

Federal Minister for S&T, Pakistan, H.E. Rana Tanveer Hussain, alongwith distinguished guests				
of ICERET-2016, Islamabad, Pakistan (18-20 October 2016) (page 07)				

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From the Executive Director's Desk

It is an honour for me to address the readership of this newsletter in my capacity as the interim Executive Director, COMSATS.

Being the focal person for the host country, by virtue of holding the post of Federal Secretary, Ministry of Science and Technology, Government of Pakistan, I have been associated with the working of COMSATS for more than a year. It was a unique experience to chair the 3rd meeting of the COMSATS Consultative Committee, held in Accra, Ghana, on 26th October, 2015. It was reassuring to have a feel of the discernible commitment that the Member States have towards COMSATS and their engagement with one another through the process of cooperation and coordination in the field of Science and Technology with a view to creating synergies and building S&T capacities for developing their economies.

The increasing number of member countries as well as the Centres of Excellence are a manifestation of the fact that the developing countries have come to recognize the potential and benefits emanating from the cooperative enterprise

that has been set in motion by COMSATS.

Science, Technology and Development

Profile of Member COMSATS' Technical

COMSATS' Brief and Announcements

Advisory Committee: Prof. M.H.A. Hassan

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It needs to be recognized that the task COMSATS has been entrusted to accomplish, with relatively limited means and resources, is guite challenging. Nevertheless, it is satisfying to note that, at least, the direction is clear and reasonable efforts are being put in this direction - the two basic ingredients required to ensure the success of any endeavor. The leadership of this organization over the years deserves due credit for their efforts to establish and strengthen the organization and uphold its mission. Among these, has been my colleague, Dr. I.E. Qureshi, who has recently relinquished charge upon completion of his second term as Executive Director COMSATS.

In conclusion, I would like to share with all stakeholders of COMSATS and the readers of this newsletter that it would be my responsibility to further the objectives of this organization by promoting its efforts for multilateral collaboration and various related initiatives being undertaken by this organization. I would welcome any input or feedback on ways to ensure that the organization's undertakings can be made more useful for the Member States.

NEWS/ACTIVITIES/HIGHLIGHTS FROM COMSATS SECRETARIAT

Leadership Change at COMSATS Secretariat

COMSATS Secretariat has undergone a major change in its leadership during the reporting period. Mr. Fazal Abbas Maken, the Federal Secretary, Ministry of Science and Technology (MoST), Government of Pakistan, assumed the interim charge as the Executive Director of COMSATS 19th October 2016, succeeding Dr. I.E. Qureshi, who had completed his second term in the office this September. The organization awaits appointment of a full-time Executive Director.

Mr. Maken has been the ex-officio Chairperson of COMSATS Consultative Committee since late 2015. After assuming charge as the Executive Director COMSATS, Mr. Maken has held a number of meetings with various department heads of the Secretariat for suitable continuation of COMSATS' programmes and activities.

As per tradition at COMSATS Secretariat, the outgoing Executive Director was bid farewell in a graceful ceremony held at COMSATS Secretariat, Islamabad, on 30th September 2016. Officers and other staff members of COMSATS candidly shared their experiences working with Dr. Qureshii, who reciprocated by expressing gratitude to all COMSATS' employees for their cooperation over the years and considered his association with COMSATS a highlight of his career.

Brief Profile of Mr. Fazal Abbas Maken Executive Director COMSATS

As the Federal Secretary, Ministry of Science & Technology

(MoST) Government of Pakistan, Mr. Fazal Abbas Maken is using his diverse expertise in policy-making and trade promotion to create linkages amongst R&D institutions, academia and the industry. He is endeavouring to re-align the existing R&D paradigm in the country towards industry-specific and need-based research, with a view to contribute towards technological advancement of



the industrial sector. Moreover, he is also supervising the administration of distinctive trade-related services for standardization, accreditation and conformity assessment being provided through his ministry.

He joined the Pakistan Administrative Service in 1983 after graduating in Economics and Statistics from the Government College, Lahore, Pakistan. He has since been undertaking district-level administrative assignments related to law & order and revenue collection, while holding midmanagement and senior management positions related to planning & development, project management, policy making and promotion of Pakistan's international trade. He played an instrumental role in formulating policies regarding immigration, arms control, and regulations of private security companies. He also launched a project to introduce e-filing in the Ministry.

COMSATS' Observes UN Day for South-South Cooperation

COMSATS organized a Seminar on September 22, 2016, to celebrate the UN Day for South-South Cooperation, in Islamabad, Pakistan. The event was held in collaboration with Pakistan Academy of Sciences (PAS), at the latter's premises. The seminar bore the theme 'Framework of Sustainable Development Goals (SDGs)'. Mr. Neil Buhne, UN Resident Coordinator and UNDP Resident Representative in Pakistan, was the Chief Guest at the event that was attended by over 90 participants, including academicians, scientists, economists, entrepreneurs, policy makers & practitioners, media and civil society; representatives of government, and non-governmental organizations, as well as international development agencies.

In his inaugural address, Mr. Buhne stated that dynamics of the world and cooperation patterns over the years are changing very fast, but South-South Cooperation is still relevant in many ways. He laid emphasis on the importance of development indicators for assessing the progress made by the developing countries.

Speaking at the inaugural ceremony, Dr. Anwar Nasim, President PAS, strongly advocated the role of science academies in promoting S&T for sustainable development. In special connection to COMSATS, he recalled and recognized the services of Prof. Abdus Salam, who made invaluable contributions to the development of science and institution-building in the developing countries. He hoped that the science complexes created for promotion of S&T would live up to their mandate and potential.

On behalf of COMSATS, Mr. Irfan Hayee, Deputy Director (Programmes) COMSATS, delivered opening remarks. He noted that COMSATS' programmes are consistent with the concepts of South-South cooperation and Sustainable Development Goals. He considered COMSATS' Network of Centres of Excellence an important technical resource for undertaking S&T based South-South Cooperation activities.

Prof. Dr. Zabta K. Shinwari, Secretary General PAS, presented his keynote address entitled 'From MDGs to SDGs & South-South Cooperation Needed for its Success'. He highlighted the crucial relationship between science, society, and policy-making, and the socio-economic challenges that need to be taken into account for making S&T beneficial for the society. He believed that there could be no development without scientific interventions and solutions. He opined that most of the sustainable development goals (SDGs) are interlinked; achieving one goal could have unintended consequence on the other if pursued separately. He stressed the need for having concrete policies for South-South cooperation to accelerate



Inaugural Session of the Seminar

the progress towards achieving SDGs.

The second keynote address was given by Prof. Dr. Anwarul-Hassan Gilani, Chairman, Pakistan Council for Science and Technology (PCST), who was also representing the Ministry of Science and Technology, Government of Pakistan. In his address entitled 'Role of ST&I to the Three Dimensions/Pillars of Sustainable Development', he pointed out the interdependence of various SDGs. He believed that there is an over emphasis on one of the pillars of Sustainable Development, the Economy, without due consideration to the other two, i.e., society and environment. For successful achievement of SDGs, Dr. Gilani called for country-specific need assessment and rationalizing the goals accordingly. He opined that global agendas cannot be adopted as such for each nation.

