

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

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**INTERNATIONAL WORKSHOP
ON**

**TECHNOLOGICAL INNOVATION AND MANAGEMENT FOR
SUSTAINABLE DEVELOPMENT**

**GWALIOR, MADHYA PRADESH, INDIA
27-29 MARCH, 2018**

BRIEF REPORT

The Sustainable Development Agenda for 2030 was adopted at the United Nations Sustainable Development Summit on 25th September 2015, which includes a set of 17 Sustainable Development Goals (SDGs) with 169 targets to end poverty, fight inequality and injustice, and tackle climate change by 2030. Implementation of most of these Goals and achieving the targets thereof is largely feasible only through direct and indirect application of Science, Technology & Innovation (STI).

In so far as the climate change is concerned, the cause primarily lies with the use of fossil fuels which are the largest source of carbon dioxide, a greenhouse gas that impacts on environment as well as human health. This is triggering the world to look for alternative sources of energy that are both less harmful and renewable. The gradual, yet fast, adoption of newer and renewable sources of energy is also essential for all the nations because of the steady depletion of the conventional fossil fuel reserves across the globe. However, the promise of renewable energy can only be realised through significant investments in technological innovation including research and development and transfer of technologies on alternative sustainable technologies such as solar, biomass, wind, hydropower, geo-thermal power, ocean energy sources, etc. and the energy storage technologies necessary to operate them competitively.

With the above issues in view, the Centre for Science & Technology of the Non-Aligned and Other Developing Countries (NAM S&T Centre) has been frequently organising interactive workshops, roundtable meetings and training courses on topics concerning sustainable development, climate change, clean energy, energy conservation, energy efficiency etc. and in continuation thereof, an International Workshop on 'Technological Innovation and Management for Sustainable Development (For Greener, Safer & Smarter World)' was organised by the Centre in collaboration with ITM University, Gwalior, Madhya Pradesh, India during 27-29 March 2018.

The Inaugural Session was presided over by Mr. Ramashankar Singh, Chancellor, ITM University (ITMU). The session started with the holy prayer and lighting of the traditional lamp by the dignitaries. Dr. Richa Kothari, Dean, School of Sciences, ITMU made a welcome address, which was followed by the opening remarks by Prof. Dr. Kamal Kant Dwivedi, Vice Chancellor, ITMU. Prof. Dr. Arun P. Kulshreshtha, Director General, NAM S&T Centre, in his address, presented the genesis of the event and briefly described the activities of the inter-governmental organisation headed by him. Other dignitaries who spoke during the Inaugural Session were:

Prof. R.D. Gupta, Advisor to Chancellor, ITMU; Dr. Daulat Singh Chauhan, Managing Director, ITMU; Prof. Arvind Kumar, Vice Chancellor, Rani Laxmibai Central Agriculture University, Jhansi; and Dr. Akhilesh Kumar Pandey, Chairman, Madhya Pradesh Private University Regulatory Commission, Bhopal. The Chief Guest, Prof. V.S. Ramamurthy, Former Secretary to the Government of India, Department of Science & Technology (DST) in his address underlined the importance of Science, Technology & Innovation (STI) for Sustainable Development and to address the impact of climate change on the environment. He said that the R&D Policy should suit the requirements of a particular region keeping in view the local problems and solutions thereof. He emphasized that ethics should be a part in the process of technology selection and the technologies posing public risks and having unacceptable social and cultural impacts must be avoided. The Vote of Thanks was delivered by Dr. Kuldip Dwivedi, Organizing Secretary of the workshop.

The Workshop was attended by 62 researchers and administrators including 25 professionals and experts from 19 countries i.e. Afghanistan, Cambodia, Cuba, Egypt, Indonesia, Iraq, Kenya, Malaysia, Mauritius, Myanmar, Nepal, Nigeria, Palestine, South Africa, Sri Lanka, Togo, Vietnam and Zambia, Zimbabwe and 37 from the host country, India.

