floods, earthquakes, mudslide, torrential rain, hurricanes, tornadoes etc. Actions at multiple levels engaging different actors' viz., national and international stakeholders and private institutions is the need of the hour to push the international protection regime forward.

The emerging trends in extreme natural phenomena coupled with recent high-profile megadisasters like Monsoon flooding in Bangladesh; Hurricane Irma in USA and Caribbean; floods in different regions of India; mudslide in Colombia; and earthquakes in Mexico and Iran, are raising global awareness of the need to build the capacity of national governments, civil society organisations and international entities to prevent, respond to and recover from natural disasters. Keeping this in view, the NAM S&T Centre in partnership with the National Science & Technology Commission (NASTEC), Sri Lanka and the Research Centre-Technology for Disaster Prevention, South Eastern University of Sri Lanka (RC-TDP, SEUSL) organised an international Roundtable on 'Impacts of Extreme Natural Events: Science & Technology for Mitigation (IRENE)' in Colombo, Sri Lanka during 13-15 December 2017, which brought the scientists, experts and professionals engaged in R&D, policy making and implementation, social activists and other stake holders to a common forum for sharing views and experiences for the development of a road map for reducing the risks in real situations.

The Inaugural Session started with the National Anthem and lighting of the traditional lamp. During the Inaugural Session Prof. Dr. M. J. S. Wijeyaratne, Chairman, National Science & Technology Commission (NASTEC) made a welcome address, which was followed by the address of Prof. Dr. Arun P. Kulshreshtha, Director General, Centre for Science & Technology of the Non-Aligned and Other Developing Countries (NAM S&T Centre), who presented the genesis of the event and also briefly described the activities of the inter-governmental organisation headed by him. The Chief Guest, Mr. Udaya R. Seneviratne,

Secretary, Ministry of Science, Technology & Research (MOSTR), Sri Lanka and Vice President, NAM S&T Centre in his Inaugural Address remarked about the calamities being faced by the humanity due to climate change related natural disasters. Prof. Dr. M.M.M. Najim, Vice Chancellor, South Eastern University of Sri Lanka (SEUSL) gave an introduction with the background of the Roundtable; and a Vote of Thanks was delivered by Dr. Muditha Liyanagedera, Director and CEO, NASTEC.

The Roundtable was attended by 44 senior professionals from 18 countries –Egypt, India, Indonesia, Iran, Iraq, Malaysia, Mauritius, Myanmar, Nepal, Pakistan, Palestine, Qatar, South Africa, Togo, The United Kingdom, Vietnam and Zambia, and the host country Sri Lanka.