Dr. Abid Qaiyum Suleri, Executive Director, Sustainable Development Policy Institute (SDPI) and Mr. Syed Tanvir Abbas Jafri, Incharge China Study Center, COMSATS Institute of Information Technology (CIIT), gave technical talks. Dr. Suleri shared people's skepticism about the achievement of SDGs. He noted that although per capita incomes seem to be increasing, the disparity in incomes and inequality is still on the rise. He called for rationalizing expectations from the SDGs and modifying approaches for achievement of these Goals, especially in the light of world community's experience with the MDGs.

Mr. Jafri's talk, entitled 'China: Exporting Sustainable Development', dealt with the 'One Belt one Road (OBOR)' programme of China, as a case study of South-South Cooperation. He informed that with trade as its major focus, OBOR involves cooperation agreements with 65 countries and benefits many more. He discussed a number of related aspects of the programme, including financial, political, social and cultural. He believed that despite the vast benefits this project may accrue for the countries involved, these countries need to remain sensitive towards their human resource and innovation needs.



The event concluded with an interactive panel discussion session, with the following as panelists: Dr. Suleri; Dr. Nasim; Prof. Dr. N.M. Butt, Chairman PINSAT; Dr. Qasim Jan, Advisor COMSTECH; as well as Mr. Wasim Hashmi Syed, Advisor (HRD), Higher Education Commission (HEC) of Pakistan, who represented Dr. Mukhtar Ahmad, Chairman HEC.

COMSATS holds collaborative events on Atmospheric Aerosol in Beijing, China

In September 2016, COMSATS facilitated the organization of the 15th CTWF International Symposium on Atmospheric Aerosol (19-24 September) and the International Lecture Courses on Atmospheric Aerosols (25-27 September) that were held in Beijing, China. Hosted by COMSATS' Centre of Excellence in China, the International Center for Climate and Environment Sciences (ICCES), the events' other coorganizers included: CAS-TWAS-WMO Forum (CTWF), the Aerosol Comparisons between Observations and Models (AeroCom), and the International Satellite Aerosol Science Network (AeroSAT).

The events were attended by over 150 participants belonging to Belgium, Brazil, China, Egypt, Finland, France, Germany, Ghana, India, Iran, Japan, the Netherlands, Nigeria, Norway, Pakistan, Spain, Sri Lanka, Sweden, Switzerland, Thailand, the United Kingdom, and USA.

The International Symposium was inaugurated on 19th September 2016, in an opening ceremony that featured addresses by Dr. Kai Feng, and Dr. Yifen Pu of the Chinese Academy of Sciences, China; Dr. Xiaohong Liu of the University of Wyoming, USA; Dr. Mian Chin, and Dr. Ralph Kahn of the NASA Goddard Space Flight Center, USA; and Dr. Thomas Popp of the Deutsches Zentrum fur Luft-und Raumfahrt, Germany.

The event that spanned six days had 15 technical sessions that featured 50 technical presentations and invited lectures



Technical Session of 15th CTWF International Symposium on Atmospheric Aerosol underway

on different areas related to atmospheric aerosol, as well as several discussion sessions. The topics covered during the symposium, inter alia, included: air pollution-climate change relationship; aerosols-cloud interactions; dust storms; effects of aerosol on air quality and surface radiation trends; using satellite datasets for studying aerosol; indirect effects of aerosol; effects of aerosols on the poles; employing different climatic models to assess the impacts of atmospheric aerosol; and uncertainties in the satellite datasets related to atmospheric aerosols. Moreover, three poster presentation sessions were arranged to enable the participants to showcase their research efforts and results related to the theme of the event.

The symposium was followed by the three-day International Lecture Courses on 'Atmospheric Aerosol', which commenced on 25th September 2016. During the opening ceremony Prof. Lin Zhaohui, Director ICCES, China; Prof. Brian Toon of University of Colorado, USA; and Mr. Farhan Ansari, Sr. Assistant Director Programmes, COMSATS, spoke on different aspects of the central theme of the event.

There were 13 invited lectures delivered by five subjectexperts belonging to USA and China. Prof. Toon delivered lectures on topics, including relationship of aerosol with Asian monsoon, effects of volcanic eruptions on climate change, and clouds-aerosol relationship on earth and mars. Prof. Margaret Tolbert of the University of Colorado, USA, gave lectures on particulate water in atmospheric aerosol, and cirrus cloud formation in the upper troposphere.

Dr. Mian Chin covered models used to study atmospheric aerosol. Prof. Hong Liao of the Nanjing University of Information Science and Technology, China, discussed historical changes and climatic effects of aerosols in China, while Prof. Xiaohong Liu gave an overview of aerosol-cloudclimate interactions. The events concluded with distribution of certificates among the local and foreign participants.

Fifth Meeting of COMSATS' ITRG on 'Climate Change and Environmental Protection' held in Beijing, China

The fifth meeting of COMSATS' International Thematic Research Group (ITRG) on 'Climate Change and Environmental Protection' was held on 28th September 2016, in conjunction with the aforementioned events, held in Beijing, China. The meeting was hosted by ICCES, China, and chaired by its Director, Prof. Zhaohui Lin, who is the designated Group Leader.

The meeting reviewed the progress of the group with regard to execution of its joint research project, entitled 'Characteristics and Mechanism of Extreme Climate Events under the Climate Change Background'. It was attended by the existing group members belonging to China, Pakistan, Iran and Thailand. Moreover, a number of other scientists belonging to Pakistan, Brazil, Thailand, Nigeria, Iran, Jamaica, Ghana, Egypt and Sri Lanka, participated in the meeting. In all, 21 scientists represented 18 organizations during the meeting.

In his opening remarks, Prof. Lin expressed pleasure on leading the thematic group, which is working in one of the most significant areas of concern for the developing countries. In his presentation, Prof. Lin recalled that the overall goals of the research project being undertaken by the group are: collecting meteorological datasets from participating developing countries for climate change studies, studying the characteristics of extreme weather and climate events, understanding the linkage between extreme climate events of different regions in the world for understanding the mechanisms responsible for these events, and providing training opportunities to participating scientists to enhance their research capabilities. Highlighting the significance and impacts of atmospheric aerosol, Prof. Lin suggested inclusion of this component in the joint research project of the group.



5th ITRG Meeting on 'Climate Change and Environmental Protection' in progress

Mr. Farhan Ansari, Sr. Assistant Director (Programmes), COMSATS, appreciated ICCES for consistently hosting the meetings of the Group over the last few years, as well as for its active participation in COMSATS' programme. Mr. Ansari also made a multimedia presentation, in which he highlighted the history, mission, mandate, structure and technical activities of COMSATS, as well as the objectives and implementation mechanism of the ITRG programme, and the key outcomes of the previous meetings of the group.

During the technical session, the participants of the meeting presented their country-specific meteorological data, details on-going projects, and indicated their research expertise and interest. It was informed that a joint paper on studying floods and droughts using GIS is being prepared by two ITRG members: Dr. Shahina Tariq (Pakistan) and Dr. Chandima Gomes (Malaysia). COMSATS' support to the preparation of this paper was duly acknowledged.

