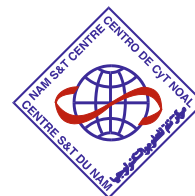


# NAM

## S&T Newsletter



A Quarterly of the  
Centre for Science and Technology of the Non-Aligned  
and Other Developing Countries (NAM S&T Centre)

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### FROM THE DG'S DESK

Warmest Greetings to all our Esteemed Readers!!



With the goodwill and support of the Focal Points of the NAM S&T Centre and the scientific community in its Member Countries, the Centre has implemented several significant initiatives over the years to promote South-South Cooperation in Science and Technology. It remains committed to assisting the NAM and other Developing Countries in their pursuit of collective self-reliance and facilitation in achieving the UN Sustainable Development Goals (SDG) - 2030.

During the second quarter of this year, the NAM S&T Centre successfully organized two scientific events. An International Consultative Meeting on 'Research & Development and Technology Transfer for Sustainable Agriculture and Food Security in Low-Income Countries' was organized in partnership with the National Institute for Scientific and Industrial Research (NISIR), Lusaka, Zambia and the Ministry of Technology and Science (MoTS), Lusaka, Zambia during May 8-9, 2024 in Lusaka, Zambia. The two-day programme was attended by more than 90 scientists, researchers, academicians, policymakers and other professionals from 10 countries to discuss policies, regulations and strategies for enhancing sustainable agriculture and food security in low-income countries. The second event was an International Conference on 'Integrated Responses to the Intensification of Extreme Climate and Weather Events in Developing Economies' that was organized in partnership with the School for Climate Studies, University of Stellenbosch (SU), South Africa; Alliance for Collaboration on Climate and Earth Systems Science (ACCESS), South Africa and the Scientific Committee on Problems of the Environment (SCOPE), Delft, the Netherlands during May 22-24, 2024 in Stellenbosch, South Africa. The Conference brought together over 150 participants from 12 countries and aimed to foster understanding of effective systems for responding to the intensification of extreme climate and weather events in the Global South.

I am delighted to announce that our book titled 'Water Management in Developing Countries and Sustainable Development' edited by Dr. S. Suriyanarayanan (India), Dr. Shivaraju H.P. (India) and Dr. David Jenkins (UK) and published by Springer Nature, Singapore has been released in May 2024. This book provides comprehensive insights into sustainable water resource planning and governance, infrastructure development and optimal regulations to conserve the quality as well as quantity of water available in the developing countries.

For the next quarter, the Centre is pleased to announce the organization of an International Training Programme on 'STI Policy: Roles of STI for Excellence in Commercialization in Emerging Economies' in partnership with the International Science, Technology and Innovation Centre for South-South Cooperation under the auspices of UNESCO (ISTIC), Kuala Lumpur, Malaysia during September 12-14, 2024 in Kuala Lumpur. Interested scientists and experts may look for the detailed guidelines for submission of applications for the Training Programme available at the Centre's website: [www.namstct.org](http://www.namstct.org).

The Centre is also looking forward to the publication of two other important books/monographs shortly through Springer Nature, Singapore. These books are: *Arsenic Remediation of Food and Water: Technological Interventions and Perspectives from Developing Countries*; and *Severe Storms: Anatomy, Early Warning Systems and Aftermath in Changing Climate Scenarios*.

We eagerly seek the continued support and cooperation of our Member Countries and other stakeholders in our future S&T endeavours.

Happy Reading!!

  
**(Amitava Bandopadhyay)**  
Director General

### Centre Organised

International Consultative Meeting on  
**Research & Development and Technology Transfer for  
Sustainable Agriculture and Food Security in Low-Income Countries**  
Lusaka, Zambia, 8-9 May 2024

Agriculture is given priority status in developing countries. However, to make agriculture more sustainable and protect vulnerable farming systems in low-income countries', concerns about climate change present risks and uncertainties that need to be addressed. Specifically, in low-income countries, the frequency of extreme weather events such as unpredictable rainfall, high temperatures and fluctuations in pest and disease attacks, are already affecting agricultural productivity and yield, thereby threatening food security in these regions. Consequently, there is a need to intensify research and development to identify "South-specific Barriers" to sustainable agriculture and recommend suitable adaptation methods to facilitate affordable distribution of food and maintain people's livelihoods even amidst climatic and other uncertainties. International collaboration is important in achieving sustainable agriculture and building more food-

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International Conference on  
**Integrated Responses to the Intensification of  
Extreme Climate and Weather Events in Developing Economies**  
Stellenbosch, Cape Town, South Africa, 22-24 May 2024

Human-induced climate change beyond natural climate variability, including more frequent and intense extreme events has caused widespread adverse impacts and related losses and damages to nature and people. The adverse impacts of extreme weather and climate events are amplified by their increased intensity, duration and spatial extent. Sequential extreme events can compound increasing impacts above what would normally be expected for an isolated extreme weather event.

To initiate collaboration on developing appropriate systems to respond to extreme climate and weather events, the Centre for Science & Technology of the Non-Aligned and Other Developing Countries (NAM S&T Centre), New Delhi in partnership with the School for Climate Studies, University of Stellenbosch (SU), South Africa; Alliance for Collaboration on Climate and Earth Systems Science (ACCESS), South Africa and the Science Scientific Committee on Problems of the Environment (SCOPE), the Netherlands, organized a comprehensive International Conference on "Integrated

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secure countries. South-to-South collaborations are being encouraged at multiple levels including capacity building for human resources and sharing technical strategies.

Realizing the importance of these issues, the Centre for Science & Technology of Non-Aligned and Other Developing Countries (NAM S&T Centre), New Delhi, India in partnership with the National Institute for Scientific and Industrial Research (NISIR), Lusaka, Zambia and the Ministry of Technology and Science (MoTS), Lusaka, Zambia organized an International Consultative Meeting on '**Research & Development and Technology Transfer for Sustainable Agriculture and Food Security in Low-Income Countries**' during **May 8-9, 2024**.

The two-day programme was attended by more than 90 scientists, researchers, academicians, policymakers and other professionals from 10 countries namely: Egypt, India, Malaysia, Mauritius, Myanmar, Nepal, Palestine, South Africa, Zimbabwe and the host country Zambia.



The Inaugural session was facilitated with an introduction by **Dr. Kutemba K. Kapanji-Kakoma**, Scientific Researcher, NISIR. **Dr. Henry Kambafwile**, Director/Chief Executive Officer, NISIR extended a warm welcome to all assembled dignitaries and participants and also summarized the importance of the Consultative Meeting in today's context and important S&T challenges Zambia is facing in overall development of the country.

**Dr. Amitava Bandopadhyay**, Director General, NAM S&T Centre, New Delhi welcomed the delegates and briefly discussed the idea behind conducting this Meeting. In his address, he provided an overview about the NAM S&T Centre, describing its organizational structure, objectives and major scientific activities & achievements. Dr. Bandopadhyay thanked the Hon'ble Minister and other dignitaries for gracing the occasion. He also thanked Dr. Kambafwile, Members of the NISIR Organising Committee and officials from MoTS, Zambia for organizing the Consultative Meeting.

