



S&T Newsletter



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

VOL. 27, No. 4
JANUARY - MARCH 2018

FROM THE DG'S DESK



Warmest greetings to our esteemed readers!!

The NAM S&T Centre successfully organised the International Workshop on 'Technological Innovation and Management for Sustainable Development (For Greener, Safer & Smarter World)' at the ITM University, Gwalior, India during 27-29 March 2018. The event was attended by the researchers, science administrators and experts from 20 countries, i.e. Afghanistan, Cambodia, Cuba, Egypt, India, Indonesia, Iraq, Kenya, Malaysia, Mauritius, Myanmar, Nepal, Nigeria, Palestine, South Africa, Sri Lanka, Togo, Vietnam, Zambia and Zimbabwe and got concluded with the adoption of a Gwalior Resolution on the Workshop theme.

The Centre brought out its latest publication (76th) titled 'Technology Transfer and Commercialisation', which has been edited by Ms. Sheikha AlAkzhami of Oman.

Applications have been invited for the Joint NAM S&T Centre - ZMT Bremen (Germany) Fellowship in Tropical Coastal Marine Research for the year 2018.

International scientific activities on a range of topics are lined up by the Centre in coming period, including an International Workshop on 'Modern and Emerging Trend in Vaccine Development' jointly with the National Biotechnology Development Agency (NABDA) at Abuja, Nigeria on 22-24 May 2018; an International Workshop on 'Antimicrobial Resistance and Strategies for Its Mitigation' jointly with Guru Angad Dev Veterinary & Animal Sciences University (GADVASU) at Ludhiana, India during 10-13 July 2018; and an International Training Programme on STI Policy and Management for Developing Countries (ITPS) jointly with the International Science, Technology and Innovation Centre for South-South Cooperation under the Auspices of UNESCO (ISTIC) at Kuala Lumpur, Malaysia on 6-10 August 2018. We look forward to receiving nominations from concerned researchers and professionals for these important events.

Happy Reading!


(Arun P. Kulshreshtha)

Centre Organised

International Workshop on
Technological Innovation and Management for Sustainable Development
(For Greener, Safer & Smarter World)
Gwalior, Madhya Pradesh, India, 27-29 March 2018

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



Inauguration of International Workshop on Technological Innovation and Management for Sustainable Development at ITM University, Gwalior, 27-29 March 2018

(Contd. from Page 1 - IRENE, Colombo, Sri Lanka)



Group Photo during Inauguration of International Workshop on Technological Innovation and Management for Sustainable Development at ITM University, Gwalior, 27-29 March 2018

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.

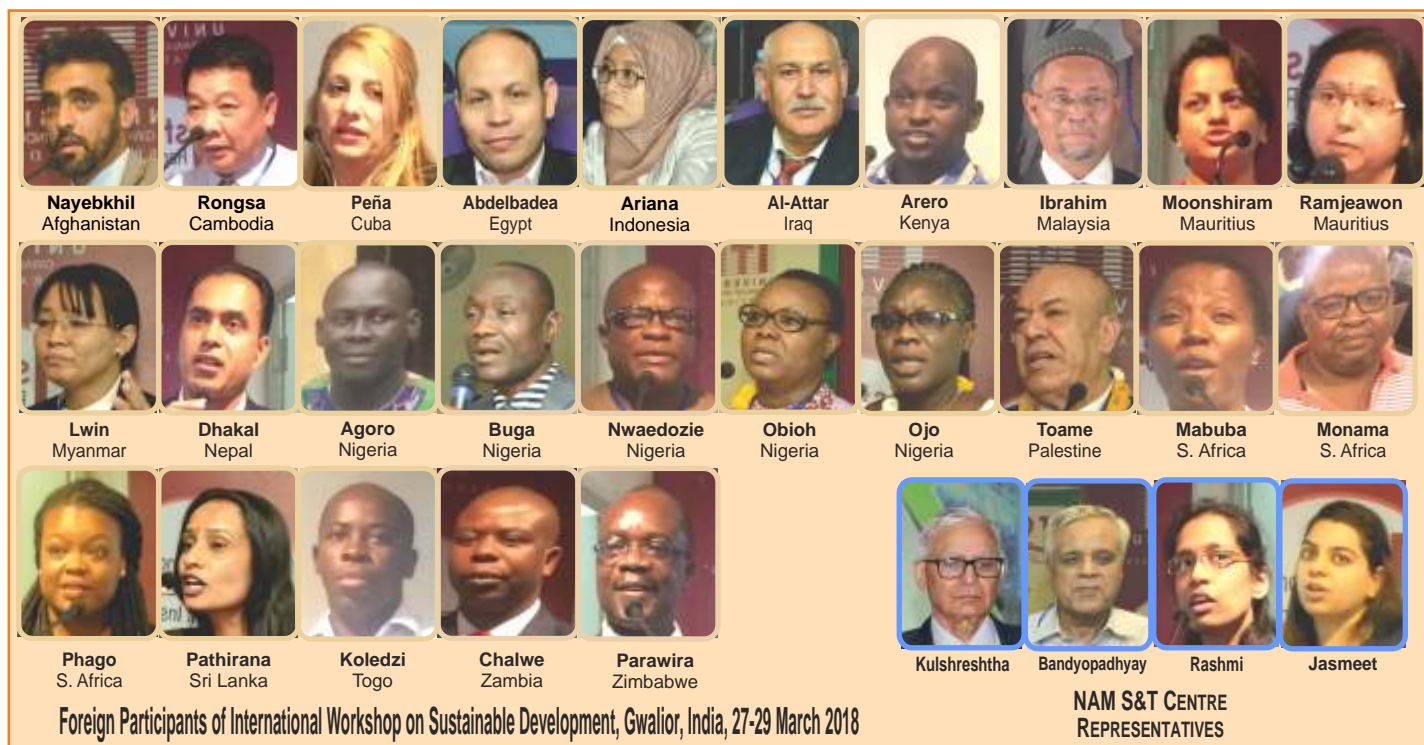
The Inaugural Session was presided over by Mr. Ramashankar Singh, Chancellor, ITM University (ITMU). The session started with the holy prayer and lighting of the traditional lamp by the dignitaries. Dr. Richa Kothari, Dean, School of Sciences, ITMU made a welcome address, which was followed by the opening 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 20 countries i.e. Afghanistan, Cambodia, Cuba, Egypt, Indonesia, Iraq, Kenya, Malaysia, Mauritius,

Myanmar, Nepal, Nigeria, Palestine, South Africa, Sri Lanka, Togo, Vietnam, Zambia, Zimbabwe and the host country India.

25 foreign professionals and experts were from **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

(Contd. from Page 2 - IRENE, Colombo, Sri Lanka)



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



(Contd. from Page 3 - IRENE, Colombo, Sri Lanka)

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 Nwaedozi [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 Nwaedozi 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



Valedictory Session

(Contd. on page 5)

(Contd. from Page 1 - SFSA Conference, Pretoria)

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 emphasised 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.



Visit to Gwalior Fort - Group Photo

DISTINGUISHED VISITORS TO THE CENTRE

- 11th January 2018** **Dr. Hemalatha Reddy**, Principal and **Dr. Vartika Mathur**, Dept. of Zoology, Sri Venkateswara College, Delhi University, New Delhi, India
- 29th January 2018** **Dr. George John**, Former Advisor/Scientist-H, Department of Biotechnology, Ministry of Science and Technology, Government of India and Former Vice Chancellor of Birsa Agricultural University, Ranchi, Jharkhand
- 1st February 2018** **H.E. Ms. Jainaba Jagne**, Ambassador and **Ms. Naomi A Williams**, Deputy Head of Mission (DHM), The Gambian High Commission in New Delhi, India
- 22nd March 2018** **Prof. C. Rajasekaran**, Department of Biotechnology, School of Bio-Sciences and Technology, Vellore Institute of Technology (VIT), Vellore, Tamil Nadu, India and **Dr. Ranjan Das**, Associate Professor, Assam Agriculture University, Jorhat, India

Gwalior Resolution-2018

ON TECHNOLOGICAL INNOVATION AND MANAGEMENT FOR SUSTAINABLE DEVELOPMENT (FOR GREENER, SAFER AND SMARTER WORLD)

WE, THE DELEGATES, participating in the international workshop on Technological Innovation and Management for Sustainable Development (For Greener, Safer and Smarter World), jointly organized by the Centre for Science and Technology of the Non-aligned and other developing countries (NAM S&T Centre), New Delhi, India and the ITM University Gwalior, M.P, India during March 27-29, 2018,

COMPRISING the scientists, academicians, researchers, technologists, engineers, consultants, industrial professionals, policy-makers and practitioners from Afghanistan, Cambodia, Cuba, Egypt, India, Indonesia, Iraq, Kenya, Malaysia, Mauritius, Myanmar, Nepal, Nigeria, Palestine, South Africa, Sri Lanka, Togo, Zambia and Zimbabwe;

COMMITTING ourselves to achieving the laudable development goals set forth by the global community at the United Nations Sustainable Development Summit held on September 25-27, 2015 which aims at eradication of poverty, fighting inequality and injustice and tackling climate change by 2030; and

RECOGNIZING the significance of Science, Technology and Innovation (STI) as the key to achieving inclusive and environment-friendly development in full cognition of the yawning North-South divide. In addition to South-South co-operation, North and South need to engage constructively to aid and assist the developing countries in the process of environment-friendly development.