The group reviewed its progress and identified the following six topics for its future activities: (i) land use, aerosol and climate change, (ii) climate change adaptation and sustainability, (iii) monitoring and comparison of aerosol, (iv) monitoring and comparison of extreme events, (v) urbanization and environmental impact, and (vi) simulations and prediction of aerosol and their validation. The group designated coordinators for the afore-mentioned topics/subgroups.

The meeting also finalized work plan and time-line for the activities of the afore-mentioned sub-groups/topics for the period 2016-2017. The group will organize trainings/ workshops as well as facilitate expert-exchange through short-term visits and doctoral scholarships. The group members agreed to publish joint research papers based on their collaborative research findings, acknowledging the support provided by COMSATS.

The 2nd International Conference on Agriculture, Food Security, and **Biotechnology, held in Khartoum, Sudan**

The 2nd International Conference on Agriculture, Food Security, and Biotechnology was held from October 17-18, 2016, in Khartoum, Sudan. The Conference was organized by COMSATS in collaboration with the Islamic Educational, Scientific, and Cultural Organization (ISESCO); the Industrial Research and Consultancy Centre (IRCC), Sudan; and University of Khartoum, under the patronage of the Ministry of Higher Education and Scientific Research (MoHESR), Government of Sudan. Researchers and subject experts from Egypt, Iran, Oman, Pakistan, Senegal, and Sudan contributed to the two-day conference as speakers, which also had representation of a large number of local organizations. Over 300 participants attended the conference.



The conference brought together scientists, researchers, technologists and faculty members of higher education institutions to share their experiences and recent developments in the field of agriculture and biotechnology, and examine from a scientific point of view the need to increase the global sustainable availability of food. With 32 speakers representing national governments, international organizations, industry, NGOs, universities and research institutions, the Conference focused on key questions relating to food security, with regard to how biotechnology could contribute to ensuring food for all.

The inaugural ceremony of the Conference was held at the Grand Hall of MoHESR. The Honourable Minister for Higher Education and Scientific Research, H.E. Prof. Somaia Abukashawa, inaugurated the Conference as the Chief Guest. Other distinguished guests at the ceremony included Sudanese government officials: H.E. Mr. Yagoub Mohamed Altaib, State Minister, Ministry of Agriculture & Forestry; H.E. Mr. Bahar Idris Abu Garda, Federal Minister of Health; and Prof. Azhari Omer Abdelbagi, Undersecretary MoHESR. Prof. Ahmed Hassan Fahal, University of Khartoum (UoK); Dr. Widad H. AbdelHalim, Director General IRCC, Sudan; Dr. Ismail Abdel-Hamid, Expert, Science Directorate, ISESCO; and Ms. Huma Balouch, Sr. Assistant Director COMSATS were also present on the occasion.

Opening the conference, Prof. Fahal categorized food security as one of the most important challenges faced by the humanity, and involves much more than agriculture. H.E. Prof. Somaia stressed the importance of increasing production through research in biotechnology to ensure food security in the country. H.E. Dr. Abdallah opined that the answer to Africa's food security challenges lay in improving agricultural productivity, especially by the regions' smallholders. Using biotechnological applications, he further stated, would make an important contribution towards improving productivity. Dr. Widad H. AbelHalim said that the world population can live sustainably by recognizing the intimate relationship between food, water, energy and climate change. Prof. Azhari considered biotechnology a

key technology of the 21st century. It provides new solutions for issues related to nutrition, agricultural productivity, fine chemicals and bio-based plastics.

Dr. Ismail Abdel-Hamid assured the participants that the activities of ISESCO and COMSATS would duly take into account the recommendations of the Conference. Speaking on the occasion, Ms. Huma Balouch mentioned that adoption of new technologies in agriculture is extremely important to address the ever increasing population of developing countries, where more than 70% of the world's poor live and more than half of the population is faced with food scarcity.

The Conference programme consisted of five technical sessions and one keynote session. Two keynote presentations were made by Mr. Wagdy Merghani, Chief Executive Officer, Mahgoub Group, Sudan, and Prof. Dr. Abd Allah Ahmed Abd Allah of the University of Khartoum, who formerly was the Sudan's Minister of Agriculture, Food and Natural Resources.

The Conference focused on the seven themes: food production and food security; pest and disease control using biotechnological approaches; improving agricultural productivity through enhanced resource-use efficiency (Genetically Modified Crops); climate-change impacts, adaptation, vulnerability for crops and post-harvest components of food systems; metrics for measuring food security across local and regional contexts; reducing postharvest losses and contaminations; and food loss and waste management.

The intellectual contributions made during the event covered a wide range of topics. Major emphasis was laid on understanding and assessing the relevance of biotechnology across a range of life sciences disciplines, with regard to crop improvement. A number of speakers deliberated on the importance of assessing the information needs of farmers in order to address major scientific and related socio-cultural issues. The sessions included active discussions that encouraged information and idea sharing, and laid grounds for future cooperation among the participants and their institutions.

The 2nd Meeting of COMSATS' ITRG on 'Agriculture, Food Security, and Biotechnology'

The second meeting of COMSATS' International Thematic Research Group (ITRG) on 'Agriculture, Food Security, and Biotechnology' was held on October 19, 2015, at the Industrial Research and Consultancy Centre (IRCC), Sudan, on the sidelines of the Sudan event reported earlier. The 2nd meeting of the Group was chaired by Dr. Widad H. AbdelHalim, Director General, IRCC. The meeting was attended by the members of the Group belonging to University Cheikh Anta Diop (UCAD), Senegal, and COMSATS Institute of Information Technology (CIIT), Pakistan, as well as five scientists and researchers from Iranian Research Organization for Science and Technology (IROST), Iran; Agriculture Fisheries Development Fund (AFDF), Oman; University of Khartoum, Sudan, and Agriculture Research Corporation (ARC), Sudan.

Ms. Huma Balouch, Sr. Assistant Director (Programmes), COMSATS, made a presentation on the historical perspective, mandate, structure and technical programmes of COMSATS, as well as the background and objectives of COMSATS' ITRG programme, and expectations from the Group's 2nd meeting.

The technical session of the meeting commenced with a talk by Dr. Salah Mohamed Elawad, Consultant (Agriculture Development and Policy), UoK, Sudan, who introduced topics relating to the theme of the Group's proposed project for collaboration. Proposals on the same were also made by representatives of other participating organizations, IRCC and ARC, Sudan. The participants of the meeting helped in identifying areas of mutual interest in the field of agriculture, food security, and biotechnology, and highlighted the relevant potential of their institutions.

Further deliberations of the meeting led to the finalization of the title of the joint research project: 'Improvement of Wheat Quality and Productivity using both Traditional and Modern Techniques'. Later, the participants of the meeting deliberated on broad goals of the joint research project and agreed on the following objectives for the said project: i) enhancement of heat and salinity stress tolerance in wheat; ii) screening and evaluation of wheat germplasm for high productivity; iii) producing a suitable wheat variety for processing; and iv) application of modern molecular techniques (DNA markers, protein markers, proteomics, and transcriptomics) in wheat breeding.