The foreign participants included; **Afghanistan** [Mr. Shamsulhaq Nayebkhil, Desk Officer NAM and Focal Point of the NAM S&T Centre in Afghanistan, Directorate General of United Nations and International Conferences, Ministry of Foreign Affairs of Afghanistan, Kabul]; **Cambodia** [Mr. Teav Rongsa, Director, Department of National R&D and Infrastructure and General Secretariat of National Science & Technology Council (GS-NSTC), Ministry of Planning, Phnom Penh]; **Cuba** [Ms. Norelis Peña Peña, Head, Science, Technology, Innovation, Territorial Delegation of Science, Technology & Environment, Peralta, Holguín]; **Egypt** [Dr. Ramadan Abdelbadea Shawky Abdelbadea, Researcher Doctor, Plant Ecology and Ranges Department, Environment and Dry Land Agriculture Division, Desert Research Center, Cairo]; **Indonesia** [Ms. Lutfah Ariana, Researcher, Research Center for Science and Technology Development, Indonesian Institute of Sciences (LIPI), Jakarta]; **Iraq** [Dr. Falah Ibrahim Mustafa Al-Attar, Director of Solar Energy Research Center, Renewable Energy Directorate, Ministry Science and Technology, Baghdad]; **Kenya** [Dr. Jaro Arero, Deputy Director, Basics Sciences and Engineering, Kenya National Commission for UNESCO, Nairobi]; **Malaysia** [Dr. Ismail Bin Ibrahim, Senior Research Officer, Mineral Research Centre, Department of Mineral and Geoscience, Ipoh, Perak]; **Mauritius** [Mrs. Poonam Veer Ramjeawon, Research Coordinator, Mauritius Research Council, Ebene and Mrs. Yashwaree Baguant Moonshiram, Senior Lecturer, Faculty of Engineering, University of Mauritius, Reduit]; **Myanmar** [Mrs. Nan Sandar Lwin, Director, Department of Research & Innovation, Ministry of Education, Yangon]; **Nepal** [Dr. Rabindra Prasad Dhakal, Chief, Faculty of Technology, Nepal Academy of Science and Technology (NAST), Khumaltar, Lalitpur]; **Nigeria** [Mrs. Caroline Taiwo Ojo, Director, Corporate Planning Department, National Office for Technology Acquisition and Promotion, Abuja; Dr. Gloria I. B. Obioh, Acting Director/ Head, Environmental Biotechnology & Bio-conservation Department, National Biotechnology Development Agency (NABDA), Abuja; Dr. Isaac Madueke Nwaedozie, Deputy Director/SA-DG, National Office for Technology Acquisition and Promotion, Abuja; Dr. Mohammed Lawal Buga, Director, Raw Materials Research and Development Council (RMRDC), Abuja and Mr. Olayiwola. A. Agoro, Assistant Director, Department of Bioresources Technology, Federal Ministry of Science and Technology, Abuja]; **Palestine** [Mr. Ziad Mustafa Ahmad Toame, CEO, Higher Council of Innovation and Excellence, Al-Reehan District, Ramallah]; **South Africa** [Ms. Evah Phago, Technology

Transfer Analyst, Water Research Commission, Pretoria; Dr. Nonhlangabezo Mabuba, Senior Lecturer, CnrNindt and Beit, University of Johannesburg, Johannesburg and Mr. Phenyane Patrick Monama, Lecturer, Department of Applied Chemistry, University of Johannesburg, Johannesburg]; **Sri Lanka** [Mrs. Pathirannahelage Nayanangani Dilrukshi Pathirana, Assistant Director-Marketing, National Engineering Research and Development Centre of Sri Lanka, Industrial Estate, Ekala, Ja-Ela]; **Togo** [Dr. Komi Edem Koledzi, University Lecturer & Researcher, Faculty of Sciences, University of Lome, Lome]; **Zambia** [Mr. Bright Chalwe, Business Development Specialist (Technology Businesses), National Technology Business Centre (NTBC), Lusaka]; and **Zimbabwe** [Dr. Wilson Parawira, Executive Dean & Professor, Microbiology & Biotechnology Department, Faculty of Science, Bindura University of Science Education, Ministry of Higher and Tertiary Education, Science and Technology Development, Bindura]. The NAM S&T Centre was represented by its Director General, Prof. Arun P. Kulshreshtha; and Mr. M. Bandyopadhyay, Senior Expert and two Research Associates, Ms. Jasmeet Kaur and Ms. Rashmi Srivastava.