UNANIMOUSLY RESOLVE THAT

- STI policies need to reflect strategies for creating conditions to develop a greener, safer and smarter world.
- Equitable access to STI should be made available to all countries without any legal impositions or unilateral sanctions on them which could severely impede the scope of technological advancement and use.
- Adequate funding mechanisms for capacity building in STI should be in place in the areas of basic sciences, R&D infrastructure, IPR, technology transfer, incubation, commercialization and development of S&T Parks.
- A holistic measure on STI-driven environmental management may be developed along the line of Human Development Index (HDI).
- Environmentally sound cultural traditions and practices should be encouraged and propagated.
- As the waste reduction, disposal, reuse and its conversion into energy continue to be the top priority, the governments may come out with policy directives and incentives to this effect.
- Realizing the importance of healthy ocean ecosystem, trends for strengthening blue economy, methods for climate change mitigation and sustainable use of ocean resources must be promoted.
- Responsible and responsive regulatory mechanism may be developed by the governments for all environment management initiatives.
- Environment-related policy initiatives should be effectively implemented and mechanisms should be developed to periodically monitor and evaluate their progress.
- There is a strong need to ensure Women Empowerment and Gender Equality to facilitate successful transfer of Environmentally Sound Technologies (ESTs) at the household and community levels.
- Technological innovations should be geared towards bridging the deepening digital divide within the developing societies.
- Governments need to facilitate commercialization of indigenously developed technologies.
- STI driven smart villages, towns and cities should be designed and developed to meet environmental and safety requirements, better connectivity and inclusive service delivery to ensure quality of life. All developmental initiatives should essentially reflect the specific socio-cultural ethos.
- Echoing United Nations Environment Programme (UNEP) conception of sustainable consumption and procurement, current business processes may strategically innovate, market and develop communication technologies in partnership with the governments and stakeholders to promote green consumerism.
- Technological innovations should be harnessed to develop more sustainable products, services and behavioural/attitudinal change initiatives in line with current and future consumption patterns.
- Countries are encouraged to individually and/or jointly initiate and implement projects and programmes on STI for sustainable development.
- The governments, business communities and stakeholders are exhorted to rededicate themselves and act on their obligations to provide for a sustainable living, meeting the developmental goals and aspirations of the people of the nations, that would also ensure a green, safe and smart planet for the present and future generations

**THUS RESOLVED AND ADOPTED ON THE 29TH DAY OF MARCH 2018 AT GWALIOR,
MADHYA PRADESH, INDIA.**

Research Training Fellowship for Developing Country Scientists (RTF-DCS) 2016-17

Egypt - Project Completion Report of Dr. Mohamed Abdelmoghny Ramadan Helal



Dr. Mohamed Abdelmoghny Ramadan Helal, Assistant Researcher at Department of Parasitology and Animal Science, Veterinary Research Division, National Research Centre, Cairo, Egypt was sponsored by the NAM S&T Centre under its RTF-DCS Fellowship scheme for 2016-17 to carry out research in the Department of Veterinary Parasitology, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, Punjab, India on a project titled 'Anthelmintic Resistance Diagnosis in Gastrointestinal Nematodes of Small Ruminants' under the supervision of Dr. Lachhman Das Singla from 3rd June to 13th December 2017.

Parasitic gastroenteritis of small ruminants is a major constraint on efficient small ruminants production in developing countries of the world including Egypt and India due reduction of productivity, mortality and reduced weight gains. To get maximum production, small ruminant producers adopt preventive control measures that include intensive management approach and regular treatment of their animals with anthelmintic which is believed to have resulted in emergence of parasites resistant to some classes of anthelmintic products. To date, there are no recorded data on parasites resistance to commonly used anthelmintics in Egypt although rapid increase in both prevalence and magnitude of anthelmintic resistance.

The research work conducted by Dr. Helal aimed to assess anthelmintic resistance using sensitive tests would be a useful tool to enable farmers to anticipate the efficiency of the drug before drenching the flock. During training programme, he evaluated the anthelmintic resistance status in goat flock infected by gastrointestinal nematodes (GIN) by means of *in vivo* and *in vitro* methods at Government Mathawara breeding goat farm, Ludhiana, Punjab, India. He determined the efficacy of albendazol, ivermectin and closantel by three average-based and two individually-based faecal egg count reduction tests and the results revealed that the occurrence of multiple anthelmintic resistance to broad spectrum and widely used anthelmintics was higher than expected. He also measured the anthelmintic resistance status in this flock to benzimidazole (albendazole) by *in vitro* Egg Hatch Assay (EHA). The prevalence of anthelmintic resistant was very similar to those percentages reported with the different FECRT formula. Results indicated that these tests are time consuming, costly and have low sensitivity, can detect resistance only when large number of the individuals in the population are already resistant. Further these tests estimate only the overall resistance of a nematode community without identifying the resistant species.

Thus he applied molecular techniques for early, accurate diagnosis of benzimidazole (BZ) resistance for specific parasite species under the guidance of Professor Singla potentially meet the constraints of conventional assays. At larval level, he used restriction fragment length polymorphism strategy for isotype 1 - tubulin gene to overcome the limitations of morphological identification of larval stages of trichostrongylid nematode species. Allele-specific PCR (AS-PCR) was conducted to detect mutations of residue 200 of the β -tubulin, which is implicated in benzimidazole resistance and consistently found to differ between drug susceptible and drug resistant populations. Benzimidazole resistance in *H. contortus* larvae was estimated in 73% in goats and 54% in sheep in field and abattoir isolates, respectively. Dr. Helal also genotyped and evaluated the distribution of β -tubulin alleles associated with benzimidazole resistance at adult levels through performing comparative efficacy for AS-PCR and restriction fragment length polymorphism-polymerase chain reaction (RFLP-PCR) techniques. Overall, the prevalence of BZ resistant allele (R) was found 47% and 48% using AS-PCR and RFLP-PCR technique, respectively. Results indicated that both techniques are rapid and sensitive, and can be used at large scale for diagnosis of BZ resistance in *H. contortus*. However, RFLP-PCR is an easy, highly reproducible, accurate and less expensive than allele specific-PCR in addition to heterozygous resistant alleles did not existed in case of direct sequencing although both AS-PCR and RFLP-PCR could detect such cases.

The study indicated that molecular tests were superior to conventional methods for BZ resistance detection. AS-PCR provided real picture of the magnitude of resistance in the parasite population present in the individual larval isolates of small ruminant flocks. Hence, the AS-PCR for pooled larvae from flock is much helpful in formulating deworming schedule at the farm with due consideration of BZ resistant in *H. contortus* which is not possible with conventional tests. Regarding genotyping of adult worms, it was found that RFLP-PCR is an easy, highly reproducible, accurate and less expensive than allele specific-PCR and can detect heterozygous alleles which did not existed in case of direct sequencing. Additionally, it can be used at large scale for diagnosis of BZ resistance in *H. contortus*.

Egypt - Project Completion Report of Mr. Amir Mohammed Mohammed Ali Abdo



Mr. Amir Mohammed Mohammed Ali Abdo, Research Assistant, National Center for Radiation Research and Technology, Cairo, Egypt was sponsored by the NAM S&T Centre under its RTF-DCS Fellowship scheme for 2016-17 to carry out research in the Bio Ceramics and Coating Division, CSIR -Central Glass and Ceramic Research Institute (CGCRI), Kolkata, India on a project titled 'The Prospect of Treatment of Acquired Immune Deficiency Syndrome (AIDS) / Alzheimer's Disease Uses SHRNA - Nanoceramic Conjugate (Up to Cellular Level)' under the supervision of Dr. Jui Chakraborty from 6th December 2016 to 1st June 2017. The main objective of this research was to evaluate the

Alzheimer's is a chronic neurodegenerative disease belonging to the terminal illness class of diseases which affects millions of people all over the world as one of the main causes of dementia. The processing of Amyloid Precursor Protein (APP) leads to accumulation of the amyloid plaques which are the main neuropathological hallmark lesion of Alzheimer's. Accordingly, targeting this protein has attracted the attention of many research groups and, in this project; they focused on the silencing of the APP gene by the action of shRNA through the designing of shRNA-

(Contd. from Page 7 - RTFDCS Reports - 2016-17)

plasmid loaded Layer Double Hydroxide (LDH) nanocarriers for efficient delivery of this macromolecule. From the preliminary studies for characterizing the properties of the designed intercalates, it was found out that the plasmid was sustainably released from the LDH nanoparticles in the acidic medium with a burst release in the alkaline medium suitable for its efficient delivery to the nucleus while protecting in the cytosol. In addition, these intercalates were stable against the action of DNase and serum, but had weak stability against the restriction enzyme effects. Moreover, the storage of these intercalates for 14 days at different temperatures preserved the integrity of the loaded plasmids.