Participants of the 2nd Meeting of COMSATS' ITRG in Sudan

SPECIAL SECTION: INT'L CONFERENCE & EXHIBITION ON RETs (ICERET)

COMSATS' constant engagement in the scientific capacitybuilding of its Member States, includes awareness and information-sharing events on a number of important scientific themes having a direct bearing on national development issues. Among these issues, concerns regarding clean and affordable energy take the centrestage, and is increasingly becoming a part of global agenda for developed and developing countries alike. It is but natural for the world striving for a sustainable future to turn to renewable energy technologies (RETs) for ensuring availability of abundant yet environment-friendly energy. This realization constituted the core thought behind holding ICERET-2016 from October 18-21, 2016. The event was organized by COMSATS in collaboration with the Islamic Educational, Scientific and Cultural Organization (ISESCO) and Pakistan Council of Renewable Energy Technologies (PCRET), in Islamabad, Pakistan. The three-day conference commenced from 18th October, while the exhibition was held at the premises of PCRET from 19th to 21st October 2016.

Conference Inauguration

The Conference was inaugurated on October 18, 2016, by H.E. Rana Tanveer Hussain, Federal Minister for Science and Technology, Government of Pakistan. The inaugural ceremony was attended by over 120 participants from academia, industry, R&D organizations, as well as representatives of media, international organizations and diplomatic community in Islamabad.

In his inaugural address, the Federal Minister considered it important to fully exploit RETs for successful implementation of the Government's energy policies, especially amidst the huge concerns related to energy scarcity. Noting the abundance of solar energy available with the developing countries, he considered RETs a solution to their energy security issues. "Pakistan is endowed with abundant solar energy throughout the year, which is a great investment opportunity for foreign and local business enterprises", said the Minister. He considered the presence of eminent Pakistani and foreign scientists, academicians and experts encouraging and hoped for the best outcomes of the conference.

The Federal Secretary, Ministry of Science and Technology (MoST), Mr. Fazal Abbas Maken, graced the occasion with his presence as distinguished guest. In his remarks, he highlighted the importance of advancements in RETs, especially in view of the rising environmental concerns in the wake of rapid climate change. He called for concerted efforts to enhance the share of renewable energy in the total energy-mix of Pakistan.

Director General PCRET, Dr. Basharat Mahmood, opined that developing cost-effective energy solutions can greatly

benefit developing countries by contributing towards improving living conditions, especially in remote areas, reducing mass migration to urban areas, and saving foreign exchange on import of fossil fuels. He noted that PCRET is making all-out efforts to strengthen this area in Pakistan. He hoped that the deliberations of the event would enrich the Council's efforts with new knowledge and best practices in the field. Mr. M. Nadeem Zakir, Head of Photovoltaic Division of PCRET, hoped that the conference would help sensitize relevant quarters towards the importance of R&D, commercialization and widespread use of RETs.

Speaking on behalf of COMSATS, Mr. Irfan Hayee, Deputy Director (Programmes), considered the theme of the event important, especially in the light of the Sustainable Development Goal-7, 'Affordable and Clean Energy'. He noted the sizable number of registrations received for the event that also included those from 10 universities.

Mr. M. Yaqoob, Assistant Secretary-General Pakistan National Commission for UNESCO (PNCU), represented ISESCO on the occasion. He opined that focused R&D efforts in RETs could help make environment cleaner, and energy supplies cost-effective, with healthy outcomes for public health.

A highlight of the inauguration was the presentation of a shield to the eminent Pakistani scientist and Former Special Advisor to the Prime Minister of Pakistan on Strategic Programmes, Dr. Ishfaq Ahmad, for his life-long contributions to Science and Technology. Shields were also presented by the Federal Minister to other honourable guests and international participants of the event.



Dr. Ishfaq Ahmad receiving a Shield from the Federal Minister for Science and Technology, Government of Pakistan

Technical Sessions

The conference had eight technical sessions in all spread over three days, during which 30 invited and contributed talks were delivered by 29 speakers. A total of 10



international speakers participated in the conference, five of whom represented COMSATS' S&T Centres of Excellence in Egypt, Iran, Jordan, Kazakhstan, and Sudan; four represented private-sector enterprises from China, Germany, USA, and Taiwan; while one international speaker represented a leading university of USA. The speakers from China and Taiwan made virtual participation. Moreover, on the sidelines of these talks, five posters were presented by groups of students. Over 110 registrations were made for the conference from over 60 different organizations from across the country – academic institutions (57%), R&D organizations (24%) and industry and SMEs (19%).

During the conference, 10 talks were given on the theme of solar/ photovoltaic technologies, five on biomass and biodiesel, four on fuel cells, two on wind energy, while the rest touched upon different aspects of RETs, including its importance in national energy-mix, integration in energy system, deployment, financing and economic value assessment, as well as case study on exploiting RETs in telecom sector. The first talk of the conference was given by Prof. Dr. M.A. Lodhi from Texas University, USA, who touched upon concentrated, integrated and cascaded solar power generation system.

Dr. Iqbal Chaudhry of Qorvo Inc, USA, highlighted R&D efforts aimed at lowering the levelized cost of electricity (LCOE) in concentrated photovoltaic (CPV) technology. Dr. Gholamreza Farahani of the Iranian Research Organization for Science and Technology (IROST), Iran, shared research on maximum power point tracking in solar energy systems while Mr. Kairolla S. Sekerbayev of Al-Farabi Kazakh National University (KazNU), Kazakhstan, elucidated on research being made at his institution focusing on optical absorption properties of organometal perovskites with different iodine and bromine content for photovoltaic technologies. Two case-studies presented under the theme were: Implementation of 100 KW hybrid solar system at CIIT Islamabad; and performance of solar photovoltaic pump coupled with high efficiency irrigation systems. Other topics covered under 'solar/PV technologies' included: PV modules performance improvement through extended surfaces under climate of Pakistan; High Čoncentration Photovoltaics (HCPV); and PV Test Solution & Quality Assurance.

Under the theme 'biomass/biofuel', Dr. Abdulrahim Saad, Industrial Research & Consultancy Centre (IRCC), Sudan took stock of recent advances on biomass pyrolysis; while Prof. Dr. Gamila H. A. Ahmed of Water Pollution Research Department, National Research Centre (NRC), Egypt, deliberated on sustainable cultivation of microalgal biomass and wastewater treatment for biofuel production. Mr. Azim Khan Niazi of Nagaro GmbH, Germany, advanced the use of smart biogas plants as a sustainable decentralized solution for urban and rural organic waste management in developing countries.

Under the theme of 'fuel cell', an overview of Polymer Electrolyte Membrane Fuel Cell Energy Systems for Sustainable Development was presented. Speakers also touched upon Anisotropic Anion Exchange Membranes for Solid Alkaline Fuel Cells (SAFCs); development of a prototype for the generation of hydrogen from organic wastes in high yield; as well as fabrication of photocatalytically efficient ZnO/CuO hetero-junction photoanode for photo-electrochemical hydrogen production.

Engr. Muhieddin Tawalbeh, representing Royal Scientific Society (RSS), Jordan, presented country case-study with special reference to the capacity building in Wind Energy and Concentrating Solar Power (CSP) project (WECSP) in Jordan. Another presentation under the theme 'wind energy' was made focusing on self-starting high-speed vertical axis wind-turbine with distributed blade sections. One of the



Panel Discussion Session of the ICERET-2016 in progress



technical sessions was dedicated to renewable energy related projects of UNIDO being implemented in Pakistan. The technical sessions of the event concluded with a panel discussion session on the third day of the conference. It was chaired by Dr. Iqbal Chaudhry of Qorvo, Inc., USA, and Cochaired by Mr. Nadeem Zakir, Head of Photovoltaic Division, PCRET.