**Dr. Palesa Sekhejane** from the Human Sciences Research Council (HSRC), South Africa in her remarks, thanked NISIR and extended her warm greetings to all the guests and delegates. She gave a brief description about HSRC and its S&T activities.

**H.E. Mr. Felix Mutati**, Hon'ble Minister of Technology and Science, Zambia in his inaugural address articulated the existential threat posed by climate change to global food security and urged for the deployment of innovative technologies as solutions against impending crises in regard to food shortage and food security. He also advised the Members of Scientific Community to focus especially on agricultural and food processing technologies that are cost effective and implementable in the developing world.

Over the two days, the meeting was conducted with five **Technical Sessions** under which two **Special Invited Lectures** and five **Keynote Lectures** were delivered and also nineteen **Technical Paper Presentations** were made.



The first Special Invited Lecture was delivered by **Dr. Kalaluka Munyinda**, Department of Plant Science, University of Zambia, Lusaka on '*Creating Variability in Legume Crop Varieties for Adaptation*'. Using the cowpea plant as a case study, Dr. Munyinda underscored the significance of cultivating drought-tolerant varieties suited to semi-arid regions, elucidating how such crops can serve as a source of nutrients, thereby ensuring food security during extreme climate events.

The second Special Invited Lecture was jointly delivered by **Dr. Rodney Managa** and

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**Dr. Blessing Masamha** from the Institute of South Africa in the Human Sciences Research Council, Pretoria, South Africa on '*Towards a Transformed Agri-food Systems: Leveraging the Digital Divide and Climate-smart Agriculture Technologies in Rural, Peri-urban, and Urban Areas*'. Their lecture delved into the transformative potential of leveraging digital and climate-smart agriculture technologies across rural, peri-urban, and urban landscapes. Their talk was centered on accelerating the evolution of agri-food systems to fortify food security and nutrition, elucidating how digital innovations can catalyze this paradigm shift.

During first Technical Session - **Sustainable Agriculture in the Global South: Overview, Perspectives and Challenges**; two Keynote Lectures were delivered by: **Dr. Hlamalani Judith Ngwenya**, Founder & CEO, FOSCC, South Africa and **Prof. Dr. Vishal Kumar Gupta**, Dean (Academics), JSS Academy of Higher Education & Research (JSS AHER), Mysuru, Karnataka, India. Their respective presentations were on '*Tackling Technology Poverty to Address Sustainable Agriculture and Food Security Opportunities for Low Income Countries*' and '*Growing Medicinal Plants through Sustainable Agriculture: Building Human Resource Capacity in Low-income Countries*'. The third Keynote Lecture during Technical Session II; **Research & Development on Sustainable Agriculture: Current Status and Bridging the Gap** was delivered by **Dr. Patrick Chikoti**, Deputy Director, Zambia Agricultural Research Institute (ZARI), Zambia on '*Research and Development in Sustainable Agriculture in the Global South: Some Strategic Considerations*'.

Another Keynote Lecture was delivered by **Dr. Xavier Poshiwa**, Dean, Gary Magadzire School of Agriculture, Great Zimbabwe University (GZU), Masvingo, Zimbabwe on '*Bridging the Gap: Research and Development, Technology Transfer and Sustainable Agriculture in Low-Income Countries*' during the third Technical Session: **Climate Resilient Agriculture, Compatible Technologies and Technology Transfer**.

The fifth Keynote Address was delivered by **Mr. Richard Chintu**, National Marketing Coordinator, Food Reserve Agency (FRA), Zambia on '*Enhancing Food Security in Zambia through Food Waste Reduction in the Face of Climate Change*' during Technical Session IV: **Food Security in Low-Income Countries: Challenges and Way Forward**.

Nineteen technical papers were presented by researchers from eight countries. From Egypt, **Dr. Ahmed Mohamed Magdy Ahmed Abdo Gabr**, Professor, National Research Center, Cairo, presented paper on '*Impact of Digital Agriculture in Desert and Urban Area*'.

**Dr. Lingaraju Honnur Gurusiddappa**, Assistant Professor, Department of Environmental Sciences, JSS AHER, Mysuru, Karnataka, India presented paper on '*Influence of Different Levels of Panchagavya on Growth & Yield Attributes of Tomato (Solanum Lycopersicum)*'. From Mauritius, **Dr. Sunita Facknat**, Professor in Sustainable Agriculture, Faculty of Agriculture, University of Mauritius, Reduit, presented her paper on '*Transformation of a Rural Community into a Climate Smart Village – Case of Belle Mare in the Republic of Mauritius*' and from Malaysia, **Dr. Ida Idayu Binti Muhamad**, Professor, Food and Biomaterial Engineering RG, Bioprocess & Polymer Engineering Department, Faculty of Chemical and Energy Engineering, Universiti Teknologi Malaysia, Johor, Malaysia on '*Eco-design with Active Smart Packaging for Sustainable Agriculture*' and **Mrs. Nor Affini Binti Zakaria**, Assistant Secretary (Administrative and Diplomatic Officer), Ministry of Science, Technology and Innovation (MOSTI), Putrajaya, Malaysia presented a paper on '*Agriculture and Food Security in Malaysia's National Biotechnology Policy 2.0 (NBP 2.0)*'.

**Dr. Myat Minn**, Director, Department of Biotechnology Research, Ministry of Science and Technology, Naypyita from Myanmar, presented paper on '*The Sustainable Agriculture and Rural Development for Strengthening Food Security in Myanmar*'.

Presentation by **Dr. Gopal Bahadur K.C.**, Professor (Adjunct) and Academician, Institute of Agriculture and Animal Sciences, Tribhuvan University and Nepal Academy of Science and Technology (NAST), Khumaltar, Kathmandu, Nepal was on '*Status of Cereals and Food Security in Nepal (A Country Status Report)*'.

**Mr. Hazem S. Maraaba**, Director General, Technical Directorate, Higher Council for Innovation and Excellence (HCIE), Ramallah from Palestine presented paper on '*R&D and Technology Transfer for Sustainable Agriculture and Food Security in Palestine as Low-Income Countries under Occupation Limitations-HCIE Role as Case Study*'.

Eleven technical papers from the host country Zambia were presented by: **Ms. Ruth Simwanza**, Community Markets for Conservation (COMACO) Zambia Ltd., **Dr. Lloyd Mbulwe**, Zambia Agricultural Research Institute; **Mr. D. Kaluba**, Zambia Agriculture Research Institute, **Dr. Joyce Nawire Malinga**, Zeteo Africa Ltd.; **Mr. Kweleka Mwanza**, University of Zambia; **Dr. Alinesi Johnson Chakwiya**, Senior Scientific Officer, Plant Science Research Centre, National Institute for Scientific and Industrial Research; **Mr. Banda**, Kapasa Makasa University (KMU), **Dr. Oliver Mbuzy**, Chief Technical Officer & Co-founder, Netagrow Ltd; **Mr. Shoes Thole**, Microbiologist, Sanket Medical Laboratories; **Dr. Bwalya Katati**, Mycotoxicology Laboratory, National Institute for Scientific and Industrial Research and **Mr. Choolwe Mutelo**, Standard Development Officer, Food & Agriculture Division, Zambia Bureau of Standards. Their respective eleven presentations were on: '*Women's Involvement in Sustainable Agriculture*'; '*Agriculture Research and Development - ZARI Perspective*'; '*Design and Construction of an On-farm Rainwater Harvest System to Serve as both Short- & Long-Term Source of Water for Crop Production*'; '*Changing the Way We Do Technology Transfer in Sub Saharan Africa*'; '*Knowledge for Climate Harnessing Indigenous and Local Resilient Smallholder Livestock Production in Eastern Zambia*'; on '*Towards Domestication: Vegetative Propagation and Tuber Dormancy Breakage of Wild Yam (Dioscorea hirtiflora)*'; '*Cultivating Tomorrow's Farms*'.