Nigeria - Project Completion Report of Mr. Awotunde Oluwasegun Samson



Mr. Awotunde Oluwasegun Samson, Lecturer, Habib Medical School, UIU Kampala Campus, Kampala, Uganda was sponsored by the NAM S&T Centre under its RTF-DCS Fellowship scheme for 2016-17 to carry out research in the JSS College of Pharmacy, JSS University, Ooty, India on a project titled "Antioxidant, Cytotoxicity and Erectogenic Potential of *Terminalia Schimperiana* root" under the supervision of Dr. Dhanabal Palaniswamy from 1st August to 20th December 2017.

The medicinal importance of *Terminalia schimperiana* root was investigated by evaluating the Antioxidant, Cytotoxicity and Erectogenic potential of the extract fractions. The extracts were investigated for free radical scavenging activity, reducing capacity and competition with DMSO by adopting 2, 2 - diphenyl, 1-picrylhydrazyl (DPPH) and 2, 2 azinobis-3-ethylbenzothiazoline-6-sulfonic acid (ABTS) *in vitro* methods.

The result suggested that the polar Hydro-ethanol fraction was found to have potent DPPH antioxidant activity with IC₅₀ value of 19.36±0.436 µg/ml and ABTS scavenging activity with IC₅₀ value of 0.9420±0.011 µg/ml, while the Saponin fraction has moderate DPPH scavenging activity with IC₅₀ of 59.33±0.417 µg/ml and moderate ABTS scavenging activity with IC₅₀ value of 2.273±0.036 µg/ml (Rutin DPPH IC₅₀ value= 14.5±0.29 µg/ml, Rutin ABTS IC₅₀ value= 0.2976±0.012 µg/ml). Cytotoxicity of hydro-ethanol and total Saponin fractions against Vero (African Green Monkey, Kidney) and MCF-7 (Human, Breast Carcinoma cancer cell lines) using MTT assay 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide shows the IC₅₀ values of Hydro-ethanol fraction on MCF-7 and Vero cell lines were 42.96426µg/ml and 99.16392µg/ml respectively, while, the IC₅₀ values of total Saponin fractions on the cell lines were 85.86034µg/ml and 146.2571µg/ml respectively. Cell viability assay results indicated a higher cytotoxicity activity of the hydro-ethanol than the total Saponin fraction on the two cell lines. The *in silico* Docking study of ROCK-II with isolated ligands, resulted in ligand binding affinity within the ROCK-II binding pocket with residues like Glu-170, Met-172, Asp-176, Asp-218, Tyr-171, Phe-384, Ala-102, Phe-103, Lys-121 and HOH-603, and binding interactions of Hydrogen bond, Salt bridge interaction, Aromatic hydrogen bond and Water bridge. The activity score of Y27632 (Standard) with 4 interactions is higher than all the other ligands compared. However, Ethyl cis trans decanoate also posed very good inhibiting activity with just one interaction while the other ligands showed different G- scores against ROCK-II enzyme and all posed fair binding capacity and interaction. These *in silico* experiments demonstrate that all the isolated compounds from the extract could bind ROCK-II and could together inhibit its function leading to increase in smooth muscle than collagen level in the penile tissue of male Wistar rat, thus increasing the blood flow and sexual function.

Sudan - Project Completion Report of Dr. Ramzy Ahmed Yousif



Dr. Ramzy Ahmed Yousif, Lecturer in the Department of Fisheries & Wildlife Science, College of Animal Production Science & Technology, Sudan University of Science and Technology (SUST), Sudan was sponsored by the NAM S&T Centre under its RTF-DCS Fellowship scheme for 2016-17 to carry out research in the Fish Nutrition Research Laboratory, Department of Zoology, Aligarh Muslim University, Aligarh, India on a project titled 'Proximate Composition and Fatty Acid Profile of Oil Seed Meals used in Fish Feeds' under the supervision of Dr. Mukhtar A. Khan from 16th February to 16th August 2017. The main objective of this research was to evaluate the proximate composition and fatty acid profile of oil seed meals with a view to develop cost-effective diets for Nile tilapia (*Oreochromis niloticus*) fingerlings as alternative protein sources to fishmeal and also to conduct feeding trial to evaluate the level of fish meal that could be replaced by oil seed meals in diet for fingerling Nile tilapia.

In his study, firstly proximate composition and fatty acid profile of oilseed meals used in fish feeds were analysed and then feasibility of replacing fishmeal with groundnut cake and soybean meal for Nile tilapia *Oreochromis niloticus* fingerling by replacing 0% control diet, 20%, 40%, 60%, 80% and 100% fishmeal protein by groundnut oil cake (1st experiment) and soybean meal (2nd experiment) protein was worked out. Fish were stocked at the rate of 20 per tanks in triplicate groups. *Oreochromis niloticus* fingerlings (0.57±0.05g; 3.49±0.12 cm) for experiment I and (0.42±0.01g; 3.05 ± 0.07 cm) for experiment II were fed the experimental diets near to satiation for 6 weeks. Diets used in 1st experiment and 2nd experiment contained 35% CP and 16.53kJ.g⁻¹ GE. In first experiment, replacement of fish meal by groundnut oil cake on protein to protein basis was found to be feasible up to 40% as evident by insignificant differences (p<0.05) among the absolute weight gain (8.21-8.52 g/fish), feed conversion ratio (1.91-1.98), protein efficiency ratio (1.26-1.31) and specific growth rate (2.02-2.08%) of fish fed diet 1, 2 and 3. However, further replacement of fish meal by groundnut oil cake protein beyond 40% resulted in a significant decrease (P<0.05) in above parameters. In 2nd experiment, replacement of fishmeal by soybean oil cake on protein to protein basis was found to be feasible up to 20% as evident by insignificant differences (P<0.05) among the growth indices such as LWG (86.94-89.51%), FCR (1.92-1.95), PER (1.28-1.30), SGR (2.23-2.28%) in fish fed diets 1 and 2. However, further replacement of fishmeal by groundnut oil cake beyond 20% (diet 3 and 4) resulted in a marked decrease (P<0.05) in growth parameters.

Hence the results so obtained from the experiments that indicate 40% and 20% of fish meal protein could be replaced by soybean meal and groundnut meal without altering the growth, conversion efficiencies and body composition of fingerling *O. niloticus*, respectively, thus enabling formulation of cost-effective artificial feeds for the intensive culture of this fish.

SCIENCE AND TECHNOLOGY NEWS IN THE DEVELOPING WORLD

Brazil: Novel Methodology increases Resolution in oligodendrocyte Proteomics

One of the key challenges of proteomics, the study of all proteins expressed by a cell or organism, is managing to distinguish between molecules that are structurally different yet have the same mass. This is hard because a mass spectrometer, the main apparatus used in this type of study, works like a weighing scale, sorting the molecules analysed according to their mass. One way to reduce confusion when using a mass spectrometer is to start by submitting the sample to liquid chromatography, which separates hydrophilic ('water-loving') proteins from hydrophobic ones. The hydrophilic proteins enter the spectrometer first, and the most hydrophobic are left for the last, decreasing the likelihood that two different molecules with equivalent masses will be interpreted as only one by the apparatus. It is like solving a jigsaw puzzle with millions of pieces. When you first open the bag, the pieces are all jumbled and overlapping. You must begin by sorting them out. As we work with proteomics, we constantly endeavor to develop more refined sorting techniques. In a study, the Brazilian researchers at the Neuroproteomics Laboratory at the University of Campinas (UNICAMP) optimised a method to increase the resolution of proteomic analysis by mass spectrometry. Thanks to a combination of two other techniques – two-dimensional liquid chromatography and ion mobility – they succeeded in identifying 10,390 proteins expressed in oligodendrocytes, the central nervous system cells responsible for producing myelin, a lipidic substance that plays an essential role in the information exchange between neurons. In a previous study using single-dimensional liquid chromatography for pre-sorting, the group had identified only 2,290 proteins in oligodendrocytes. They now have a far more complete oligodendrocyte protein database, which is available online, and the data can be downloaded. In addition, the optimisation technique can be used to study the proteome of any biological sample. The first step in proteomic analysis using mass spectrometry is to break down the proteins extracted from the biological sample of interest, which in this case consists of oligodendrocytes, into smaller particles called peptides. A small protein can give rise to at least ten different peptides. The spectrometer is not good at analysing the entire molecule because of its large size. Next the group submitted the sample to separation by chromatography. Instead of using a single matrix, as in the conventional technique, they used two. In the first separation, only a fifth of the injected peptides entered the spectrometer in liquid form. This was followed by another fifth in the second separation, and so on. It is as if you spread out the pieces of the jigsaw puzzle with both hands instead of only one. Inside the spectrometer, the sample is transformed into gas and flies back and forth in a vacuum. The smaller the peptide, the faster it reaches its destination, and the apparatus then measures its mass. As the molecules are flying about inside the spectrometer, the ion mobility technique injects a small amount of gas into the apparatus through a tube. The resistance offered to the gas by the molecule depends on its three-dimensional shape, so if two different peptides with the same mass are flying together and the researchers inject the gas in the opposite direction, they will tend to be separated by the force of resistance to the gas. It is like picking up two sheets of paper with the same mass, crumpling one into a ball, and dropping them both. Because of its shape, the crumpled sheet will reach the floor first. At the end of the experiment, more than 223,000 peptides identified by the spectrometer were reconstructed using bioinformatics tools, resulting in the 10,390 proteins. Ideally, it should be possible to identify at least two peptides per protein. That way, one can be sure that a molecule is really present in the sample, since two proteins with two exactly identical peptides are unlikely to occur. In this study, about 20% of the proteins were identified by more than 20 peptides. The methodology enabled the researchers to identify even proteins that were relatively scarce in the sample, i.e., in quantities about 10 million times smaller than those of the most highly expressed molecules.