Concluding Ceremony

The concluding ceremony of the Conference was presided over by the Federal Secretary, MoST, who in his closing remarks called for stronger coordination between policymakers, industry members and academia for working out ways to upgrade industrial processes to achieve high efficiency through state-of-the-art renewable energy technologies. He appreciated the intellectual content presented during the Conference on important topics related to RETs, and lauded COMSATS, ISESCO and PCRET for holding a successful event on an important theme.

Event recommendations were also presented at the concluding ceremony by Dr. Iqbal Chaudhary. It was stressed that the governments of developing countries should play a strong role in supporting use of RETs through formulating relevant policies and strategies, enhancing research funding, as well as introducing initiatives such as 'tax credit' for consumers. The relevant steps taken by the Government of Pakistan, such as 'net metering' and dutyfree import of solar panels, and other renewable energy



Mr. Maken Presenting Certificates at the Concluding Ceremony

products were noted and appreciated. The Conference further recommended that the private sector should provide consultation to governments for promoting RETs, as well as training opportunities in the related fields.

The two coordinators from PCRET and COMSATS, Mr. Nadeem Zakir and Mr. Abid Jan, respectively, presented the vote of thanks. At the end, Federal Secretary, MoST, Mr. Maken distributed the certificates and souvenirs to the participants of the event.

Exhibition of RETs at PCRET

The three-day Exhibition on RETs was inaugurated at PCRET by Prof. Dr. Gamila H. A. Ahmed on October 19, 2016. A total of 15 stalls exhibiting different RET products were showcased, which included windmill, solar panels and PV Balance-of-System (BOS), such as solar charge controllers, batteries, inverters, net metering systems; AC & DC solar water pumping systems; wind, solar and weather data acquisition systems; solar passive building insulation products; different types of solar cookers, water heaters, vegetable/ fruits dehydration plants, water desalination/ purification plants; rawal plugs & anchors for solar modules roof installations; special cables; LED lights; demo biogas plant and indigenously manufactured solar powered car and a bus having solar powered computer lab.

These stalls were arranged by various organizations, including Renewable Energy Association of Pakistan (REAP), Pakistan Science Foundation (PSF), Pakistan Meteorological Department (PMD); National Institute of Electronics, Adaptive Technologies Pvt. Ltd, Symbol Industries Pvt. Ltd, Shajim Engineering Services & Technology, M/s Creative Electroncis and Automation, and M/s Sunlife Solar, M/s Pak Agro Tech International, and M/s Ingenious Engineering Products.

The exhibition was open to all and caught the interest of many, in particular the representatives of international organizations.



Conference Participants during a Visit to Exhibition of RETs at PCRET

S&T INDICATORS OF A MEMBER STATE

In Spectrum: Islamic Republic of Pakistan

Pakistan, officially the Islamic Republic of Pakistan, came into being as a Muslim-majority state after partition of the Indian sub-continent in 1947.

The country is located in South Asia and has a total area of about 796,100 sq. km. It is the 7th most populous country in the world with a population exceeding 200 million people (World Factbook 2016 est.). Pakistan shares borders with Afghanistan to the northwest, China to the north, India to the south and east, and Iran to the west. The north-east border with India is subject to dispute, with both nations claiming the mountain regions of Jammu and Kashmir. It is an ethnically and linguistically diverse country. Official languages are Urdu and English, while a number of other local languages are spoken in different parts of the culturally diverse provinces of the country.

The country has three major geographic regions: the northern highlands, the Indus River plain and the Balochistan Plateau. The Indus Valley civilization, which is one of the oldest in the world and goes as far back as 5,000 years, is spread over much of what is presently Pakistan; two most well-known archeological sites where the remains of this civilization can be found are Harappa and Mohenjodaro. The climate, flora and fauna of the country also varies based on its geographical variation, from northern arid high desert at 5,000 meter altitude, to southern coastal sub-tropical region.

Pakistan has a semi-industrialised economy with a wellintegrated sector of agriculture. Pakistan's economy is the 24th largest in the world in terms of purchasing power and 41st largest in terms of nominal Gross Domestic Product (GDP) (World Bank, 2015). Major export commodities of Pakistan are textiles (garments, bed linen, cotton cloth, yarn), rice, leather goods, sporting goods, chemicals, carpets and rugs while the major import commodities include, petroleum, petroleum products, machinery, plastics, transportation equipment, edible oils, paper and paperboard, tea, iron and steel. The country's services sector is the major contributor to the GDP, contributing 55.4%, followed by agriculture (25.5%) and industry (19%), according to the World Bank Indicators 2015. The GDP growth rate (annual) for the year 2015 was about 5.54%.

With significant arable land area, out of the total area of 79.6 million hectares 21.2 million hectares are cultivated; the rest of the territory is rangelands. Cropped area constitutes 23.8 million hectares, forests about 4.21 million hectares. Almost 80 percent of the cultivated area is irrigated. The country has the world's largest contiguous irrigation system. The country is among the world's top ten producers of wheat, cotton, sugarcane, mango, dates and kinnow oranges, and holds 13th position in rice production (FAO, 2013). Major crops (wheat, rice, cotton and sugar cane) contribute to 6.5 percent of the country's GDP, while minor crops contribute to 2.3 percent.

Another 11 percent of the country's GDP is contributed by the livestock sector which e m p l o y s approximately 35 million people. Fisheries and forestry contribute 0.4 percent and 0.2 percent of the GDP, respectively (FAO).



The country has extensive natural gas reserves, and abundant but poor quality coal, iron ore, copper, salt and limestone reserves.

With extreme temperatures in summers and winters, monsoons constitute an important part of the country's weather. The heavy rainfalls are a major water resource. Large amounts of agricultural production and the continuously increasing population place high demands on Pakistan's water resources. At present, the annual per capita availability of water in Pakistan is estimated at a critical 1,100 cubic meters. Due to climate change during the recent years, however, the erratic changes in the monsoon trends result in frequent flooding, and on some occasion extremely dry spells due to less rainfall or none at all.

The country has also been facing a number of internal and external conflicts and security threats due to its strategic geopolitical location. Apart from its ongoing conflicts at borders shared with India and Afghanistan, the country has remained at center stage during US interventions against Soviet Union in Afghanistan in 1980s, as well as US War on Terror that ensued the 9/11 debacle. Important foreign policy concerns for the country thus are: threats to its sovereignty; terrorism; geo-political conflicts and proxy wars; and refugee from Afghanistan. According to 2015 estimates, 80,000 Pakistanis died as a result of US war on terror. According to the United Nations Refugee Agency (2015), Pakistan has some 1.5 million registered refugees.