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with Smart Technology'; 'Food Safety: Important in Food Security'; 'Biological Control of Mycotoxins in the Face of Climate Change' and 'The Role of Standardization in Implementing the Sustainable Development Goals (SDGs) and Food Security'.

After the third Technical Session, a **Panel Discussion** was held on the theme of '**Handling Extreme Climate Events in Developing Economies: Droughts, Floods and Severe Storms**'. The panel of the experts included Prof. Dr. Vishal Kumar Gupta (India), Dr. Sunita Facknat (Mauritius), Dr. Gopal Bahadur K.C. (Nepal), Dr. Hlamalani Judith Ngwenya (South Africa), Dr. Alick Muvundika (Zambia), Ms. Elina Hall (Zambia) and Prof. Dr. Xavier Poshiwa (Zimbabwe).



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**Responses to the Intensification of Extreme Climate and Weather Events in Developing Economies”** during 22-24 May, 2024 in Stellenbosch, South Africa. The main aim of the Conference was to share knowledge and experience in anticipating and adapting to the risks posed by the Extreme Climate Events (ECEs) and to identify the common policy approaches and actionable implementation plans for predicting, preparing, responding and recovering from ECEs.

The Conference brought together over **150** participants from the core of climate sciences including climate vulnerability experts, sustainability and climate risk analysts, policymakers, government officials, representatives from academia and industry and other non-government organizations from 12 countries namely: **Egypt, India, Iraq, Malaysia, Mauritius, Mexico, Myanmar, the Netherlands, Nepal, Palestine, Zimbabwe** and the host country **South Africa** and provided them with an understanding of developing appropriate systems for responding to intensification of extreme climate and weather events. Around **80** delegates attended the Conference remotely.

The **Opening Ceremony** was chaired by **Prof. Guy Midgley**, Distinguished Professor and Acting Director, School for Climate Studies and Centre for Invasion Biology, University of Stellenbosch. He welcomed distinguished participants, keynote speakers, various partners and sponsors and other invited guests and gave an overall overview of the Conference.

A Welcome Address was given by **Prof. Bertram Fielding**, Dean of Science, University of Stellenbosch.

**Prof. Jon Samseth**, President of the Scientific Committee on Problems of the Environment (SCOPE) in his address highlighted that the Conference addressed the issue of extreme climate events, such as the extreme precipitation, that is currently being experienced in Brazil among many other such natural disasters globally, which is leading to many fatalities and causing severe economic consequences.

**Dr. Amitava Bandopadhyay**, Director General, NAM S&T Centre, New Delhi who could not participate in the event and his address read out by Ms. Jasmeet Kaur Baweja, highlighted that the NAM S&T Centre is an esteemed partner of this Conference and has sponsored 10 experts and professionals from 9 of its Member Countries. The Director General thanked Dr. Neville Sweijd and Prof. Guy Midgley and other team members of the Stellenbosch University for the successful organization of the event. The gratitude of the NAM S&T Centre was also conveyed to Mr. Daan du Toit, Acting Director General, Dept. of Science & Innovation (DSI), South Africa and Vice President, NAM S&T Centre Governing Council as well as the esteemed Focal Point of the Centre in South Africa - Ms. Mmampei Chaba and Mr. Selby Modiba, Dept. of Science and Innovation, for their continued support to the Centre over the years.

An address was given by **Mr. Tlou Ramaru**, Department of Forestry Fisheries and the Environment, South Africa.

**Dr. Crispin Olver**, Executive Director, Presidential Climate Commission (PCC), South Africa was represented by **Ms. Peliwe Jubase** in the event. On behalf of Dr. Olver, she explained that the Presidential Climate Commission (PCC) is an independent, multi stakeholder body and PCC aims to facilitate a transition towards a low-carbon and climate resilient economy.

**Mr. Imraam Patel**, Deputy Director General, Research Development and Support, Department of Science and Innovation, South Africa was represented by **Ms. Kogilam Govender**. On behalf of Mr. Patel, she acknowledged the long-standing partnership of the South African counterparts with the NAM S&T Centre and the SCOPE. She further mentioned that this Conference has been organized well in time, considering the problems that extreme weather events are posing. While South Africa has experienced these events such as - the Day-Zero drought in Cape Town, the massive compound storm events in Durban in July 2022, and the persistent drought and flooding in the Eastern Cape, among many others, and it is cognizant of the fact that such events are occurring globally with increased intensity. Hence, it is important to ensure that appropriate thinking and planning is done to mitigate adverse impacts of such extreme events.

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**Prof. Celeste Saulo**, Secretary General of the World Meteorological Organization was represented by **Dr. Johan Stander**. He underlined that the rapid urbanization, especially in developing economies, leading to denser population living in these areas are often ill-equipped to handle extreme weather and the consequences of this shift are multifaceted.

**Mr. Ishaam Abader**, CEO, South African Weather Service was represented by **Dr. Dawn Mahlobo**. On behalf of Mr. Abader, she mentioned that we must reaffirm our commitment to the vital efforts of various stakeholders who are committed to protecting lives and livelihoods against the backdrop of increasingly severe and frequent extreme weather events.

**Dr. E.B. Sithole**, Deputy Director General (Head), National Disaster Management Center (NDMC), South Africa was represented by **Dr. Malebo Makunyane**. She mentioned that the NDMC, encourages more in-depth research and development to unlock the critical instruments and levers that put South Africa on a trajectory of becoming more resilient in the face of extreme weather and changing climate.

The **Plenary Sessions** were held at Stellenbosch Institute for Advanced Study (STIAS), Stellenbosch, South Africa from May 22-24, 2024. The Conference participants were grouped into 8 main groups and discussed 4 main topics (i) Climate Science and Extreme Climate Events; (ii) Observations and Early Warning Systems; (iii) Risk and Vulnerability to Extreme Climate Events; and (iv) Response, Recovery and Policy. The sessions were divided into Keynote Lectures and Flash Talks.

In total, 14 Keynote Lectures were delivered by experts and 56 Flash Talks were presented by the participants during four sessions.

**Session 1** entitled “**Climate Science and Extreme Climate Events**” was chaired by Dr. Neville Sweijd (first half of the session) and Dr. Mary-Jane Bopape (second half of the session)

An **Opening Keynote** was given by **Mr. Tlou Ramaru**, Department of Forestry, Fisheries and the Environment (DFFE), South Africa. He explained the National Climate Change Bill that has enabled development of an effective climate change response and transition to a low carbon and climate resilient economy and society.