The UNICAMP group has also studied the human oligodendrocyte proteome for several years, with the aim of better understanding the causes of schizophrenia as a basis for proposing novel therapeutic approaches. The currently available treatments focus on neurons, but the neural communication failures observed in patients with schizophrenia may be due to oligodendrocyte dysfunction. One of the research lines consists of evaluating how the drugs used to control schizophrenia modify the oligodendrocyte proteome and with this new methodology, five times more information can be obtained on the role of these drugs.

Source: Agencia FAPESP Newsletter, 3rd January 2018

Brazil: World's Best Breezes lead to Cheapest Wind Power

Beyond the resorts and pristine beaches of Brazil in the Northeast some of the world's best winds for generating electricity lie in Serra Branca. It is a wind generator's heaven, featuring breezes so perfect for spinning turbines that this Brazilian region is capable of churning out more wind energy than any other part of the world. Brazil already has almost 11 gigawatts of turbines in operation at present and was ranked the No. 5 wind market in the world based on 2016 installations, according to the Global Wind Energy Council. Consistent breezes give the country a capacity factor of 39 percent, the amount of electricity produced compared to its potential output if every turbine was spinning all the time. That is the best in the world. And Rio Grande do Norte state, where Serra Branca is located, with higher average speeds and little variation in wind direction, is even better. That is why the state accounts for the most wind-power capacity in Brazil, with 2.7 gigawatts, followed by Bahia, with 1.6 gigawatts. The country is seeking to increase installed clean-energy capacity by 19 gigawatts by 2026 to diversify the local grid. In the latest testament to the region's wind bounty, a French renewable energy company, Voltalia SA, just won contracts to build more farms there that will sell the cheapest wind power Brazil has ever seen. Two of Voltalia's existing wind farms there were rated among the five most efficient in Brazil in 2016, coming in at 60.8 percent and 58.4 percent. More wind translates into more electricity to sell, allowing Voltalia to offer lower prices. The company won contracts to supply energy from five projects with 155 megawatts of capacity in a pair of government-organised auctions last month. In one of the events, it offered to deliver electricity for \$29.82 a megawatt-hour, a record low. The company is developing a total of 1,000 megawatts of wind farms in the region, and may bid for contracts in the next auction, set for April.

Source: EQ International, 11th January 2018

China: Chinese-European Emission-Reducing Solutions (CHEERS)

A new Research and Innovation Action, designated CHEERS, has commenced under the EC-Horizon 2020 programme's Low-Carbon Initiative. The action involves a 2nd generation chemical-looping technology tested and verified at laboratory scale (up to 150 kWth). Within five years, the core technology will be developed into a 3 MWth system prototype for demonstration in an operational environment. This constitutes a major step towards large-scale decarbonisation of industry, offering a considerable potential for retrofitting industrial combustion processes. The system prototype is based on a fundamentally new fuel-conversion process synthesised from prior research and development actions over more than a decade. The system will include heat recovery steam generation with CO₂ separation, which will comply with industrial standards, specifications and safety regulations. Except for CO₂ compression work, the innovative concept is deemed capable of removing 96% of combustion-related CO₂ while eliminating capture losses to almost zero. Applied to industrial auxiliary systems, CHEERS aims at reducing drastically the efficiency drop lost to the CO₂ capture chain. Hence, a reduction by at least 50%, from a current level of 9-10%-points, typical of absorption techniques, to less than 4%-points in power generation systems seems feasible. In steam generation systems, the gain is even larger, dropping from a level of 18-33% efficiency penalty with absorption techniques to mere 2-3%-points with the new technology. This gain shall be demonstrated in operations using petroleum coke as the most challenging fuel. In this respect, CHEERS is conceived as a greening measure for the petroleum refining sector, converting petroleum coke and heavy residual oil into auxiliary steam and power. It is anticipated that a successful demonstration will pave the ground for a wider deployment of the technology in the energy-intensive industry, especially processes hampered with combustion-related CO₂. The responsibility of the action lies with the CHEERS consortium, which comprises nine parties: SINTEF Energy Research (coordinator, Trondheim, Norway); IFP Energies nouvelles (Lyon, France); Tsinghua University (Beijing, China); SINTEF Industry (Oslo, Norway); Total(France); Dongfang Boiler Group (Chengdu, China); Zhejiang University (Hangzhou, China); Politeknika Slaska (Gliwice, Poland); and Bellona(Brussels, Belgium). CHEERS has a budget of €16.8 million, financed by the European Union's Horizon 2020 research and innovation programme together with the Chinese Ministry of Science and Technology (MOST) and Chinese industry. The system prototype demonstration will be carried out in Deyang at the Key Laboratory for

(Contd. from Page 9 - S&T News)

Clean Combustion and Flue Gas Purification of the Sichuan Province, P.R. China.

Source: *SINTEF.Com*, 3rd January 2018

Egypt: Innovative Truck Design to tackle Wheat Losses

During the harvesting season in Egypt, it is common to see grains scattered across routes used by transport vehicles. This is due to bumpy roads, too many bags of wheat stacked on these vehicles, or bad packaging. According to the Ministry of Supply and Internal Trading, the wheat lost during transport currently amounts to one-sixth of the local harvest, and was almost half three years ago. The country loses 15 per cent of the grain destined for its silos, costing the government approximately US\$1.1 million. Four years ago, the former Egyptian Minister of Supply decided to tackle the problem by asking the Academy of Scientific Research to dedicate a fund to find a solution. Now a truck has been designed by an Egyptian team from the Agricultural Engineering Research Institute (AENRI) using a grant of about US\$56,000 from the Academy to put an end to wheat losses during transport from fields to storage silos, which was evaluated last December and will be tested during the next harvest season in June. The truck is also equipped with a precise system to record the weight of the crop and estimate the price for the farmer in the field that addresses one of the main problems associated with the transportation process: the fact that officials cannot weigh the wheat accurately using manual tools at storage silos, where supplies may arrive either damaged or containing a high amount of impurities due to the poor packing. The truck separates out impurities from the grains using the difference between their weights: working on the principle of critical velocity, the air inside the vehicle retains the grains while removing the impurities. Verifying the grade of the wheat arriving at silos, which is based on the personal assessment of an official, is another problem this invention aims to solve. The truck is also equipped with a precise system to record the weight of the crop and estimate the price for the farmer in the field. These issues do not affect just the farmer, but also the state, which ends up paying a price for high-grade wheat when in fact it receives cargo with a large amount of damaged grain. The former Minister of Supply intends to produce 600 trucks to cover the entire country. This innovation could also be used to transport imported grain, which is subject to similar problems.

Source: *SciDev.Net*, 26th February 2018

India: Security Ink to stop Fake Currency Notes, Illegal Drugs

Counterfeiting causes huge financial losses in the pharmaceutical and financial sectors. Organic dyes and semiconductor quantum dots are widely used to generate unbreakable security codes, but dyes are unstable and quantum dots are toxic. The researchers from the CSIR-National Physical Laboratory (CSIR-NPL) in New Delhi have however now synthesised a light-emitting ink that can be used to develop security codes to stop the production of fake currencies, illegal drugs and fraudulent copying of vital documents. In search of a better security ink, they prepared a security ink by mixing nanorods of rare-earth elements with light-emitting solids made of zinc and manganese in a specific polymer-based ink. They then tested the ink's potential to check counterfeiting by printing specific security codes on black paper. When exposed to ultraviolet light and infrared laser, the ink emitted yellow and red light. The nanorods gave off the red light and the light-emitting solids contributed to yellow emission, indicating that the components of the ink retained their individual optical properties even in a mixed condition. The ink was then successfully used to generate security codes for the national emblem and a logo of a CSIR institute on black paper, suggesting its potential for use in combating fraudulent imitations. The scientists now plan to make security ink for generating codes for mobile-based scanners to provide full protection against counterfeits.