The overall programme of the Workshop was conducted in seven technical sessions which are summarized as below:

Technical Session I: ‘Role of Science, Technology & Innovation for Sustainable Development’ was chaired by Dr. Gloria I. B. Obioh from Nigeria and had *five* presentations namely, ‘Innovation and Need for a Regional Innovation System (*Keynote Lecture*) by Dr. I.V. Murali Krishna [India]; ‘The Role of Innovations, Science and Technology in Sustainable Development’ by Mrs. P. N. Dilrukshi Pathirana [Sri Lanka]; ‘Innovation Status in Palestine’ by Mr. Ziad Mustafa Ahmad Toame [Palestine]; ‘Technological Advances in Forage Seed Production for Sustainable Livestock Production’ by Dr. Vijay K. Yadav [India] and ‘Science, Technology & Innovation for Sustainable Development – The Developing Country Perspectives’ by Mr. M. Bandyopadhyay [NAM S&T Centre].

Technical Session II: ‘STI Policy & Planning in Achieving Sustainable Development Goals’ was chaired by Mr. Teav Rongsa from Cambodia and had *six* presentations namely, ‘Commercialisation of Domestic R&D Results in Nigeria: Issues and Prospects for Growth and Development’ by Mrs. Caroline Taiwo Ojo [Nigeria]; ‘Technological Innovation and Management for Sustainable Development in the Islamic Republic of Afghanistan - Government-Industry Hardware and Software Manufacturing Industries and Equipment’ by Mr. Shamsulhaq Nayebkhil [Afghanistan]; ‘Design and Performance Testing of Induction Motor as Generator for Hydro Turbine’ by Mrs. Nan Sandar Lwin [Myanmar]; ‘Developing Innovative Marine Renewable Energy for Sustainable Development in Mauritius’ by Mrs. Poonam Veer Ramjeawon [Mauritius]; ‘Revealing the Future of Marine Research towards Sustainable Development in Indonesia’ by Ms. Lutfah Ariana [Indonesia] and ‘Improved Uptake of Mercury by Sulphur-containing Carbon Nanotubes’ by Mr. Phenyane Patrick Monama [South Africa].

Technical Session III: ‘Initiatives on Climate, Energy & Environment’ was chaired by Dr. Komi Edem Koledzi from Togo and had *six* presentations namely, ‘Microclimate dynamics in Tree based Natural Resource Management in Agro-Forestry’ (*Keynote Lecture*) by Dr. Badre Alam [India]; ‘Managing Domestic Technological Innovations for Sustainable Development and Planning in Developing Countries: Nigeria’s Limited Experience’ by Dr. Isaac Madueke Nwaedozie [Nigeria]; ‘Promoting Investment and Innovation in Renewable Energy in Zambia’ by Mr. Bright Chalwe [Zambia]; ‘Integrated Management of Organic Wastes for Clean Energy: A Case Study of Nigeria’ by Dr. Mohammed Lawal Buga [Nigeria]; ‘Effect of Edaphic Factors on

the Zonation of Vegetation in some Littoral and Inland Salt Marshes of Egypt’ by Dr. Ramadan Abdelbadea Shawky Abdelbadea [Egypt] and ‘Opportunity in converting Organic Wastes to Electricity in Nigeria: Framework for Biogas Technology Development’ by Dr. Gloria I. B. Obioh [Nigeria].

Technical Session IV: ‘Utilising Natural Resources for Sustainable Development’ was chaired by Dr. Wilson Parawira from Zimbabwe and co-chaired by Prof. J.L. Bhat from India. It had *four* presentations namely, ‘Impact of Fibre Rich Diets on Glycaemic Index and Blood Glucose Management of Human Type II Diabetes Mellitus (With special references to Gwalior)’ by Dr. Shweta Choudhary [India]; ‘Natural Resources Management Inter-Linkages across the 2030 Agenda for Sustainable Development’ by Ms. Jasmeet Kaur [India]; ‘Magnetic Separation of Mica from A Selected Malaysian Pegmatite Deposit’ by Dr. Ismail Bin Ibrahim [Malaysia] and ‘Genetic Improvement of Berseem in India: Present Status and Future Prospects’ by Dr. Tejveer Singh [India].

Technical Session V: ‘STI for Social Empowerment’ was chaired by Dr. Isaac Madueke Nwaedozie from Nigeria and had *six* presentations namely, ‘Green Trends in Mobility Engineering’ (*Keynote Lecture*) by Dr. Ravish Masti [India]; ‘Leveraging Mobile Phone Technology to achieve Sustainable Development Goals in Kenya’ by Dr. Jaro Arero [Kenya]; ‘Science, Technology and Innovation Roadmap: A Pathway for Growth and Development in Nigeria’ by Mr. Olayiwola. A. Agoro [Nigeria]; ‘The Thermal and PV Solar Energy Projects Status Report in Iraq’ by Dr. Falah Ibrahim Mustafa Al-Attar [Iraq]; ‘Factors affecting on Purchasing Intention towards Green Products: A Case Study of Young Consumers in Cambodia’ by Mr. Teav Rongsa [Cambodia] and ‘Results of the Study of Danger, Vulnerability and Risks in Coastal Municipalities: Holguin Science and Technology for Mitigation’ by Ms. C. Norelis Peña Peña [Cuba].