During this session, there were three Keynote Lectures: the first lecture by **Mary-Jane Bopape** along with G. Keebine, T. Ndarana, I.L. Mbokodo, K. Hlahane, T. Motshegwa, Y. Amha, O.M. Ogega, C. Mfopa, D.D. Mahlobo, F.A. Engelbrecht and H. Chikoore on “Weather-Related Disasters in South Africa from 1980 to 2022”; second lecture by **S. Suriyanarayanan** on “An Overview of Disaster Risk Management in India: Strategies, Challenges and Innovative Approaches” and third lecture by **Bruce Hewitson** on “Climate Events (ECEs) and the Robustness of Communicable Information”. The session comprised 16 Flash talks.

**Session 2** was on “**Observations and Early Warning Systems**” which was jointly chaired by Prof. Jon Samseth (first half of the session) and Prof. Hector Chikoore (second half of the session). There were four Keynote Lectures by: **John Harding**; Jeff Smithers & **Kobus Du Plessis**; **Dr. Dawn Mahlobo & William Bond**, Michael Cramer and Adam West. Their respective presentations were entitled: “Improving Observations and Early Warning Service Delivery - A Development Partner's Perspective”; “The National Flood Studies Programme for South Africa: Overview and Developments to Date”; “Climate Services: A Plea for all South Africans” and titled “Why Wildfires Jump over the Urban Edge: A New Understanding and its Implications for Fire Protection”. There were 12 Flash talks by the participants.

**Session 3** on “**Risk and Vulnerability to Extreme Climate Events**” was jointly chaired by Dr. S. Suriyanarayanan (first half of the session) and Dr. Neville Sweijd (second half of the session). The session had three Keynote Lectures by **Johan Stander**; Babatunde Abiodun & **Ross Blamey** and **Godwell Nhamo**, Lazarus Chapungu & Gideon W Mutanda. Their respective lectures were on: “Overview of WMO Programmes on Extreme Events”; “Pan-African and Transdisciplinary Lens on the Margins: Tackling the Risks of Extreme Events (PALM-TREES)” and “Climate and Weather-Induced Extremes in South Africa (2000-2024): A Review Triggered by the Climate Change Response Fund Announcement”. Seventeen Flash talks were there in the session 3.

**Session 4** on “**Reponse, Recovery and Policy**” was chaired by Dr. Rocio Diaz-Chavez. There were two Keynote Lectures: “ECE Response-Ability: Exploring Requirements and Approaches to Staffing, Equipping and Organizing ECE Response” delivered by **Johan Minnie** and second lecture entitled “Policy and Practices for Recovery from Extreme Climate Events in Egypt” by **Nesrin Ahmed Abbas Abuzied\***. During the session, 11 flash talks were given by the participants.

**Session 5** was on “**Consolidation of Outcomes**” and a presentation was given by Dr. Neville Sweijd, ACCESS/CSIR on the draft declaration and next steps were discussed. The outcomes of the working group sessions were collated into the draft declaration which was finalized with further inputs and comments from the participants.

Closing Remarks were given by Dr. Neville Sweijd, ACCESS/CSIR.

It was concluded that Climate change is leading to the increase in the frequency and intensity of extreme climate and weather events, such as - heat waves, droughts, floods and tropical cyclones - aggravating water management problems, reducing agricultural production and food security, increasing health risks, damaging critical infrastructure and interrupting the provision of basic services such as water and sanitation, education, energy and transport. Hence, there is a need to strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in the countries that are highly vulnerable to climate change, in particular, Least Developed Countries, Small-Island Developing States and African Countries.

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The following concrete steps were recommended for effectively responding to such extreme events:

1. Climate change policy actions should be integrated into national sustainable development strategies and planning and to achieve SDG 13 on “take urgent action to combat climate change and its impacts”.
2. Appropriate actions should be taken for improving education, raising awareness, human and institutional capacity building on climate change mitigation, adaptation, impact reduction and early warning system.
3. Mechanisms should be developed by the governments for building capacity for effective climate change-related planning and management, including focusing on women, youth and local and marginalized communities.
4. Commitment should be made by the developed-country parties to mobilize financial resources to address the needs of developing countries in the context of meaningful mitigation actions against climate change.
5. Research should be directed at determining the historical and future trends associated with extreme climate conditions, natural disasters and/or destructive impacts and consequences. An index or set of indices should be used to assess these trends.
6. Stronger linkages among climate sciences, policymaking and practical applications should be developed to translate the research findings into effective climate change actions.
7. Risk, Vulnerability and Impact (RVI) assessment of extreme climate and weather events should be done. Early Warning Systems should be aligned with RVI assessment.
8. For an effective disaster risk management and response, disaster avoidance strategies and training should be developed for specific types of ECWEs. This should be tailored to the need of different locations and communities and should be done in close collaboration with local authorities, emergency services and other organisations.
9. A dedicated body should be established to coordinate the management and adaptation response to the threats of ECWEs. The established body should be integrated with the National Framework for Climate Services (NFCS) that seeks to reduce losses from climate hazards and extreme weather events.
10. South-South and triangular cooperation programmes should be developed in order to promote collaboration on climate change mitigation and adaptation, helping countries to develop, learn and adopt innovative approaches, knowledge and solutions for effectively responding to extreme climate and weather events.

## *Special Feature*

### **Plastic Pollution Issue: Brief by International Union of Conservation of Nature (IUCN)**

This brief highlights the issue of plastic pollution, why the issue is important and what can be done to manage it.

#### **The Issue**

Plastic is a synthetic organic polymer made from fossil fuels, such as gas and petroleum. According to the United Nations Environment Programme, over 460 million metric tons of plastic are produced every year. Plastic is used in nearly all consumer and industrial activities, from construction and vehicles to electronics and agriculture. When discarded improperly, plastic waste pollutes and harms the environment, becoming widespread driver of biodiversity loss and ecosystem degradation. It threatens human health, affects food and water safety, burdens economic activities and contributes to climate change. Macro-plastics (pieces larger than 0.5 mm) accounted for 88% of global plastic leakage into the environment in 2019, totalling around 20 million metric tons and polluting all ecosystems. Much of the world's plastic pollution is generated by single-use products such as bottles, caps, cigarettes, shopping bags, cups, and straws. Pollution sources are mainly land-based, coming from urban and stormwater runoff, littering, industrial activities, tyre abrasion, construction, and agriculture. In the marine environment, plastic pollution originates primarily from land runoff, but includes paint shed from shipping, discarded fishing gear, and more. Due to solar radiation, wind, currents and other natural factors, plastic breaks down into microplastic (smaller than 5 mm) and nanoplastic (smaller than 100 nm) particles. 'Primary' microplastic particles are also shed by products such as synthetic textiles and tyres through abrasion. Nanoplastics can cross cell membrane and enter living organisms. Many nations lack the capacities and facilities to properly manage plastic products and waste, and the burden often falls on the local level. This impact is disproportionately felt by islands, developing countries, indigenous people, local communities, women, and children. This problem is deepened by the global trade of plastic products and waste to locations where infrastructure is not sufficient for safe and environmentally sound management.