Source: *Nature India Alert*, 24th January 2018

India: Silk Protein helps heal Wounds and kill Bacteria

A nanomaterial made of silver oxide nanoparticles and silk protein can speed up the healing of skin wounds, which is also capable of killing disease-causing bacteria, making it a potential candidate for making antibacterial wound-dressing materials. Healing of the skin wounds is a complex process that involves interactions between various cells, extracellular components and certain growth-promoting proteins. Such wounds are always vulnerable to infections caused by deadly bacteria that have developed resistance to existing nanoparticle-based wound-dressing materials. To devise a biocompatible wound-dressing material, scientists from the Indian Institute of Technology Madras, Chennai and the Indian Institute of Science, Bangalore, synthesised the nanomaterial

by heating and drying a mixture of silver nitrate solution and a silk protein in a microwave oven. This process gave rise to a silver-oxide-nanoparticles-embedded silk protein. The silk-based nanomaterial killed disease-causing bacteria more efficiently than ciprofloxacin, a widely used antibiotic. The silver nanoparticles probably formed pits on the bacterial cell membrane that eventually damaged the membrane structure and killed the bacteria. The nanomaterial also healed an artificially created wound by accelerating the migration of specific cells that play vital roles in the wound-healing process. Besides, it is non-toxic to specific mice cells, showing its potential use in making biocompatible wound-dressing materials.

Source: *Nature India*, 30th January 2018

Kenya: BT Maize as Solution to Fall Armyworm Infestation

Kenya is on the brink of starvation following a heavy infestation by the fall armyworm on their maize farms. First reported in the country in March last year, the pest has ravaged over 250,000 hectares of maize farms in 27 out of 47 counties. A fact-finding mission to Machakos County revealed that the pest has devastatingly devoured almost the entire maize crops in the county as farmers grapple with the agonising reality. Most farmers have hardly harvested anything from their farms and the plants have died because of the attack by the fall armyworm. Scientists from the Kenya Agricultural and Livestock Research Organisation (KALRO) under the Water Efficient Maize for Africa (WEMA) project have been conducting national field trials to evaluate the performance of Bt maize and provide sustainable solutions against pest invasion and drought in the country. In the course of the research, it has been demonstrated in regulated experiments at Kitale (Trans Nzoia County) and Kiboko (Makueni County) that Bt maize is not only able to control the stem borer, but also the fall armyworm. Farmers in Kenya are urging the government to fast track the adoption of genetically modified crops that will see the commercial release of Bt maize eventually marking the end of their woes.

Source: *Crop Biotech Update*, 24th January 2018

Mexico: GE Tomato to decrease Hypertension

Cardiovascular diseases remain a leading global cause of death. According to the World Health Organization (WHO) hypertension affects 30 percent of the world population. Lowering Blood Pressure (BP) reduces the risk of complications arising out of cardiovascular diseases, especially stroke and acute coronary events, and it delays the progression of kidney disease. A team of scientists from Universidad Autonoma de Sinaloa (UAS), Mexico have successfully developed a genetically engineered tomato that can help treat hypertension. The researchers looked at scientific literature to search for proteins that help reduce hypertension and devised a way to incorporate the protein in tomatoes, which is a popular fruit globally. The team extracted the desired protein from amaranth, expressed it into tomato, and fed the GE tomatoes to hypertensive rats in the laboratory. Results showed that the amarantin from GE tomatoes had therapeutic effects similar with captopril, a common drug for hypertensive patients. The next stage of the project will include testing of the GE tomato on humans

Source: *Crop Biotech Update*, 21st March 2018

Namibia: Opens First Lab to test GMO

Testing of Genetically Modified Organisms (GMO) is crucial to ensure that only GMOs and GMO products that are approved for use are on the market. Namibia has suffered misinformation on GMOs because of the lack of detection capacity and training in biotechnology. On 29th January 2018 Namibia opened in Windhoek the first lab for testing food for GMO. Designed by the National Commission on Research, Science and Technology, the lab would test GMO foods so that only those that are approved for use in Namibia get into the market. The lab would also help in research and academic activities in the field. It is also expected to allow the country have an evidence-based approach in making informed decisions on the standard of food produced or imported to the country. The laboratory will also play a role in building local capacity through research, producing professors and researchers in the field of biotechnology. By building local food safety assessment capacity, Namibia will be in a better position to make informed decisions on the standard of food produced or imported through an evidence-based approach.

Source: *Xinhua*, 2nd February 2018

Pakistan: Database to help deal with Genetic Disorders

The medical risks of first-cousin marriages include higher rates of infant

(Contd. from Page 10 - S&T News)

mortality, birth defects, learning difficulties, blindness, deafness, dumbness, epilepsy, thalassaemia, spontaneous abortion, infertility, stillbirth and metabolic disorder. Pakistan, a country with a high rate of marriages among close relatives, has taken a step towards dealing with inherited disorders by establishing a genetic mutation data base, or mutome, that the developers say will help provide genetic counselling and screening, and aid in personalised healthcare. Experts say that about 29 million people out of Pakistan's 200 million populations suffer from genetic defects attributable to close or first-cousin marriages. The Pakistan Genetic Mutation Database (PGMD), which already covers 1,000 mutations implicated in 120 types of syndromic and non-syndromic disorders, was built using the PubMed database of references and abstracts as well as consultations with the country's leading genetic scientists. According to information on the PGMD website, the rate of consanguineous marriages (marriages among close cousins) in Pakistan is 62.70 per cent - by far the highest among countries in the 'consanguinity belt' which includes several countries of the Middle East where the rate averages at 40 per cent. The work to identify genes responsible for various diseases, which showed up a number of mutations, led to the development of the PGMD. The high ratio of first degree consanguinity makes the Pakistani population a rich source for various kinds of genetic disorders. While the PGMD will assist researchers, clinicians and genetic counsellors, high priority has been given to ensure security and confidentiality. To avoid chances of data being compromised or used in any questionable way, the identities, addresses, ethnicity, locality, gender etc. of individuals have been kept secret.

Source: SciDev.Net, 15th January 2018

Spain: Using New Breeding Techniques (NBTs) to develop Tobacco Plants as Biofactories

Tobacco is native to tropical America with the plant being a part of the nightshade family. It is widely cultivated in warm regions, especially in the USA and China. The nicotine-rich leaves of the plant are cured by a process of drying and fermentation for smoking or chewing. Science has established the tobacco plant as harmful to people's health; however, the plants can also be used to provide beneficial effects for its users. Researchers at the Molecular and Cellular Plant Biology Institute (IBMCP), part of the Universitat Politècnica de València, Spain, along with the Spanish National Research Council (CSIC) and eight other countries, are coordinating the NEWCOTIANA project which is a \$8.86 million European initiative financed by the Horizon 2020 programme. The EU funded research and innovation project aims to make use of plant new breeding techniques and technologies to produce medicine, cosmetics and other products from tobacco plants. The NEWCOTIANA project proposes to apply high accuracy new breeding techniques to turn the leaves and any of a similar species called *Nicotiana benthamiana* into bio-factories for substances that will promote health factors, such as Anti-ageing; Anti-inflammatory agents; Vaccines; Antibodies; and Medicines. New breeding techniques including the CRISPR technique, which is also known as the 'genome editor', offer opportunities to improve crops. Other NBTs that the researchers will apply include new grafting techniques or transitory gene transferring systems. New varieties of tobacco and *Nicotiana benthamiana* will be generated that safely work as bio-factories to harvest medical substances of high added value. The NEWCOTIANA project will contribute to refreshing traditional tobacco cultivation, creating new healthy uses for the plant. In turn, these new uses will revitalise rural areas in line with economic growth.

Source: Crop Biotech Update, 7th March 2018

Vanuatu: Ancient DNA offers Clues to Remote Pacific Islands' Population Puzzle

Vanuatu, an 80-island archipelago strewn across 1,300 km of the southern Pacific Ocean, was one of the final pockets of the planet to be reached by humans, with its first inhabitants arriving only 3,000 years ago. For more than a century, researchers have puzzled over why its inhabitants speak languages rooted in Southeast Asia, but trace most of their genetic ancestry to what is now Papua New Guinea, which has its own distinct languages. Two ancient-DNA studies are unraveling the complex sequence of human migrations that left remote islands in the Pacific with a rare linguistic and genetic disconnect. The genomic studies now suggest that a series of population replacements on the islands led to this unusual situation. Until recently, one explanation for the islands'