Technical Session VI: UNESCO – IHP Special Session on ‘Addressing Water Scarcity and Quality Issues’ was chaired by Dr. V.C. Goyal from India who at the outset familiarised the audience with the International Hydrological Programme (IHP) of UNESCO. It had *five* presentations namely, ‘Addressing Water Scarcity and Quality Issues in India’ (*Keynote Lecture*) by Dr. Bharat R. Sharma [India]; ‘Accelerating Green Technologies through the Water Innovation Value Chain in South Africa’ by Ms. Evah Phago [South Africa]; ‘Ecology-Hydrology Interface in addressing Water Quality Issues’ by Dr. Ram Boojh [India]; ‘Removal of Heavy Metals from Environmental Water by using Fruit Waste’ by Dr. Nonhlangabezo Mabuba [South Africa] and ‘Water Security Assessment’ by Dr. Jyoti P. Patil [India].

Technical Session VII: ‘Waste Recovery for Creating Inclusive and Sustainable Cities’ was chaired by Dr. Falah Ibrahim Mustafa Al-Attar from Iraq and had *seven* presentations namely, ‘Sustainable Solid Waste Management in Delhi through Landscaping and Landfills’ (*Keynote Lecture*) by Prof. J.L. Bhat [India]; ‘Sustainable Management of Plastic Wastes of Urban Nepal by A Novel Technology: Scope, Economy and Environmental Impact’ by Dr. Rabindra Prasad Dhakal [Nepal]; ‘Regeneration of Rose Hill Town Centre, Mauritius’ by Mrs. Yashwaree Baguant Moonshiram [Mauritius]; ‘Waste Recovery into Biogas: Promotion and Suitability of Bio-Digesters in Industrial Units’ by Dr. Komi Edem Koledzi [Togo]; ‘Useful Waste or Wasting Useful? Technological Interventions for Construction and Demolition Waste Recycling in Sustainable Cities & Communities’ by Ms. Rashmi Srivastava [India]; ‘Mechanisms of Pathogen Removal by Macrophytes in Constructed Wetlands’ by Dr. Wilson Parawira [Zimbabwe] and ‘A

Case Study of Millions of Plus Cities in India' by Mrs. Gunjan Jain & Dr. Shuvojit Sarkar [India].

Poster Presentations were displayed at the Atrium in front of the Seminar Hall.

A Cultural Programme was held in the evening of Day 1 with Indian dance performances by the students of ITMU. On the evening of Day 2, another Cultural Programme was held at NAAD Amphitheatre, ITMU, Old Campus.

The Concluding Session was addressed by Mr. Ramashankar Singh, Chancellor, ITMU who emphasized on the dangers posed by the corporate world in undermining the interests of the common man and the environment at large. Extensive discussion on the draft Gwalior Resolution prepared by a Committee including Dr. Payel Sen, Specialist in Public Administration and Urban Governance, was carried out. The finalised Resolution was unanimously adopted by the participants after incorporating the comments/inputs from the participants for its submission to the concerned ministries, agencies and other authorities in their countries.

The Valedictory Session was chaired and addressed by the Chief Guest, Prof. S.K. Rao, Vice Chancellor, Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior. Other speakers were Dr. Abhay Kumar Pandey, Professor & Head, Department of Biochemistry, University of Allahabad, Allahabad; Prof. Dr. Arun P. Kulshreshtha, DG, NAM S&T Centre; Prof. Dr. Kamal Kant Dwivedi, Vice-Chancellor and Dr. Kuldip Dwivedi, Assistant Professor, ITMU. The participants expressed their gratitude to the organisers and hosts, NAM S&T Centre, New Delhi and ITM University, Gwalior for the excellent arrangements and efficient coordination throughout the Workshop. This was followed by the distribution of Certificates to the participants and the Session got concluded with the Vote of Thanks by Dr. Kuldip Dwivedi.

A visit was also arranged to the Gwalior Fort to acquaint the foreign delegates with the medieval majesty of this part of India.