#### **Why is this Important?**

- a) *Impacts on Human Health:* Microplastics have been found in human blood and placentas and in food and drinks, including tap water, beer, and salt. Several chemicals used in the production of plastic materials are known to be carcinogenic and can cause developmental, reproductive, neurological, and immune disorders.
- b) *Impacts on Economies:* The accumulation of plastic litter negatively impacts various aspects of a country's economy and trade systems, with income declines in sectors such as small- and medium-enterprises, tourism, fisheries, agriculture, and water safety. IUCN's research on these economic impacts demonstrates examples and possible solutions.
- c) *Impacts on Species and Ecosystems:* All land, freshwater, and marine ecosystems are affected by plastic pollution. Natural ecosystems provide essential services for conservation, economies, and human well-being. For example, healthy mangroves provide coastal protection services, whereas wetlands are important for freshwater provision. The most visible impacts of plastic debris are the ingestion, suffocation, and entanglement of species. Wildlife such as birds, whales, fish, and turtles often mistake indigestible plastic waste for food and die of starvation as their stomachs become filled with it. It also causes internal and external injuries that reduce the ability to swim and fly. Domesticated farm animals are also affected by plastic pollution. Floating plastics transport invasive alien species, one of the leading causes of biodiversity loss and species extinction. Plastic pollution can also seep carcinogenic chemicals (such as those found in certain plastic products or fireproofing coatings) into the soil. These can run into groundwater or rivers, affecting exposed people and ecosystems.

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d) *Impacts on Climate*: Climate impacts begin with oil and gas extraction, the refining of these products into plastics, and then plastic pollution itself. Incinerating plastic waste releases greenhouse gases and other pollutants into the atmosphere, including carbon dioxide, dioxins, and methane.

### What can be done?

The removal of legacy plastics and prevention of pollution requires reducing plastic production, the circularity of supply and value chains is increased and changing consumer behaviour. It also involves public and private investment and the development of infrastructure along the full lifecycle of plastics, including circular economy solutions like reuse, refill, etc. Despite positive efforts from countries to tackle plastic pollution, such as bans on certain forms of single-use plastics, a global plastics treaty is essential because plastic pollution is trans-boundary and a main driver of biodiversity loss.

To effectively address the triple planetary crisis and ensure the proper implementation of the Global Biodiversity Framework (GBF), the Paris Agreement, the Sustainable Development Goals (SDGs), and initiatives under the broader chemicals, waste, and pollution agenda; a future plastics treaty must adopt a common approach and require collective action on a global scale.

Biodiversity has come to play a prominent role in international law, particularly in multilateral environmental agreements. A focus on the connections between plastic pollution, biodiversity loss, and the degradation of ecosystems at the global, regional, and national levels is important for effective action. The protection and restoration of biodiversity, and nature must be incorporated into the legally binding control measures and enforcement terms of a future treaty.

To address plastic pollution globally, IUCN supports the following:

- Ambitious reductions in plastic production, phasing out harmful subsidies, eliminating products and chemicals of concern, and agreeing on the adoption of strong national plans, reporting requirements, and compliance mechanisms.
- Measurable and ecologically sustainable objectives, targets and actions.
- An inclusive, just, and gender-responsive process and effective and science-based nature-positive frameworks, including a global treaty.
- Convergence between commitments made by States at various international and regional treaties, including the Kunming-Montreal Global Biodiversity Framework (GBF), the agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction (BBNJ), the Ramsar Convention on Wetlands, and others.
- Improved product design created with full lifecycle approaches for a more circular economy, and support for nature-positive Extended Producer Responsibility Systems that go beyond waste management.
- Enhanced national legislation and capabilities to address plastic pollution, reporting, and compliance.
- Funding a strong financing mechanism, for capacity building, technological assistance and transfer, education, and to build on and share Indigenous and traditional knowledge.

*Source: <https://www.iucn.org>, May 2024*



## Brief News

### CoViNet launch by World Health Organization

The World Health Organization on March 27 launched a global network of laboratories to identify and monitor potential emergence of novel corona viruses. The new Network called CoViNet, comprises 36 laboratories from 21 countries. It will undertake animal health and environmental surveillance and timely risk assessment. It will also help set up monitoring facilities in developing countries.

*Down to Earth: Pg 12, 16-30 April 2024*

### Gene Therapy lets deaf children hear

A group of five children in China who were born deaf can now hear with both ears after getting gene therapy to provide a normal copy of mutated genes. This is a big technological advancement and expected to see very broad use of the technology for treating other genetic diseases.

*New Scientist: Pg 15, 16 June 2024*

### Wildcat kittens born in 'major milestone'

The birth of wildcat kittens in the Cairngorms National Park has been hailed as a major milestone in efforts to rescue the mammals from extinction in UK. These are potentially the first wildcats to be born outside captivity in Scotland for more than five years after 19 wildcats, bred at the Highland Wildlife Park, released in a pilot project.

*The Guardian Weekly: Pg. 8, 28 June 2024*

### Glassy gel as hard as plastic but also stretchy

Michael Dickey at North Carolina State University and his colleagues have devised a new gel like material - 'glassy gel' which is soft enough to stretch to almost seven times its original length but still being strong and clear. They found that the strength and stretch depends on the ratio of polymers and liquid salts used. If damaged, the glassy gels can be repaired by applying heat, which makes molecules on the broken edges reconnect.

*New Scientist: Pg. 17, 29 June 2024*

### Blue and fin whales are interbreeding

A new genetic study finds that blue whales are mating with fin whales and producing fertile young. Study published in Conservation Genetics. Though it has been known that the two species could produce hybrids, often called 'flue' whales it was only recently found that these hybrids were fertile.

*BBC Wildlife: Pg. 22, April 2024*

### Insect eyes to give robots a wide view

A team has replicated the architecture of compound insect eyes using nanowires made from a crystal material called perovskite. An overlapped pair of the artificial eyes creates a field of view of 220 degrees. They could give drones, robots and driverless cars a very wide field of vision.

*New Scientist: Pg 19, 25 May 2024*

### Garden Variety Fungus Mops up Pollution

A common fungus, *Aspergillus niger* can simultaneously remove both heavy –metal contaminants and organic pollutants from the surroundings. Researchers Qianwei Li at China University of Petroleum in Beijing and gher colleagues simultaneously exposed the fungus to toxic metals, including cobalt (II), and an organic dye called orange II. The team found that the presence of both pollutants enhanced the uptake of metals and degradation of organic dye. The results suggest that *A.niger* or similar fungi might be useful for remediating soil and water, tainted by complex mixtures of contaminants.

*Nature: 629 Pg. 11, 2 May 2024*

### New Lease of life for old Electric-Vehicle batteries

When retired, Electric Vehicles (EV) batteries still retain 70-80% of their original capacity to store charge. That means that they can store power when demand for electricity is low – an especially useful capability for managing solar and wind energy. Scientists estimated that, by 2030, retired EV batteries could satisfy 30% of the global grid-storage requirements. But repurposing batteries is not straight forward. Every car battery ages differently. Predicting any given battery's performance is key to ensuring the grid's safety and stability. To achieve this Xiaofan Cui, then at Stanford University in California, and his colleagues through their study on retired EV batteries, developed machine-learning algorithms that can accurately monitor the real-time health of a battery deployed in power grid.