language and genetic mismatch had been that the first people who settled in Vanuatu and the rest of remote Oceania were from a seafaring culture known as the Lapita, who traced their ancestry back to Taiwan but emerged through what is present-day Papua New Guinea. When they arrived in Vanuatu, they carried some Papuan ancestry but still spoke languages from a linguistic family common in the islands of Southeast Asia, called Austronesian. But ancient genomes from some of Vanuatu's first settlers, published in 2016, scotched that theory. The archipelago's earliest inhabitants carried little Papuan ancestry. This discovery posed an obvious question: when did Papuans get to Vanuatu? The two latest studies published in *Current Biology* and *Nature Ecology & Evolution* build on that work to illuminate the next chapter of Vanuatu's human history. The islands' first settlers had roots in Taiwan, the studies agree. The teams used similar genetic data sets, sequences from around a dozen ancient inhabitants of the islands of Vanuatu and the surrounding region, to conclude that those first settlers were soon joined by people of almost entirely Papuan ancestry, around 2,500 years ago. They also found that later ancient inhabitants had predominantly Papuan genetics but also carried a small portion of Austronesian ancestry, similar to present-day Vanuatuans. The teams differ in their interpretation of this pattern. One group asserts that the Papuans rapidly overran the existing settlers. The researchers interpret the presence of a roughly 2,300-year-old individual of almost total Papuan ancestry as proof of a near-complete population replacement, at least on the island where the remains were found, and people descended from the first Vanuatuans retreated to pockets of the archipelago and later mixed with the Papuan émigrés. By contrast, another team at the Max Planck Institute for the Science of Human History in Jena, Germany argues that a steady trickle of people from Papua mixed with the earlier inhabitants. There wasn't this huge boom, and the Papuans came in and killed off everyone. The researchers say that modern linguistic features in Vanuatu support their hypothesis: the languages, although Austronesian, bear some minor Papuan attributes, including what's known as a bilabial trill, a 'bwww' sound inserted into the middle of words. Furthermore, men of some groups in Vanuatu traditionally don penis sheaths, a practice also seen in Papua New Guinea. A Linguist at the Australian National University in Canberra is sceptical of that explanation. Not all linguists agree that Vanuatu's languages harbour Papuan features. An archaeologist at the University of Auckland in New Zealand says that it is also possible that the first people who settled Vanuatu spoke both Austronesian and non-Austronesian languages, as a result of earlier interactions. And a geneticist at the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany thinks there are still too few data to rule out the possibility that some of the first Vanuatuans had Papuan ancestry. People tend to over-interpret things a little bit because it is so exciting to have ancient DNA from this part of world. Once more genomes from the region have been sequenced, the picture is sure to grow still more complicated.

Source: Nature, 1st March 2018

Zambia: Launch of GET FiT Scheme

The Zambian government has pledged to develop 500 MW of solar PV over the next few years. After the success of the GET FiT Uganda programme, GET FiT Zambia was officially launched in Lusaka on 9th February 2018. Using the Uganda model as a template, this programme, which is a part of a partnership between the Zambian Ministry of Energy and the German development Bank (KfW), the other key partners being ZESCO and the Energy Regulatory Board, received a funding pledge of ~US\$37.9 million from the German government. GET FiT Zambia is the official name for the implementation of a renewable feed in tariff strategy in Zambia, named the Zambian Renewable Energy Feed-in Tariff (REFiT), and which was officially launched in October 2017 by the Ministry of Energy. REFiT provides an allocation of 200 MW to small and medium scale renewable energy projects up to a maximum size of 20 MW. Eligible renewables include solar PV, hydro, geothermal, biomass, waste energy and wind power. The programme aims to facilitate and increase investment in the Zambian private power sector, while helping to alleviate power constraint in Zambia, helping the country become a regional electricity center in the future. The GET

(Contd. from Page 11 - S&T News)

FiT Zambia programme includes a comprehensive package of measures to enable private investment in grid renewable energy in Zambia. It supports the Zambian government in implementing the Renewable Energy FiT (REFiT) strategy. The programme promotes inter alia the following measures: i) A feed-in tariff (financial incentives for first market participants); ii) The development of standardised contract documents; iii) The simplification of application and licensing procedures; iv) Transparent procurement processes, v) Risk mitigation measures; and vi) Support in network integration. The aim of the project is to improve the framework conditions for private investment in renewable energies in Zambia. To this end, a 150 MW portfolio of small, privately financed, grid-connected power plants (up to 20 MW) from renewable energies (RE) is to be supported. Phase I includes two rounds of calls for tender: (i) 50 MW of solar PV, presumably 2-3 power plants and (ii) another 50 MW, if any, for other renewable technologies (small hydropower, biomass, wind). In Phase II, a further 50 MW of generation capacity will be promoted. The programme supports the development of a functioning, private power generation market and contributes to the diversification of the Zambian power generation technology mix. Zambia's portfolio of renewable energy continues to grow with both this project and the recently announced project by India's Sterling and Wilson to build a 54.3 MW solar plant in Zambia, which will be the nations' largest.

Source: PV Magazine, 8th February 2018

NAM Restructuring - Its Concerns in Contemporary Times

The need for a Non-aligned block during Cold War ushered in with factions dividing the world into two grabbing for power creating a vacuum between US led West and Soviet Union leading the East turning other nations as mere pawns to their own game of power and authority on the global chessboard. However, NAM came into existence bringing a balanced outlook and catering and protecting also while strengthening the developing countries. But with the end of cold war the relevance of NAM has been questioned again and again. However, Non-Aligned Movement has a very relevant and vital part to play with certain important issues facing the Southern countries on the globe at present. While it is also important to realise that all its concerns of the past are not addressed completely and have reshaped itself in a different garb that ailing the contemporary times which need to be addressed.

Poverty and underdevelopment still remain a major problem in this region. Despite the almost total elimination of colonialism, the essence of colonialism, such as control and hegemony of external forces, continues in different forms. Neo-colonialism has evolved into a major concern of weak societies in this part of the world.

Environmental degradation, climate change, disarmament, external debt, state and non-state terrorism, and violence emanating from ethnic and religious conflicts are some of the common issues facing the NAM states today. External factors, including sympathetic states, can hardly resolve these issues for the Third World. In addition, depending on external actors to resolve Third World problems goes against the very

essence of independence that the NAM states were seeking relentlessly. These issues may be easily handled and resolved through internal mechanisms and collaboration among the states of the Third World. The NAM could and should continue to focus on these issues.

Along with them is the worrying issue of global economy, with the Western economy entering into a depression the rest of the world is bound to experience a disastrous effect specially the Southern countries which are already experiencing decline in exports, GDP and an alarming weakening of their balance of payments. This crisis if it hits the developing countries would destabilize the progress that has been made till date, calling NAM for immediate action to counter the coming setback.

The developing countries need to insist that reforms are commenced especially by developed countries on their enormous agricultural subsidies which undermine farmers and agriculture processes of developing countries affecting the final outcome. Many imbalances and unwanted rules of the developed countries threaten the developing countries, like the Economic Partnership Agreement negotiations of Africa and Pacific countries with the European Commission which is demanding zero tariffs for 80% of imports as well as other unreasonable demands such as a ban on export taxes, a deregulation of finance and investment, and to be given equal treatment as locals in the government procurement business. This has become a burning issue which requires the immediate attention of NAM.

Another matter that has been recently flagged as a subject of concern is of privacy, intellectual property and transfer of technology. The strict IPR regime preventing transfer of technology and instead raises costs and prices. Also posing strict uneven rules for developing countries access to cheap medicines, in controlling seeds and agriculture and building their own industries. Developing countries are fighting for flexibilities or reform of the present IP regime, and have launched a development Agenda initiative in WIPO. The South Centre can work with NAM members to strengthen this reform movement and to formulate national IPR policies that are pro-development.

In addition to these is the need of developing countries to review their developmental policies in view of the global economic situation, relying less on exports from West and become self reliant with domestic and regional products, while also promoting South-South trade policies and more.

These developing countries also need to coordinate to implement the post-Rio plus 20 agenda with profound climate change negotiations which are not only going to affect the climate but also have deep implication on South's economic policies.

Reproduced from Material published by the International Institute for Non - Aligned Studies (Twitter: @iinsNAM; Email: iins@iins.org) on 12th February 2018 with grateful acknowledgment

Participation of Centre's Scientists in Scientific Events

16th January 2018	Ms. Meenu Galyan and Ms. Jasmeet Kaur , Research Associates attended the Discussion Meeting on 'Research Priorities for the IOR Region' organised by Research and Information System for Developing Countries (RIS) at India Habitat Centre, New Delhi.
6th February 2018	Dr. Kavita Mehra , Publication Advisor and Ms. Rashmi Srivastava , Research Associate attended the seminar on 'Green Growth and the Right to Energy in India' organised by Indian Council for Research on International Economic Relations (ICRIER) at India Habitat Centre, New Delhi.
27th February 2018	Ms. Rashmi Srivastava , Research Associate attended the lecture on 'Role of Artificial Intelligence in Healthcare and Imperatives for India' organised by Research and Information System for Developing Countries (RIS) at India Habitat Centre, New Delhi.
27-29 March 2018	Ms. Rashmi Srivastava and Ms. Jasmeet Kaur , Research Associates attended the International Workshop on 'Technological Innovation and Management for Sustainable Development (For Greener, Safer & Smarter World)' at ITM University, Gwalior, India and presented their scientific papers.

Past Scientific Associate of NAM S&T Centre

Ms. Reshmi Hariharan



Ms. Reshmi Hariharan worked in the NAM S&T Centre as a Research Associate from January 2015 to July 2015. Her primary responsibilities included planning, implementation, evaluation and assessment of various scientific programs of the Centre.

She was deputed from the Centre to attend a meeting on the Consultative Committee of the Task Team for the establishment of the NAM S&T Centre of Excellence in Mineral Processing and Beneficiation (CEMPB) in Harare, Zimbabwe during 16-17 April 2015, where she participated in drafting the agenda and by-laws of CEMPB. On her way to Zimbabwe, she also visited Ethiopia - the Ministry of Science & Technology - on 15th April 2015 to promote the Centre's agenda aimed at technological advancement of developing countries and significance for Ethiopian community to partake in the Centre's activities.