16 foreign participants were from Egypt [Prof. Dr. Salah M. Mahmoud, Professor, Geodynamics, National Research Institute of Astronomy and Geophysics (NRIAG), Cairo]; India [Dr. B. C. Prabhakar, Professor, Department of Geology & Director, IQAC, Bangalore University, Bangalore; Dr. Bikasha Chandra Panda, Professor, Civil Engineering, Indira Gandhi Institute of Technology, Dhenkanal, Odisha; Dr. Debi Prasanna Kanungo, Senior Principal Scientist & Professor, Geotechnical Engineering Division, CSIR-Central Building Research Institute, Roorkee, Uttarakhand; Dr. K. N. Radhika, Associate Professor, Department of Civil Engineering, East West Institute of Technology, Bangalore; Dr. Krushna Chandra Gouda, Senior Scientist and Faculty, CSIR Fourth Paradigm Institute (C-MMACS), Bangalore; Prof. Ravindra Arora, Professor (Retd.), Department of Electrical Engineering, Indian Institute of Technology, Kanpur; and Prof. V. Madha Suresh, Professor and Head, Centre for Natural Hazards and Disaster Studies, School of Earth and Atmospheric Sciences, University of Madras]; Indonesia [Dr. Finarya Legoh, Principal Engineer, The Agency for Assessment & Application of Technology (BPPT), Jakarta]; Iran [Dr. Ali Reza Nejadmohammad Namaghi, Head of the Department, Department of Natural Resources, Khorasan-e-Razavi Agricultural and Natural Resources Research and Education Center, Mashhad; and Prof. M. Kafi, Professor and President, Ferdowsi University of Mashhad (FUM), Mashhad]; Iraq [Mrs. Noor Adnan Jasim, Geologist, Remote Sensing Center, Space and Communications Directorate, Ministry of Science and Technology, Baghdad]; Malaysia [Prof. Dr. Biswajeet Pradhan, Professor, Department of Civil Engineering, University Putra Malaysia, Serdang; and Prof. Dr. Chandima Gomes, Professor, Department of Electrical and Electronics Engineering, Universiti Putra Malaysia, Selangor; and Mrs. Nik Noorhayati Nik Abdul Majid, Meteorological Officer, National Climate Centre, Malaysian Meteorological Department, Selangor]; Mauritius [Mr. Damonsing Jerry Robin, Senior Civil Engineer, Ministry of Public Infrastructure and Land Transport, Port Louis]; Myanmar [Dr. Myat Soe Aung, Deputy Director, Department of Research and Innovation, Ministry of Education, Yangon]; Nepal [Prof. Dr. Jiba Raj Pokharel, Vice-Chancellor, Nepal Academy of Science and Technology (NAST), Lalitpur]; Pakistan [Dr. Muhammad Imran Shahzad, Assistant Professor / Associate Head of Department, COMSATS Institute of Information Technology (CIIT), Islamabad]; Palestine [Mr. Imadoddin Al-Baba, Director, Department of Scientific Research, Environment Quality Authority, Al-Bireh]; Qatar [Dr. Muhammad Imran, Scientist, Qatar Computing Research Institute (QCRI), Doha]; South Africa [Dr. Raymond John Durrheim, South African Research Chair in Exploration, Earthquake & Mining Seismology, University of the Witwatersrand, Johannesburg]; Togo [Dr. Komi Kossi, Research Associate, WASCAL, University of Lomé, Lomé]; United Kingdom [Dr. Kaushal Keraminiyage, Department Lead

for Teaching and Learning, Department of Architecture and 3D Design Global Disaster Resilience Research Centre; and Dr. Nuwan Dias, Post Doctoral Researcher, School of Art, Design & Architecture, University of Huddersfield]; Vietnam [Dr. Bach Tan Sinh, Acting Director, Research Centre of S&T Policy, National Institute for S&T Policy and Strategy Studies (NISTPASS), Hanoi]; and Zambia [Mr. Lusekelo Kasunga, National Remote Sensing Centre (NRC), Lusaka]. The NAM S&T Centre was represented by its Director General, Prof. Arun P. Kulshreshtha and Ms. Rashmi Srivastava, Research Associate.

The Sri Lankan participants, who made technical presentations during the Roundtable, were Mr. A. Narmilan, Lecturer (Prob.), Department of Biosystems Technology, Faculty of Technology, South Eastern University of Sri Lanka (SEUSL); Ms. E. Pavithira, Demonstrator, Department of Biosystems Technology, SEUSL; Mr. G. Naveendrakumar, Postgraduate Student, Postgraduate Institute of Science (PGIS), University of Peradeniya; Dr. H.K.W.I. Jayawardena, Senior Lecturer in Physics, The Open University of Sri Lanka; Mr. K. Nijamir, Assistant Lecturer, Department of Geography, SEUSL; Dr. Lareef Zubair, Principal Scientist & Scientific Writer, Foundation for Environment Climate and Technology; Mr. S. Mathanraj, Lecturer (Prob.), Department of Geography, Eastern University of Sri Lanka, Chenkaladi; Dr. M. G. Mohamed Thariq, Dean, Faculty of Technology, SEUSL; Ms. Nushrath Najimuddin, Junior Research Scientist, Foundation for Environment Climate and Technology; Dr. N.W.A.N.Y. Wijesekara, Medical Officer, Disaster Preparedness and Response Division, Ministry of Health, Nutrition and Indigenous Medicine; Mr. P. Rajeevkarana, Postgraduate Student, University of Moratuwa; Mr. Ruchira Lokuhetti, Junior Research Scientist, Foundation for Environment Climate and Technology; and Dr. T.T.S. Wickramarachchi, Medical Officer, Disaster Preparedness and Response Division, Ministry of Health, Nutrition and Indigenous Medicine, Colombo.