*Nature: 629: Pg 507: 16 May 2024*

## Science, Technology & Innovation News

### MEDICAL TECHNOLOGY

#### Tiny Brain Sensor Dissolves after a Few Weeks

A sensor can be injected through the skull with a needle to help monitor brain health before it dissolves within weeks. It has been tested in animals and could one day enable minimally invasive implants to monitor traumatic brain injuries or conditions like epilepsy in people.

“As far as I know, this is the first wireless sensor that can be used to monitor conditions within the body without requiring any surgery” says Jules Magda at the University of Utah, who was not involved in the work.

Jianfeng Zang, who is at Huazhong University of Science and Technology in China, and his colleagues created their 2-millimeter-wide sensor hydrogel. When an external source of ultrasound waves is applied to it, air channels spaced throughout the hydrogel direct the reflection of the ultrasound. The shape of the sensor deforms in response to changing conditions in the brain, which can be seen in the reflected ultrasound. “No wires or electronics are needed”, says Zang.

Zang and his team showed that these sensors can measure pressure, temperature, pH level and the flow rate of nearby blood vessels when injected into the brains of rats and pigs. They found comparable results to wired probes that are used to monitor brain health.

To inject this sensor into brain, a large-diameter needle is required, which could still cause pain and discomfort, says Magda. The experiments also found that the devices break down into relatively harmless components such as water and carbon dioxide within five weeks. Safety and toxicity tests will be needed to show that such materials perform reliably and safely before any human clinical trials can start, says Zhang.

*New Scientist: Pg 14,15 June 2024*

#### Adhesive Coatings can Prevent Scarring around Medical Implants

*New adhesive hydrogel coatings could prolong the lifespan of pacemakers, drug delivery depots, and other medical devices.*

When medical devices such as pacemakers are implanted in the body, they usually provoke an immune response that leads to build-up of scar tissue around the implant. This scarring, known as fibrosis, can interfere with the devices' function and may require them to be removed.

In an advance that could prevent that kind of device failure, MIT engineers have found a simple and general way to eliminate fibrosis by coating devices with a hydrogel adhesive. This adhesive binds the devices to tissue and prevents the immune system from attacking it.

“The dream of many research groups and companies is to implant something into the body that over the long term the body will not see, and the device can provide therapeutic or diagnostic functionality. Now we have such an 'invisibility cloak,' and this is very general: There's no need for a drug, no need for a special polymer,” says Xuanhe Zhao, an MIT professor of mechanical engineering and of civil and environmental engineering.

The adhesive that the researchers used in this study is made from cross-linked polymers called hydrogels, and is similar to a surgical tape they previously developed to help seal internal wounds. Other types of hydrogel adhesives can also protect against fibrosis, the researchers found, and they believe this approach could be used for not only pacemakers but also sensors or devices that deliver drugs or therapeutic cells. Zhao and Hyunwoo Yuk SM '16, PhD '21, a former MIT research scientist are the senior authors of the study published in *Nature*. MIT postdoc Jingjing Wu is the lead author of the paper.

In recent years, Zhao's lab has developed adhesives for a variety of medical applications, including double-sided and single-sided tapes that could be used to heal surgical incisions or internal injuries. These adhesives work by rapidly absorbing water from wet tissues, using polyacrylic acid, an absorbent material used in diapers. Once the water is cleared, chemical groups called NHS esters embedded in the polyacrylic acid form strong bonds with proteins at the tissue surface. This process takes about five seconds. To test this idea, Wu coated polyurethane devices with their adhesive and implanted them on the abdominal wall, colon, stomach, lung, or heart of rats. Weeks later, they removed the device and found that there was no visible scar tissue. Additional tests with other animal models showed the same thing: Wherever the adhesive-coated devices were implanted, fibrosis did not occur, for up to three months. “This work really has identified a very general strategy, not only for one animal model, one organ, or one application,” Wu says. “Across all of these animal models, we have consistent, reproducible results without any observable fibrotic capsule.”

“For the adhered devices, there is an acute inflammatory response because it is a foreign material,” Yuk says. “However, very quickly that inflammatory response decayed, and then from that point you do not have this fibrosis formation.” One application for this adhesive could be coatings for epicardial pacemakers devices that are placed on the heart to help control

(Contd. from Page 10 - STI News)

the heart rate. The wires that contact the heart often become fibrotic, but the MIT team found that when they implanted adhesive-coated wires in rats, they remained functional for at least three months, with no scar tissue formation.

<https://news.mit.edu>, 22 May 2024

## ENERGY & GREEN TECH

### Extending the Lifespan of Lithium-Metal Batteries using a Fluorinated Ether Diluents

The designing of battery technologies with increasingly longer life spans could help to meet the growing needs of the electronics and automotive industry. Lithium (Li) batteries are the most widely used rechargeable batteries worldwide. Thus, devising strategies that can increase their longevity could be far easier than designing entirely new batteries. Li-metal batteries, batteries with a Li metal anode, are among the most promising next-generation battery designs. Nonetheless, the reactivity of Li metal has so far greatly limited their cycling stability, by impairing the formation of Stable Solid-Electrolyte Interphases (SEIs), ultimately resulting in shorter battery life spans.

Researchers at the Pennsylvania State University, University of Illinois Chicago and Argonne National Laboratory have recently introduced a new method to extend the longevity of Li-metal batteries. This method, introduced in a paper published in *Nature Energy*, relies on the use of a highly fluorinated cyclic ether (3,3,4,4,5,5-hexafluorotetrahydropyran, HFTHP), which exhibits a limited reactivity to Li metal ions and can thus improve the stability of formed SEIs.

"Extending the lifespan of lithium (Li) batteries involves managing reactions at the Li anode and stabilizing the Solid Electrolyte Interphase (SEI) through strategic regulation of the electrolyte composition," Guo-Xing Li, Volodymyr Koverga and their colleagues wrote in their paper. "We synthesized a fluorinated cyclic ether with minimized Li-ion coordination capability and enhanced electrochemical stability. We demonstrated its crucial role in manipulating the SEI formation process by differentiating the contribution of dual anions to the SEI layer."

A crucial difference between the ether they synthesized and previously proposed linear fluorinated ethers, such as BTFE and TTE, is that it exhibits a minimized coordination to Li ions. This facilitates the formation of an inorganic-dominant bilayer SEI in metal-ion batteries, composed of a Li<sub>2</sub>O-rich inner layer and a LiF-rich outer layer.

This SEI was found to significantly boost the stability and reversibility of Li-metal anodes. The resulting Li-metal battery cells have a remarkably long cycling life, improved self-discharge capabilities and high-temperature performance.

The new strategy introduced by this research team could soon inform additional studies, ultimately facilitating the development of new superior liquid electrolytes for high-density Li-metal batteries. Moreover, their work contributes to the understanding of fluorinated ether diluents, highlighting their potential for the development of next-generation battery solutions.

<https://techxplore.com/news>, 24 May 2024

## ROBOTICS

### Robotic "SuperLimbs" could help Moonwalkers Recover from Falls

*SuperLimbs*, a new system of wearable robotic limbs built by MIT engineers, could help astronauts conserve energy and extend missions on the lunar surface

Astronauts are physically very capable, but they can struggle on the moon, where gravity is one-sixth that of Earth's but their inertia is still the same. "In videos, astronauts are seen, tripping and stumbling on the moon as they bounce in slow motion. Furthermore, wearing a spacesuit is a significant burden and can constrict their movements," says Harry Asada, professor of mechanical engineering at MIT. "We want to provide a safe way for astronauts to get back on their feet if they fall."