Ms. Reshmi played a vital part in implementing the Centre's international fellowship scheme titled 'Research Training Fellowship for Developing Country Scientists', which is a programme sponsored by the Department of Science and Technology, Government of India. She carried out detailed survey of technical information on relevant subjects and prepared announcement brochures for scientific activities viz. international symposium on 'Strategic Interventions to Mitigate the Hazards of Lightning' and contributed to 'NAM S&T Centre – U2ACN2 Research Associateship in Nanosciences & Nanotechnology'. During her affiliation with the Centre, she contributed to the compilation and further publication of the book on 'Science, Technology & Innovation Policy Making for Developing Countries' and the publication on RTFDCS 2013-14, Vol.2, 2015'.

The Centre provided her with a stepping stone to the next milestone in her career and Ms. Reshmi joined the National Internet Exchange of India (NIXI) as a Research Associate where she conducted research and identified the gaps in technology and policy in supporting non English content and services on the Internet. She facilitated dialogue between the industry and Government officials to support the creation of multi-lingual Internet in the country and presented her findings, by organising a series of roundtables during 2015–2017. She was a member of the 'Universal Acceptance Steering Group', a global community aimed at promoting multi-lingual Internet. Ms. Reshmi presented her findings combined with Government's perspective during the 57th Internet Corporation of Assigned Names & Numbers Meeting which was held in India during Nov 2016. She also contributed to the administrative tasks in running the registry of .IN, the top level country code domain name for India.

After her exciting stint at NIXI, she moved on to join Gartner, a global IT Advisory firm where she was involved in the development and operations of an online review platform for enterprise IT software and benchmarked various IT software and vendors against the market requirements, before finally leaving for Australia. She is a permanent resident there and is currently looking for challenging opportunities where she can make use of her knowledge about the IT industry and skills in technology research, reporting and project management.

Ms. Vaneet Kaur



Ms. Vaneet Kaur worked in the NAM S&T Centre as a Research Associate from January 2015 to July 2015. Her primary responsibilities included planning, implementation, evaluation and assessment of various scientific programs of the Centre.

She assisted in the organization of the International Training Workshop on 'Herbal Medicine in Mysore/Ooty during 30th March – 3rd April 2015 where she presented her research paper entitled 'Curcumin: A Chemopreventive and Chemotherapeutic Agent'. Ms. Kaur was also deeply involved in the organization of the International Symposium on Strategic Interventions to Mitigate the Hazard of Lightning in Lusaka, Zambia. She had also contributed to the implementation of the Centre's international fellowship scheme titled 'Research Training Fellowship for Developing Country Scientists (RTF-DCS)'; 'Joint NAM S&T Centre - ICCBS Fellowship Scheme'; and 'Joint CSIR/CFTRI (Diamond Jubilee)-NAM S&T Centre Fellowship

scheme'. She contributed towards the preparation of the guidelines and announcements of these schemes in a major way, managing the database of R&D and academic institutions, and coordination with scientists & researchers from developing countries.

During her affiliation in the Centre, Ms. Vaneet was deputed to represent the NAM S&T Centre at the 5th Global Economic Summit organised by World Trade Centre (WTC), Mumbai and All India Association of Industries (AIAI), Mumbai which became one of the biggest achievements of her career. The summit was organised on the theme 'Enabling Food for All' on 19th -21st November, 2016 at Mumbai, attended by 500 leaders across the world. She was one of the youngest speakers among the senior officials from WHO, FAO, IFAD and UNDP and various other representatives from foreign universities. She delivered a presentation on 'Technological Innovations in Agriculture' which was highly appreciated at the summit.

Ms. Vaneet had also acquired editorial skills during her affiliation with the Centre and assisted in the compilation of manuscripts and further publication of highly valuable books titled 'Perspectives of Science & Technology Diplomacy for Sustainable Development in NAM and Other Developing Countries' and 'Herbal Medicine: Drug Discovery from Herbs-Approaches, Innovations and Applications'.

After the enriching experience at the NAM S&T Centre, she moved on to the position of Junior Research Fellow at the National Institute of Immunology (NII), one of the premier research institutes of the Government of India under the Department of Biotechnology. Her research was on the Role of MicroRNAs and Their Role in Cell Cycle Regulation and Cancer. She presented her research in 12th International Conference of Asian Clinical Oncology Society (ACOS) and 35th Annual Convention of Indian Association for Cancer Research (IACR).

With her strong technical and research background, she moved to the field of Intellectual Property Rights and is currently working as a Patent Consultant in a law firm based in NOIDA. She is primarily involved in handling diverse patent assignments such as conducting Patent Analytics, facilitating inventors in filing Patent applications and drafting replies for the examination reports issued by the Indian Patent Office.

New Publication

Technology Transfer and Commercialisation

Capability for innovation can be developed through a dynamic process involving various stakeholders such as governments, academic and research institutions, and industry with the help of a combination of schemes and programmes for R&D, technology transfer and commercialisation, and for the development of new technology-based industry; backed up by adequate support facilities and suitable institutional mechanisms. The important factors for successful commercialisation of technology include S&T capability, market demand and an agent (an Entrepreneur) which transforms this capability into goods and services, to satisfy such demand.

For the technological self reliance, developing countries should encourage academic and research institutions to undertake activities on technology transfer and commercialisation through appropriate policy decisions with greater flexibility wherever required.

The present book edited by Ms. Sheikha Al Akhzami of the Innovation & Entrepreneurship Department of Sultan Qaboos University, Oman is a follow up of the above Training Workshop and comprises 14 papers by the authors from 9 countries covering several important issues related to commercialisation of technologies. The book will be useful to policy makers, researchers, academicians and other professionals involved with various aspects of technology development and commercialisation across the countries with emerging economies.

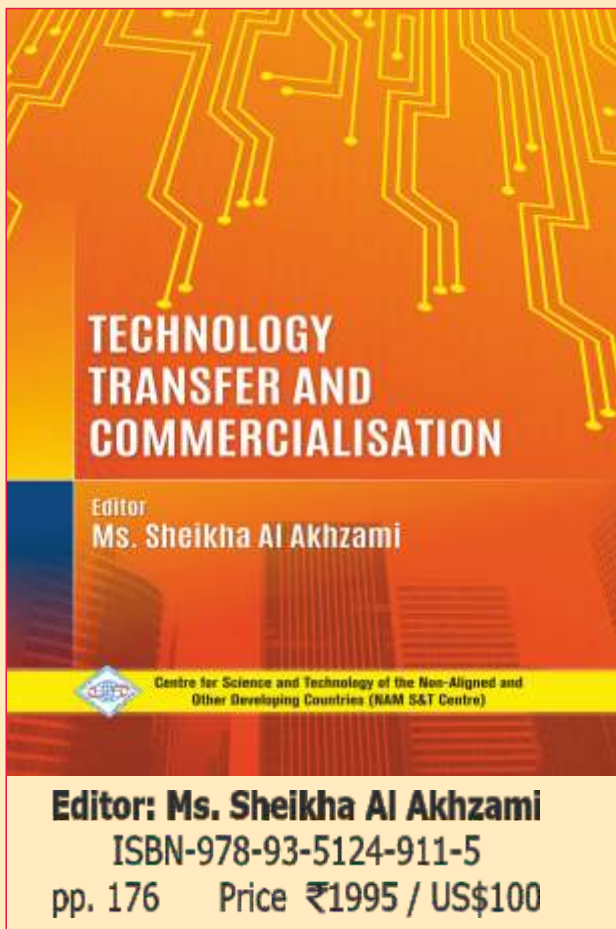


TABLE OF CONTENTS

Foreword, *Dr. H. Purushotham, Chairman and Managing Director, National Research Development Corporation (NRDC), (India)*

Preface, *Ms. Sheikha Al Akhzami, Innovation & Entrepreneurship Department of Sultan Qaboos University (Oman)*

Introduction, *Prof. Arun P. Kulshreshtha, Director General, NAM S&T Centre*

1. **Promoting Renewable Energy Technology Transfer to Ghana**, *Edem C. Bensah (Ghana)*
2. **Public R&D funding-The Indian scenario for Lab to Market Ecosystem**, *Raj Kumar Sharma (India)*
3. **Twenty five years of experience in development and commercialization of diagnostics and vaccine for aquaculture in India**, *K.M. Shankar (India)*
4. **Mechanisms for Commercialisation of Technology: The Role of Technology Business Incubators in the Promotion of Knowledge-based Industries**, *M. Bandyopadhyay (India)*
5. **Current Status of Biotechnology Commercialization in India**, *Ritu Seth (India)*
6. **Technology Transfer and Commercialisation of Technologies in Mauritius**, *Mohammad Reza Soodin (Mauritius)*
7. **Role of Government in Supporting Technology Commercialisation in Nigeria**, *D.M. Ibrahim (Nigeria)*
8. **Local Production of Copper Sulphate in Nigeria and its Impact on School Education System**, *Mercy Sule Bassi, M. O. Omojola, M. Sirajo, H.D. Ibrahim and S. Gadimoh (Nigeria)*
9. **Socio-Economic Imperatives of Intellectual Property (IP) Protection for the Commercialization of Research and Development (R&D) Results and Inventions in Nigeria**, *Samuel Ojonimi Eneanya (Nigeria)*
10. **Research, Innovation and Commercialization: Current Status In Pakistan**, *Syed Shahid Hussain and Ahmad Bilal (Pakistan)*
11. **Palestine Incubators, Challenges and Opportunities**, *Zaki S. S. Afaghani (Palestine)*
12. **Innovation Eco System Development in Sri Lanka**, *R. Wijaludchumi (Sri Lanka)*
13. **Technology Commercialisation Initiatives in Tanzania**, *Mafunda Dugushilu and Georges Silas Shemdor (Tanzania)*
14. **Science, Technology and Knowledge Transfer in Venezuela**, *Anwar Salem Hasmy (Venezuela)*