The overall programme of the Roundtable was conducted in six technical sessions, respectively chaired by Prof. Dr. M.M.M. Najim of SEUSL, Sri Lanka; Dr. Kaushal Keraminiyage of UK; Dr. M.G. Mohamed Thariq of SEUSL, Sri Lanka; Dr. Lareef Zubair of Foundation for Environment Climate and Technology, Rajawella, Sri Lanka; Prof. Biswajeet Pradhan of UPM, Malaysia; and Dr. Muditha Liyanagedara of NASTEC, Sri Lanka. The Concluding Session was chaired by Prof. Dr. Chandima Gomes of UPM, Malaysia.

The technical programme commenced with a Keynote Address by Dr. Chandima Gomes of UPM on 'Living with Extreme Natural Events: Avoiding Disasters'. The other scientific presentations made by the foreign delegates during the Technical Sessions were on 'Mitigation of Natural Events Disasters in Egypt using Seismic and GPS data' by Prof. Dr. Salah M. Mahmoud; 'Climate Change and its Impact on the Economic Sectors in the Rural Areas of Karnataka - Need for Multi-Pronged Approach' by Dr. B. C. Prabhakar; 'Risk of Lightning and Mitigating its Impact in the Eastern Indian State of Odisha' by Dr. Bikasha Chandra Panda; 'Landslide Risk Assessment and Real Time Monitoring for minimizing the Impact of Rainfall Induced Landslides in Indian Himalayas' by Dr. Debi Prasanna Kanungo; 'Working Out Ways to find Commercially Viable Measures to develop Water Resources in the Face of Climate Change and Recurring Droughts in India' by Dr. K. N. Radhika; 'Advanced Forecasting Capability of Hydro-Meteorological Disasters' by Dr. Krushna Chandra Gouda; 'Lightning, an Extreme Natural Event causing Loss of Life and Property' by Dr. Ravindra Arora; 'An Assessment of Flood Vulnerability using Risk Matrix Method- A Case Study of Kanniyakumari District, Tamil Nadu' by Prof. V. Madha Suresh;

'Restoration Opportunities Assessment Methodology (ROAM) for Landscape Stewardship from Natural Disasters: A Way Forward' by Ms. Rashmi Srivastava; 'Role of Science and Technology Communication in Disaster Risk Reduction and Awareness' by Dr. Finarya Legoh; 'Assessment of Desertification, (Extreme Natural Events) in Iran by ANN & IMDPA Model' by Dr. Ali Reza Nejadmohammad Namaghi; 'Salinization of Agricultural Resources: A Natural Disaster in Irrigated Agriculture' by Prof. M. Kafi; 'Seismicity Evaluation of Southern Iraq' by Mrs. Noor Adnan Jasim; 'Kelantan Big Yellow Flood 2014: Impacts and Mitigation' by Mrs. Nik Noorhayati Nik Abdul Majid; 'An Overview of Mauritius, the Hazards being faced due to Extreme Natural Events and the Counter Measures being undertaken' by Mr. Damonsing Jerry Robin; 'The Impacts of Extreme Natural Events: S&T Awareness, Development and Education in Myanmar' by Dr. Myat Soe Aung; 'Mitigation Technologies for Disaster Risk Reduction in Nepal' by Prof. Dr. Jiba Raj Pokharel; 'Socio Economic Assessment of Surface Deformation due to Pasni Earthquake Detected by Optical and RADAR Remote Sensing' by Dr. Muhammad Imran Shahzad; 'The Extreme Natural Events: Science & Technology for Mitigation in Palestine' by Mr. Imadoddin Al-Baba; 'Enabling Rapid Disaster Response using Artificial Intelligence and Social Media' by Dr. Muhammad Imran; 'The SSA-GEM Seismic Hazard Model for The East African Rift' by Dr. Raymond John Durrheim; 'Physical Flood Vulnerability Mapping using the Analytical Hierarchy Process Method and Geography Information System: Application to the Savannah Region, Togo (West Africa)' by Dr. Komi Kossi; 'Success and Failures of Disaster Induced Resettlements: The Role of Science and Technology' by Dr. Kaushal Keraminiyage; 'A Review on key challenges towards Risk Reduction Science and Innovation Plans' by Dr. Nuwan Dias; 'Applying Robust Decision Making (RDM) to ensure Robust Flood Management in Ho Chi Minh City, Vietnam' by Dr. Bach Tan Sinh; and 'The Use of Remote Sensing and GIS for Drought Assessment: The Case of Southern Province' by Mr. Lusekelo Kasunga.