Asada and his colleagues are designing a pair of wearable robotic limbs that can physically support an astronaut and lift them back on their feet after a fall. The system, which the researchers have dubbed Supernumerary Robotic Limbs or "SuperLimbs" is designed to extend from a backpack, which would also carry the astronaut's life support system, along with the controller and motors to power the limbs.

The researchers have built a physical prototype, as well as a control system to direct the limbs, based on feedback from the astronaut using it. The team tested a preliminary version on healthy subjects who also volunteered to wear a constrictive garment similar to an astronaut's spacesuit. When the volunteers attempted to get up from a sitting or lying position, they did so with less effort when assisted by SuperLimbs, compared to when they had to recover on their own.

The MIT team envisions that SuperLimbs can physically assist astronauts after a fall and, in the process, help them conserve their energy for other essential tasks. The design could prove especially useful in the coming years, with the launch of NASA's Artemis mission, which plans to send astronauts back to the moon for the first time in over 50 years. Unlike the

(Contd. from Page 11 - STI News)

largely exploratory mission of Apollo, Artemis astronauts will endeavor to build the first permanent moon base — a physically demanding task that will require multiple extended extravehicular activities (EVAs).

<https://news.mit.edu>, 15 May 2024

## AGRICULTURE/GENETICS

### **New Study Measures Early Detection of Aging in Seeds**

Aging is a part of life, and plants are no exception. The life cycle of a plant is felt in genebanks that store plant materials, such as seeds. Plant materials in genebanks may be accessed by farmers, researchers, conservationists, and others for breeding. But for a genebank to provide useful germplasm to growers, the seeds stored there must be alive when harvested. And as the stored seeds start to age, fewer and fewer of them live long enough to germinate. So, gene banks must continuously monitor stored seeds to ensure they haven't aged beyond their 'expiration date' and lose ability to germinate.

In a new study, researchers successfully measured aging in stored soybean seeds by checking the integrity of RNA in the seeds. Ribonucleic acid (RNA) is a nucleic acid present in all living cells. Its principal role is to act as a messenger carrying instructions from DNA for controlling the synthesis of proteins. The new method is faster and used less material than checking whether stored seeds germinate when planted, the current 'gold standard' of measuring seed age and viability. The study was published in *Crop Science*, a publication of the Crop Science Society of America.

“We could detect changes in seed age by measuring RNA integrity about five times sooner while using only a fraction of the seeds one would use for a germination assay,” says Christina Walters at the USDA-ARS National Laboratory for Genetic Resources Preservation in Fort Collins, Colorado, the lead author of the study

Germination tests can also be expensive and need a lot of human resources. “Large seed collections simply don't have the resources to be testing and regenerating seeds unnecessarily,” says Walters. But waiting too long between germination tests can also be a problem. The seeds may die between monitoring intervals and the collection would be completely lost. “So we thought, wouldn't it be great if we had a crystal ball that gave us certainty about seed age without needing to germinate?” says Walters.

In this study, the researchers compared results of their RNA integrity measurements with results from germination tests. The team found that measuring RNA integrity detected aging in soybean seeds much earlier than using germination assays. For example, changes in seed health could be detected within 7 years of storage using the RNA integrity method. In contrast, using the same seeds, germination tests could detect changes after 15-17 years. By that time, loss of seed viability was already problematic. “You actually want to catch changes in seed lots *before* they stop germinating,” says Walters. Measuring RNA integrity could help genebank managers do just that.

For soybean, the results from the RNA testing could be achieved with many fewer seeds. In some cases, significant declines in seed health could be detected with as few as 22 soybean seeds using the RNA integrity method. Detecting the same declines using germination assays would have used up hundreds of valuable seeds. Ultimately, Walters hopes these findings will help genebanks.

<https://www.crops.org/news>, 3 April 2024

## ENVIRONMENT

### **Ozone- Degrading Chemicals drop Ahead of Schedule**

The environmental impact of certain chemical compounds that erode Earth's Protective ozone layer has peaked and started to drop. The decline marks another success in the decades –long battle to save stratospheric ozone.

The Montreal Protocol, an international agreement that was adopted in 1987 , phased out ozone- depleting chemicals known as chlorofluorocarbons . A temporary fix, industries such as those supplying refrigeration equipment began using hydrochlorofluorocarbons (HCFCs) instead.

But HCFCs do still lead to ozone depletion , as well as global warming, so they, too, are being phased out.

Luke Western at the University of Bristol, UK, and his colleagues studied atmospheric HCFC levels as measure by two global monitoring networks. They found that since 2021 the chemical contribution of chlorine – which depletes ozone –to the atmosphere has been falling. So has the contribution of HCFCs to global warming.

If the trends continue, then the negative impacts of HCFCs will have peaked five years earlier than expected. That might mean that the ozone hole that appears above Antarctica each year heals earlier than expected in the coming decades.

*Nature* **630** Pg 533, 20 June 2024

## Meetings and Visits of Director General, NAM S&T Centre

### Meeting with the Undersecretary, International Division, Ministry of Science, Technology and Innovation (MOSTI), Malaysia

Dr. Amitava Bandopadhyay, Director General and Mr. Rahul Kumra, PS To DG & Assistant Administrative Officer, NAM S&T Centre met Dr. Balamurugan a/l Nallamuthu, Undersecretary, International Division, Ministry of Science, Technology and Innovation (MOSTI), Malaysia and his colleagues Ms. Nor Syamsida Binti Ismail, Ms. Wan Shafiqah Shaherra Binti Wan Khalid and Ms. Ungku Aida Farzana Binti Ungku Azly on June 25, 2024 in the office of MOSTI and had wide ranging discussion to explore scientific collaboration between MOSTI and NAM S&T Centre in the near future.



Dr. Bandopadhyay presented an overview of various scientific activities of the NAM S&T Centre including International Workshops/Conferences, Training Programmes and Training Workshops in the areas of relevance to the developing world; Publication of Books, Monographs and Fact Files; Fellowship Programmes and other initiatives. He requested Dr. Balamurugan to explore possibilities of organizing International Workshops in Malaysia during the next 2-3 years in partnership with the NAM S&T Centre.

Dr. Balamurugan in principle agreed to organise one International Workshop jointly between MOSTI, Malaysia and NAM S&T Centre sometime in 2026 in Kuala Lumpur in Physical Mode. The exact date and topic will be finalised through mutual consultation. In addition, Dr. Balamurugan also agreed to explore possibilities of the association of NAM S&T Centre as a partner for the Joint Workshop on "Virology" being planned to be organized sometime in 2025 in collaboration between the Association of Southeast Asian Nations (ASEAN); MOSTI, Malaysia; and National Institute of Biotechnology, Malaysia.



Dr. Bandopadhyay also briefed Dr. Balamurugan about the books and monographs being published by the NAM S&T Centre through Springer Nature, Singapore and presented a copy of the book on "Smart Agriculture" published recently. He also handed over copies of a few other publications of the Centre for information and perusal of the officials of MOSTI.