Pakistan's HDI trends based on consistent time series data and new goalposts							
Years	Life expectancy at birth	Expected years of schooling	Mean years of schooling	GNI per capita (2011 PPP\$)	HDI value		
1985	58.6	4.1	2.1	2,836	0.38		
1995	61.5	4.8	2.8	3,284	0.423		
2005	63.9	6.2	4.5	3,996	0.495		
2014	66.2	7.8	4.7	4,866	0.538		
Source: Human Development Report 2015							

Pakistan's HDI value for 2014 is 0.538, which put the country in low human development category, positioning it at 147 out of 188 countries and territories that is lower than South Asian average (0.607). Table-A reviews Pakistan's progress in each of the HDI indicators.

The trends in population can be seen from the Population Pyramid at Figure-A. A major portion of Pakistan's population (31.99%) is between the ages 0-14 years, while a dominant portion of about 36.87% is in the age bracket of 25-54. With a median age of 23.4 years in 2015, Pakistan would have a ready availability of a dominant young workforce for at least a couple of decades, which is a huge window of opportunity for exploiting the available human resource for development of the country. This, however, is also a challenge as the country would need sound management of these resources, formulation of policies, provision of adequate services and employment. Low literacy (57.9% in 2015) and high youth unemployment (which is one of the lowest among the developing countries) need to be immediately addressed lest this great resource should become a liability for the present and future.

The number of out-of-school children in Pakistan and the state of education at primary and tertiary levels remain a matter of policy concern. The higher education in the country is being looked after by Higher Education Commission (HEC) that has the mandate to reform Pakistan's higher education system. Between 2002 and 2009, the HEC succeeded in increasing the number of Ph.D graduates to 6,000 per year and in providing up to 11,000 scholarships for study abroad. The number of recorded publications from Pakistan in the Web of Science leapt from 714 to 3,614 over the same period. The range of achievements during the reform period remains unprecedented in the history of Pakistan's higher education and R&D sectors.

The country is a member of the United Nations, the Commonwealth of Nations, the Next Eleven Economies, COMSATS, SAARC, ECO, D8,

among other. It is also a signatory to Cairns Group, Kyoto Protocol, ICCPR,and a founding member of the Organization of the Islamic Conference (OIC). Pakistan is a major contributor to the UN's peacekeeping mission, with 160,000 troops in 41 missions spread over 23 countries in different parts of the World.

The oversight of S&T related matters in the country is done by Pakistan's Ministry of Science and Technology, which has 14 S&T/R&D institutions and two universities



under its control. In 2012, Pakistan's first National Science, Technology and Innovation Policy was launched. The policy principally emphasized the need for human resource development, endogenous technology development, technology transfer and greater international co-operation in R&D. According to the World Science Report 2015, the Ministry of Science and Technology have issued the draft National Science, Technology and Innovation Strategy 2014-2018. The strategy includes a target of raising Pakistan's R&D spending to 1% of GDP by the end of 2018.

As member of the world community, Pakistan maintains a focus on contributing to global and regional scientific programmes. The cooperation between Pakistan and CERN goes back to 1994 when an agreement was signed between the two, followed by signing of a number of protocols. The country contributed to building its major projects, i.e., ATLAS, LHC and CMS, and to-date contributes to CMS and ALICE experiment. Since 2003, Pakistan has been supplying equipment made in its Heavy Mechanical Complex-3 (HMC-3) to support CERN programmes that won the Complex a CERN award for best industrial partner in 2006. In July 2015, Pakistan became an Associate Member of CERN.

Selected Development Indicators for Pakistan							
Indicator Name		2000	2010	2013	2014	2015	
GDP growth (annual %)	4.46	4.26	1.61	4.37	4.74	5.54	
Agriculture, value added (% of GDP)	25.98	25.93	24.29	24.82	25.03	25.46	
Services, etc., value added (% of GDP)	48.83	50.74	55.13	54.16	54.07	55.54	
Merchandise trade (% of GDP)	32.56	26.90	33.38	30.18	29.64	24.60	
Exports of goods and services (% of GDP)	15.54	13.44	13.52	13.28	12.28	10.95	
Imports of goods and services (% of GDP)	23.37	14.69	19.35	20.06	18.72	17.11	
High-tech exports (% of manuf. exports)	0.07	0.39	1.69	1.88	1.41	-	
Patent applications, nonresidents	524	1149	980	783	776	-	
Patent applications, residents	23	46	114	151	146	-	
Scientific and technical journal articles	257	1017.7	5677.2	7771.5	-	-	
Internet users (per 100 people)	0	-	8.00	10.90	13.80	18.00	
Health expenditure per capita (current US\$)	-	15.50	30.95	33.64	36.15	-	
Source: World Bank Indicators 2015							

An Interview with the Federal Secretary, Ministry of Science and Technology (MoST), Government of Pakistan, Mr. Fazal Abbas Maken

1. Please briefly introduce Pakistan's S&T scenario; its current standing in terms of Human Development Index and other socio-economic indicators.

One has to say that Pakistan's current S&T standing is not satisfactory according to the international indices. For

example, Pakistan's HDI ranking in 2014 according to UNDP Human Development Report is 147. The country's rakings need a definite improvement. One tool for improving these, obviously, is a sound S&T strategy. We have revisited the Science and Technology policy, which had been formulated for 2014-2018. We thought that it needed to be more focused and the areas where action is required needed to be reprioritized. The initial draft has already been completed and



has been distributed among the stakeholders, and we have collected feedback from them through a stakeholder workshop that was conducted during the third week of October 2016. We would be consolidating the feedback received and take it to the National Commission for Science and Technology, headed by the Prime Minister of Pakistan for further review and approval for incorporation. As regards the soci0-oecomic indicators, science and technology is to play an important role. Without a scientific approach you cannot have a society based on rational thinking. Also, without technology you cannot have a strong industrial base. I think promotion of science and technology not only develops the industry but it also plays a great role in addressing your socio-cultural issues.

2. Who was in charge of the aforementioned policy-making?

Although the ultimate responsibility of the policy making or formulation of any strategy rests with the Ministry, but one of the attached organizations is mainly mandated for this is Pakistan Council for Science and Technology (PCST). It has a lead role but the concerned wing of the Ministry was also involved.

3. Please highlight the vision of the Government of Pakistan for sustainable national development and the role it envisages Science, Technology and Innovation (ST&I) to play for its development.

The Government of Pakistan has recently formulated the 'Vision 2025' and that is totally aligned with our national commitments made for the achievement of Sustainable Development Goals (SDGs). Economic development is important for achieving these goals and can only be realized

with a sound S&T base. The present government is giving particular attention to the promotion of both the higher education, as well as education at the elementary and the college levels. Because the feed-stock for the universities comes from these lower tier institutions, and unless their quality is good, the final output would not be at par. The main areas of ST&I we want to focus on are: biotechnology, nanotechnology and advanced materials. Robotics is another important area of interest to us, as are R&D interventions related to agriculture sector, because we are predominantly an agricultural society. Moreover, industrial engineering is another important area that can help in Pakistan's development efforts.

4. What major achievements have been made in terms of Science and Technology during the last 10 years?

The most significant achievement would perhaps be in our higher education sector and research and development coming from the academia. In 2005-2006, we were producing 350 PhDs annually, today we are producing more than 1,300 PhDs per annum. The number of publications has significantly risen. The number of PhD faculty in educational institutions, particularly those focusing on science and engineering, has also risen. This speaks a lot of the improvement that has already been realized. Nevertheless, there is still a long way to be covered, because we are still far behind the developed world.