Tehran Resolution on Transfer and Commercialisation of Technology in Developing Countries, 26th May 2016

The Centre Invites Applications for

Joint NAM S&T Centre - ZMT Bremen (Germany) Fellowship in Tropical Coastal Marine Research

The Centre for Science and Technology of the Non-Aligned and Other Developing Countries (NAM S&T Centre) is pleased to invite applications from suitable candidates for the Joint NAM S&T Centre - ZMT Bremen (Germany) Fellowship in Tropical Coastal Marine Research for the year 2018.

This Fellowship scheme was initiated in January 2008 for affiliation of the scientists from the developing countries with the Leibniz Centre for Tropical Marine Research (ZMT), Bremen, Germany for a period of up to 3 months to work with its senior researchers and faculty members for upgrading research skills in the fields related to Ecology, Biogeochemistry, Geology, Theoretical Ecology and Modelling, Social Sciences and Tropical Coastal Marine Systems; and undertaking short-term joint research projects. Depending on the research topic, the Fellows can also benefit from the ZMT's association with the Marine Science Institute of Bremen University, Max Plank Institute for Marine Microbiology and the MARUM Research Centre in Bremen.

Under this scheme, the NAM S&T Centre sponsors up to five scientists each year. Only one scientist can be selected from any particular developing country. While the Centre covers the international airfare of the Fellows from its member countries, ZMT provides a monthly subsistence allowance of 1250 Euros to meet the accommodation and other expenses in Bremen.

Application recommended by the parent institution of the applicant and endorsed by the Focal Point of the NAM S&T Centre in the country may be submitted to the Centre by email in the relevant format.

The selection will be made strictly based on the professional details of the applicant, plan of work to be carried out and mutual research interest of the applicant and ZMT. Guidelines for the Fellowship and the application form are available at the Centre's Website www.namstct.org.

The last date for submitting application for the Fellowship is Friday, 8th June 2018.

DISTINGUISHED VISITORS TO THE CENTRE



H.E. Ms. Jainaba Jagne, Ambassador and **Ms. Naomi A Williams**, Deputy Head of Mission (DHM), The Gambian High Commission in New Delhi, India



Dr. George John, Former Advisor/Scientist-H, Department of Biotechnology, Ministry of Science and Technology, Government of India and Former Vice Chancellor of Birsa Agricultural University, Ranchi, Jharkhand



Dr. Hemalatha Reddy (3rd From L), Principal and **Dr. Vartika Mathur** (2nd From L), Dept. of Zoology, Sri Venkateswara College, Delhi University, New Delhi, India



Prof. C. Rajasekaran (2nd From L), Department of Biotechnology, School of Bio-Sciences and Technology, Vellore Institute of Technology (VIT), Vellore, Tamil Nadu, India and **Dr. Ranjan Das**, Associate Professor, Assam Agriculture University, Jorhat, India

Centre Announces

International Workshop on MODERN AND EMERGING TREND IN VACCINE DEVELOPMENT Abuja, Nigeria, 22-24 May 2018



Vaccine, a biological preparation from living organisms, is one of most widely practiced life saving medical interventions to reduce disease and death from infectious diseases. There are 5 main types of vaccines - attenuated (live), inactivated, toxoid, subunit and conjugate - which are administered by injection, oral or intranasal routes for either preventing the disease (prophylactic vaccine) or for its treatment (therapeutic vaccine). Though the earlier period witnessed the development of vaccinology in purely empirical fashion, with the advent of molecular microbiology, molecular

genetics and molecular immunology and introduction of novel processing techniques, the production of the state-of-the-art vaccines against numerous infections of public health importance, viz. diarrhoeal, respiratory, bacterial, parasitic, sexually transmitted, vector-borne viral, zoonotic etc and against viral cancer has gained momentum through research and development efforts. However, even though the technologies today can provide adequate tools to detect, control and prevent emerging infections, the developing countries are mostly still suffering from a variety of infectious diseases for which either the vaccines do not exist or need further R&D, requiring global and continued efforts and collaboration and coordination among regulatory agencies as well as sustainable economic system to support such initiatives.

With the above in view, the Centre for Science & Technology of the Non-Aligned and Other Developing Countries (NAM S&T Centre) jointly with the National Biotechnology Development Agency (NABDA), Nigeria announces the organisation of an International Workshop on 'Modern and Emerging Trend in Vaccine Development' in Abuja, Nigeria during 22-24 May 2018.

The Workshop programme has been primarily designed to discuss and debate on the latest research results by the scientists, researchers and industry experts from the developing countries and innovative approaches introduced by them in the areas related to vaccine development as input for policy makers in government departments and ministries. The selection of the participants will be strictly based on merit and relevance of their current responsibilities to the subject of the Workshop as well as the quality of the extended abstract of the paper submitted by them along with the completed nomination form. A pre-condition for participation in the Workshop is that the participants must submit the full manuscript of their papers, in MS-Word format, at least 14 days before the commencement of the programme.

Experts and scientists desirous of participating in the Workshop, excepting those from Nigeria, may submit their nomination papers electronically to the NAM S&T Centre as early as possible but latest by Monday, 23rd April 2018. However, Nigerian Experts and scientists desirous of participating in the workshop should send their applications with completed documents to the National Biotechnology Development Agency (NABDA), Abuja, Nigeria.

International Training Workshop on STI POLICY AND MANAGEMENT FOR DEVELOPING COUNTRIES (ITPS) Kuala Lumpur, Malaysia, 6-10 August 2018



It is now widely recognised that the ongoing trend of the developing countries for a gradual transition to acquiring knowledge or innovation driven economy has to be strongly supported by strengthening of their national capacity in STI and strategically designing their Science, Technology and Innovation (STI) policy. Unfortunately, a well defined STI Policy either does not exist in many developing countries, or even if it is, the countries face difficulty in implementing the same,

besides not having trained personnel with adequate knowledge to develop the STI Policy and subsequently implement it. It is also observed that the existing STI policies often do not adequately address the needs of the local industry and economic conditions.

With the above in view, the Centre for Science & Technology of the Non-Aligned and Other Developing Countries (NAM S&T Centre) jointly with the International Science, Technology and Innovation Centre for South-South Cooperation under the Auspices of UNESCO (ISTIC) announces the organisation of an International Training Programme on STI Policy and Management for Developing Countries (ITPS) in Kuala Lumpur, Malaysia during 6-10 August 2018.

The Training programme has been primarily designed for policy makers, researchers, government officials and representatives of S&T agencies and institutions in the developing countries. The main objective of the training programme is to provide the participants an understanding of the basic elements of STI policy in support of national socio-economic transformation, the development of policy responses and the strategies for their implementation using the 'Omar Model'. The selection of the participants will be strictly based on merit and relevance of their current responsibilities to the subject of the Training programme as well as the quality of the extended abstract of the paper submitted by them along with the completed nomination form. A pre-condition for participation in the Training programme is that the participants must submit the full manuscript of their papers, in MS-Word format, at least 14 days before the commencement of the programme.

Experts and scientists desirous of participating in the Training programme, excepting those from Malaysia, are required to submit their nomination papers electronically directly to the NAM S&T Centre as early as possible but latest by Monday, 30th April 2018. However, Malaysian Experts and scientists desirous of participating in the Training programme should send their applications with completed documents to the ISTIC, Kuala Lumpur by the above stated deadline.

For further details, please visit the Centre's Website: www.namstct.org

EDITORS: Mr. M. Bandyopadhyay and Dr. Kavita Mehra ❖ ASSISTANT EDITORS: Ms. Rashmi Srivastava, Ms. Meenu Galyan and Ms. Jasmeet Kaur

COMPILATION & DESIGN: Mr. Pankaj Buttan ❖ PUBLISHED BY: Prof. Arun P. Kulshreshtha, Director General, Centre for Science & Technology of the Non-Aligned and Other Developing Countries (NAM S&T Centre), Core 6A, 2nd Floor, India Habitat Centre, Lodhi Road, New Delhi-110003 (India)

Ph: +91-11-24645134, 24644974, Fax: +91-11-24644973 E-mail: namstcentre@gmail.com, namstct@bol.net.in ❖ Website: <http://www.namstct.org>