Dr. Bandopadhyay also requested Dr. Balamurugan to explore possibilities of initiating a Joint Fellowship Programme in partnership between the NAM S&T Centre and a reputed academic institution in Malaysia with support from MOSTI, Malaysia.

Dr. Balamurugan was also briefed about the upcoming Joint International Training Programme on "STI Policy: Roles of Science, Technology and Innovation for Excellence in Commercialization" that will be jointly organised by ISTIC-UNESCO, Kuala Lumpur and NAM S&T Centre, New Delhi in Kuala Lumpur during 12-14 September, 2024.

(Contd. from Page 13 - Meetings and Visits of DG....)

## Signing of the Renewed Memorandum of Understanding (MoU) between NAM S&T Centre and International Science, Technology and Innovation Centre for South-South Cooperation (ISTIC) under the auspices of UNESCO, Malaysia

Dr. Amitava Bandopadhyay, Director General along with Mr. Rahul Kumra, PS To DG & Assistant Administrative Officer, NAM S&T Centre visited the office of the International Science, Technology and Innovation Centre for South-South Cooperation (ISTIC) under the auspices of UNESCO, Kuala Lumpur, Malaysia and met Prof. Dr. Mohd Basyaruddin Abdul Rahman, Chair, ISTIC-UNESCO Governing Board; Dr. Tengku Sharizad Binti Tengku Chik, Director and other officials of ISTIC on June 26, 2024 in connection with the renewal of the Memorandum of Understanding (MoU) which was signed between the two sides in Kuala Lumpur during the visit.



Recognizing the common interest and importance of strengthening the partnership between the NAM S&T Centre and ISTIC with the purpose of organizing joint scientific events, joint publications, exchange of expertise and dissemination of S&T knowledge and information; it was agreed to renew the MoU for a further period of three years and the renewed MoU was signed by **Prof. Dr. Mohd Basyaruddin Abdul Rahman**, Chair, ISTIC-UNESCO Governing Board and **Dr. Amitava Bandopadhyay**, Director General, NAM S&T Centre in the presence of **Dr. Tengku Sharizad Binti Tengku Chik**, Director, ISTIC and Staff Members from the ISTIC Secretariat.

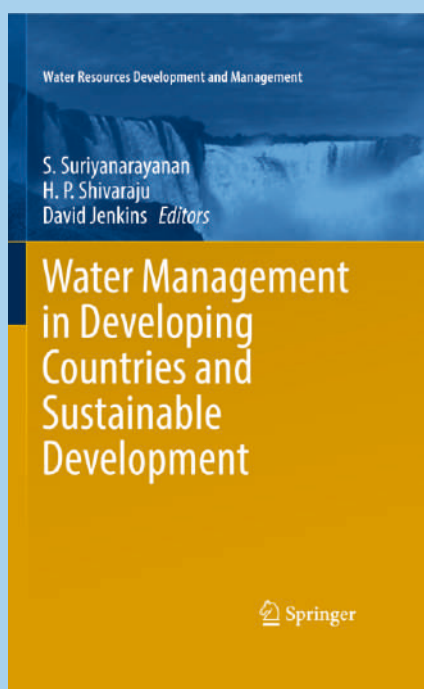
The objective of the MoU is to establish the basis for an organizational arrangement in order to encourage involvement in the broad fields of Academic, Science and Technology, predominantly to take-up joint scientific activities including organization of International Workshops and Training Workshops/Programmes in the areas of common interest and bringing out scientific publications from time to time through mutual assistance and co-operation.

On this occasion, Dr. Bandopadhyay had wide ranging discussions to explore scientific collaboration between ISTIC and NAM S&T Centre in the near future. In addition, detailed discussion was also held on the preparations for the upcoming Joint International Training Programme on "STI Policy: Roles of Science, Technology and Innovation for Excellence in Commercialization" that is going to be organised by ISTIC-UNESCO and NAM S&T Centre in Kuala Lumpur during 12-14 September, 2024.



## New Publication

# WATER MANAGEMENT IN DEVELOPING COUNTRIES AND SUSTAINABLE DEVELOPMENT



Proper access to freshwater is essential for sustaining human health, prosperity and security, poverty eradication and preservation of ecosystems. Yet, billions of people worldwide are confronted with serious freshwater challenges, arising from water scarcity, poor water quality, lack of sanitation facilities leading to severe waterborne diseases and water-related disasters. Population growth, increasing living standards, changing trade policies and adverse climate disruption have resulted in an increasing demand for freshwater. There is an urgent need to reform the existing policies regarding water conservation and develop approaches to effectively manage and sustainably use the existing water resources to satisfy social, economic and environmental needs.

Keeping in view the above issues, Centre for Science and Technology of the Non-Aligned and Other Developing Countries (NAM S&T Centre), New Delhi has gone ahead to bring out the book- **Water Management in Developing Countries and Sustainable Development** to provide information on sustainable water resource planning and governance, water infrastructure planning and implementation, optimum regulations to conserve both quality and quantity of water in developing countries.

The book through its twenty four chapters, contributed by a diverse group of specialists from fourteen countries, will serve as a valuable source of knowledge, insight and innovative solutions for water management.

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## Centre Announces

### International Training Programme on STI POLICY: ROLES OF STI FOR EXCELLENCE IN COMMERCIALIZATION IN EMERGING ECONOMIES 12 - 14 September, 2024 Kuala Lumpur, Malaysia

Science, Technology, and Innovation (STI) can serve as crucial catalyst for economic growth, competitiveness and societal advancement of the emerging economies. However, these economies stand at a critical juncture where the strategic implementation of STI can propel them towards sustainable and inclusive growth, fostering global economic integration and prosperity.

To acknowledge the crucial roles of STI and policy in technological innovation, commercialization and significant socio-economic development, there is a need to enhance the knowledge of STI policy among the public and private sectors and policymakers, particularly in developing countries.

In view of the above, the Centre for Science & Technology of the Non-Aligned and Other Developing Countries (NAM S&T Centre), New Delhi, in partnership with the International Science, Technology and Innovation Centre for South-South Cooperation under the auspices of UNESCO (ISTIC), Kuala Lumpur, announces the organization of an International Training Programme on “**STI Policy: Roles of STI for Excellence in Commercialization in Emerging Economies**” during **12 - 14 September, 2024 in Kuala Lumpur, Malaysia.**

The Training Programme will be hosted by ISTIC-UNESCO.

The Training Programme will address the pressing need for capacity building in STI policy formulation and implementation, with a special focus on “Commercialization”. It will equip the policymakers, researchers, industry leaders and key stakeholders from emerging economies with the essential knowledge and practical tools to create an environment that nurtures scientific and technological innovation, leading to successful commercialization.

Applications for participation in the Training Programme (**except from Malaysia**) may please be sent to Dr. Amitava Bandopadhyay, Director General, NAM S&T Centre, New Delhi, at **E-mail: namstcentre@gmail.com**. For further details, please see the **Centre's Website: www.namstct.org**. Applicants from Malaysia should, however, submit their requests only to ISTIC-UNESCO.

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