At the same time, in the R&D sector there has been a reorientation in terms of the direction, and all the R&D organizations and institutions associated with the Ministry of Science and Technology have been asked to focus on demand-based research rather than supply driven research.

5. Please share some Science and Technology related statistics of Pakistan.

By 2013, Pakistan had 141,265 R&D personnel (nearly 17% of these are women), including 60,699 researchers, 16,859 technicians and 63,707 research support staff. Of the total number of researchers, 86.5% are working for higher education institutions while 13.5% are affiliated with R&D organizations. Pakistan's current gross domestic expenditure on R&D as a percentage of GDP (GERD) was 0.29% in 2013.

The number of research publications by Pakistani scientists in international journals show consistent increase since 1996. However, this increase is more significant after 2002. The number of research publications per year by Pakistani scientists in international journals in 2013 was over 109,000.

6. What particular functions are the S&T organizations and R&D institutions under the Ministry of Science and Technology performing to support the operations of the Ministry?

We have 12 organizations under the Ministry of Science and Technology and two universities. The two universities are National University of Sciences and Technology (NUST) and COMSATS Institute of Information Technology (CIIT).

One of the main organizations affiliated with the Ministry is Pakistan Council of Scientific and Industrial Research (PCSIR), the main mandate of which is to facilitate the industry in development of new products and processes. It has many accredited laboratories, some of which are also used for conformity assessment by the industry. Then we have National Institute of Electronics (NIE) and Pakistan Council of Renewable Energy Technologies (PCRET), which are focused on their own specific areas. They are mandated basically to be technology providers in their specific areas. The main task of Pakistan Science Foundation (PSF) is to promote and popularize science and to fund research carried out both by the academia as well as the R&D institutions. Another important aspect for industrial development is standardization, conformity assessment and accreditation, for which we have National Physical & Standards Laboratory (NPSL), Pakistan Standards Quality and Control Authority (PSQCA), Pakistan National Accreditation Council (PNAC), respectively. These institutions are performing their respective roles in these areas.

Considering the geography of the country, another important organization under the Ministry is the National Institute of Oceanography (NIO), which, among other studies, supports and undertakes surveys on oceanography, coastal hydraulics, marine exploration and geo-engineering, and marine pollution and environment.

7. South-South Cooperation is considered important for national and regional progress 0f developing countries. How is Government of Pakistan employing this mechanism in its development agenda?

In order to develop indigenous technologies, we should not be totally dependent upon the developed world. We should strengthen ourselves through regional cooperation. Every country in the South has its own strengths, based on which we should mutually supplement one another's efforts for development.

There are multiple forums focusing on South-South Cooperation in the field of science and technology. Pakistan is the host country to some of the organizations promoting South-South cooperation. One is of course is Commission on Science and Technology for Sustainable Development in the South (COMSATS) itself. Two more of such forums being supported by Pakistan are ECO Science Foundation and COMSTECH. Pakistan is also a member of D-8 Organization for Economic Cooperation, also known as Developing-8. Regional and global cooperation is the way forward for all these countries to realize their respective strengths. We also have bilateral S&T cooperation agreements or MoUs with countries like China, Sri Lanka, Belarus and Iran. Pakistan and Belarus have established a joint Centre for Science and Technology in Islamabad during the recent visit of the President of Belarus early in October 2016.

8. In which specific areas of Science and Technology does the Government of Pakistan need support of international community? Kindly share some collaborative arrangements in this regard.

We have an agreement on education science and technology with USA. We also have a Pakistan-U.S. Joint Committee on Science & Technology, the last meeting of the Committee was held in March 2016. One of the main thrust areas is the capacity building of the higher education sector, through faculty development by providing PhD scholarships in the US universities. Similarly, the French government has been helping Pakistan for past few years in implementing inquirybased science education programme through PSF. There is a lot of potential for cooperation with China in the field of S&T especially given the implementation of China-Pakistan Economic Corridor (CPEC). China is already assisting Pakistan's National Institute of Oceanography. The next meeting of Pakistan-China Joint Coordination Committee is likely to be held in January 2017, wherein one of the main agenda items is expected to be the opening of a Pakistan-China Centre for Transfer of Technology, which would be based in Pakistan.

9. What role does the Government of Pakistan expect the Commission on Science and Technology for Sustainable Development in the South (COMSATS) to play for the national development of Pakistan and for promoting S&T in the country?

We expect COMSATS to deliver on its initial role. The main rationale behind the creation of COMSATS, which was the initiative of Dr. Abdus Salam, is to promote South-South Cooperation for initiating joint projects in priority areas of science and technology so as to achieve industrial and economic development, and pool S&T resources of the Member States to aid their development efforts.

10. As a representative of the host country of COMSATS, what message do you want to give out to other Member States?

As the focal person of Pakistan, I would like to reiterate our commitment to the process of South-South cooperation. Pakistan has already been strongly supporting such initiatives, e.g., being the host country and main financier for COMSATS. Once again, we would like to present our services in all the fields in which Pakistan is strong for the benefit of Member States. CIIT is already offering a hundred scholarships to students from Member States. We would like to encourage all the Member States to avail this offer.

ACTIVITIES/NEWS OF COMSATS' CENTRES OF EXCELLENCE

BCSIR-Bangladesh holds Workshop on Disease-free Food Crops

A workshop on green microbe based biopesicide for disease-free production of rice and other crops was held at the Bangladesh Council of Scientific and Industrial Research (BCSIR), Bangladesh, on 3rd October 2016. The workshop was jointly organized by BCSIR's Centre for Technology Transfer and Innovation, and South Korea's Gyeongsang National University (GNU). The Chairman BCSIR, Mr. Farague Ahmed, presided over the event. Mr. Dilip Kumar Bask, Additional Secretary, Ministry of Science and Technology, Bangladesh, was also present on the occasion as Special Guest. Prof. Young Chung Rayu of GNU delivered a keynote presentation based on his research work leading to innovation in rice pest control Bacillus oryzocolla, a novel bacteria that can be put immediately to use in Bangladesh. Mr. Md. Rezaul Karim, Principal Scientific Officer BCSIR; and representatives of relevant industries and departments of the country also participated in the event.

Later, an MoU for cooperation in bacterial biopesticide technology transfer was signed by Prof. Ruyan, and Mr. Karim on behalf of their respective organizations.

ICCBS-Pakistan holds Seminar on Science Communication

A one-day seminar on 'Science and Society - Science Communication and Public Engagement' was held in Video Conference Hall of L.E.J National Science Information Centre of the International Center for Chemical and Biological Sciences (ICCBS), Karachi, Pakistan, on 19th October 2016.

Speaking on the occasion, Prof. Atta-ur-Rahman, the Patron-in-chief ICCBS, considered knowledge the main driving force of world economies and innovation a key to rapid socio-economic development. He noted that L.E.J.

development courses to address the issue. Other speakers noted that science communication emerged as separate entity in 1950s leading to establishment of Science communication institutions. During the seminar, concerns were raised regarding misrepresentation and lack of accuracy in the reporting of science in media.