The presentations made by the Sri Lankan participants were on 'Impact of Extreme Climate on Crop Production and Management Techniques in Batticaloa District, Sri Lanka: Review on Flood and Drought' by Mr. A. Narmilan; 'The Effect of Floods on Livestock in Ampara District in Sri Lanka' by Ms. E. Pavithira; 'Long-term Temperature Trends in Climatological Zones of Sri Lanka' by Mr. G. Naveendrakumar; 'Understanding Connections between Climate, Extreme Weather, Air Quality, and Health with a Glance at Sri Lanka' by Dr. H. K. W. I. Jayawardena; 'Coastal Morphodynamics of Natural Hazard: A Case Study of Oluvil Area in Ampara District, Sri Lanka' by Mr. K. Nijamir; 'Cyclonic Storm Roanu and the Orographic Rainfall Mechanism triggered the Landslide in Aranayaka in May 2016' by Dr. Lareef Zubair; 'The Effects of Flooding in Kaluwanchikudy DSD: An Analysis Using GIS Application' by Mr. S. Mathanraj; 'Seasonal impact of Climate on Tea Production in Sri Lanka' by Ms. Nushrath Najimuddin; 'Use of Traffic Light signs to indicate Status of Emergency: An Innovative Visual Management tool for Health sector' by Dr. N.W.A.N.Y. Wijesekara; 'Influence of Matric Suction on Pullout Resistance of Soil Nails' by Mr. P. Rajeevkarana; 'Drought Monitoring for Sri Lanka: Spatial Extent and Temporal Evolution during the 2016-17 Drought' by Mr. Ruchira Lokuhetti; and 'Ensuring Continuity of Health Service Provision and promoting Health of Communities during Drought Situations: Circular Guidelines by Ministry of Health' by Dr. T.T.S. Wickramarachchi.

The Concluding Session of the Roundtable was chaired by Dr. Chandima Gomes, UPM,

Malaysia wherein extensive discussion on a draft Colombo Resolution on ‘Mitigation of Impacts of Human Hazards due to Extreme Natural Events: Five Year Road-Map on the Adoption and Development of Scientific & Technological Advancements’ was initiated by Prof. Arun P. Kulshreshtha, DG, NAM S&T Centre and comments/inputs from the participants were then incorporated in the draft after deliberations. The finalised Resolution was then unanimously adopted by the participants for its submission to the concerned ministries, agencies and other authorities in their countries. This was followed by the distribution of Certificates by Prof. Kulshreshtha to the Roundtable participants and the Session got concluded with the Vote of Thanks delivered by Dr. Muditha Liyanagedera, Director and CEO, NASTEC.

In order to leverage the learning and experience, a field visit was arranged for the foreign delegates to a Landslide site at Kahagalla in Central Province of Sri Lanka.

An official Banquet Dinner was hosted by RC-TDP, SEUSL at Eagles View Lagoon Hall in Katunayake on 13<sup>th</sup> December 2017. Another official Banquet Dinner was hosted by NASTEC at Amagi Aria Lagoon Resort in Negombo on 14<sup>th</sup> December 2017, which concluded with a cultural programme presented by Sri Lankan Coast Guards Band.

The participants expressed their gratitude to the organisers and hosts, NASTEC and RC-TDP of SEUSL for the excellent arrangements and efficient coordination during the Roundtable.