ICCBS-Pakistan Professor selected as a Member of IChO Steering Committee

Prof. Dr. Khalid M. Khan of ICCBS has been selected as a member of the steering committee of the International Chemistry Olympiad (IChO). The steering Committee is the body assisting IChO organizers in coordinating efforts for future Olympiads, and is currently overseeing the matters related to the organization of 49th International Chemistry Olympiads. He will be attending the IChO steering committee meeting to be held during January 11 to 15, 2017, at Mahidol University, Salyaa Campus Nakron Pathon Province, Thailand.

National Energy Research Centre of the RSS-Jordan Awarded the Global Energy Prize

A recycling system developed by the National Energy Research Centre (NERC) at the Royal Scientific Society (RSS) has been awarded the '2016 Energy Global National Award' for the best environmental project in Jordan. The system that converts animal manure into energy was implemented at a cow farm in Irbid governorate of Jordan and uses 57 tons of cow manure to produce biogas through anaerobic digestion.

The digester can take in 190 kg of manure daily mixed with 200 litres of warm water heated by a solar thermal system. It generates about 1740 m³ of biogas and 52.5 tons of solid and liquid sterile fertilizer in a year. The biogas produced by the system can be stored and used later.

The farm is not connected to the national electricity grid,

therefore a photovoltaic system with a capacity of 0.55 kW was installed as a power supply in order to operate the electrical motor of the digester and the biogas pump. A part of the biogas is used to generate electricity of about 520 KWh per year, while the other part is used as thermal energy.

National Science Information Centre was setup to communicate science information. Prof. Dr. M. Igbal Choudhary, Director ICCBS, observed that journalists and scientists in Pakistan do not fully succeed in getting the public engaged in science. He stressed the need for introducing communication skills



RSS team receiving the 2016 Energy Global National Award

Rector KazNU-Kazakhstan wins ISESCO's International Prize

The Rector of Al-Farabi Kazakh National University, (KazNU), Kazakhstan, Prof. Galym Mutanov, won the 2016 International Prize of Islamic Educational, Scientific and Cultural Organization (ISESCO). The prize is awarded every two years to scientists of ISESCO Member-States for special scientific and innovative contributions to the field of biology, chemistry, geology, mathematics, physics and scientific technologies. The award includes a certificate, a gold medal and a cash award.

Prof. Mutanov also participated in the Asian Inter-Parliamentary Forum on Science, Technology and Innovation, held in Astana, Kazakhstan, during late September 2016. Parliamentarians and experts from 25 countries and representatives of international organizations had gathered at the Forum to discuss strengthening of cooperation for the development of educational and scientific potential of the Organization of Islamic Cooperation.



CERN delegation with the Rector KazNU, Kazakhstan

KazNU-Kazakhstan and CERN to Cooperate on Nuclear Physics

The Director of International Affairs at the European Organization for Nuclear Research (CERN), Mr. Charlotte Lindberg Warakaulle, visited KazNU, on October 19, 2016. The purpose of his visit was to discuss issues of cooperation in science and education with the leadership of the university.

The avenues of cooperation explored by the officials of the two institutions included: joint training of Ph.D students; the participation of young scientists in the international school for IT and GRID technologies; research and experimental programs; and CERN projects in the field of nuclear physics, astrophysics, nuclear medicine, energy; as well as conducting joint scientific conferences.

United Nations' Corner launched at CIIT, Pakistan Library

In connection with the 71st anniversary of the establishment of the United Nations, COMSATS Institute of Information Technology (CIIT), in collaboration with the UN Information Centre (UNIC), organized the launch of the first 'UN Corner' in Pakistan at the COMSATS Central Library. The Director General (UN) at Pakistan's Ministry of Foreign Affairs, Mr. Asim Iftikhar, inaugurated the Corner, which will serve as a reference point for publications from the UN system and its partners in Pakistan.

The launching ceremony, held on October 19, 2016, was attended by several high ranking officials, including Mr. Roger Kull, Deputy Head of Mission, Swiss Embassy in Islamabad; Mr. Benedikt Hurzeler, Deputy Head, Swiss Agency for Development & Cooperation (SDC); and Mr. Vittorio Cammarota, Director UNIC. Speaking on the occasion, Mr. Kull announced that SDC will sponsor the UN Corners being set up in Government universities across Pakistan.

French and Belarusian Officials visit CIIT-Pakistan

Mr. Sébastien Cartier, Higher Education Attaché, Cultural and Cooperation Department, French Embassy in Islamabad, Pakistan, visited CIIT on October 6, 2016. Mr. Cartier was received by Dr. Arshad S. Malik, Head, International Office CIIT.

Mr. Cartier endorsed the idea of sponsoring of the French experts/professors for delivering lectures at CIIT and also assured that the "French Corner" will soon be established at CIIT. He also visited the library and appreciated the modern facilities available for students and other users. Mr. Cartier stated that his visit will pave way for future collaboration between the French Embassy and CIIT.

Earlier, on 3rd October 2016, a delegation from Belarus visited CIIT Islamabad. It comprised of Chairman, State Committee on Science and Technology (SCST), Dr. Alexander Shumilin, and Head Sub-Division International Science, Technology & Innovation Cooperation Department SCST, Mr. Sergei Siniukovich. Mr. Yauhen Hurynau, Head of the Division on Cooperation with the Countries of Asia, Africa and Latin America, Department of International Cooperation in Science, Technology and Innovation, Belarusian Institute of System Analysis and Information Support, also accompanied the delegation.

The delegation highly appreciated the research driven culture at CIIT and the quality of facilities it offers, based on which they expressed interest in strengthening collaboration with CIIT on a number of different avenues.

MICROBIAL FORENSICS: CHALLENGES FOR THE UPCOMING BIOSAFETY & BIOSECURITY

Prof. Habib Bokhari*

Statistics suggest that infectious diseases result in approximately half of the estimated 50 million total deaths that occur world-wide annually. The importance of basic research for discovering ways to control emerging and reemerging diseases cannot be overemphasized. Most of the prevalent diagnostic methods and epidemiological characterizations of infectious diseases are based on timeconsuming processes, such as culturing (to get pure isolates), serology, physical characteristics, and metabolic profiles of infectious organisms, etc. Recently, however, a variety of innovations have been introduced thanks to Microbial Forensics.

The difference between Forensics and Microbial Forensics is very little, except for the situations in which a human is a source of biological evidence or criminal investigation (where one species, two genders: 10-17 microsatellite markers present on genome suffice for most identifications). Microbial Forensics deals with a range of harmful microorganisms, including viruses, bacteria, fungi, parasites, helminths, as well as the toxins that some of these organisms produce. Microbial Forensics often refers more to the use of the principles of science and technology and techniques to deal with even more complex data comprising of microbial species, strains and subtypes. Its challenges may also include developing new approaches to deal with new theoretical and experimental problems that. Development of this field depends a lot on the gradual in R&D in basic sciences (life sciences) that would lead to the advancements in the field of infectious diseases.

The nations that possess the deadliest weapons are generally more scientifically advanced and are the ones deemed most 'civilized' as per standard principles of the present day world. Historically, as we became more civilized, developing lethal weapons, including bioweapons based on more scientific grounds, became an industry itself. Japan's use of vectors/fleas raised on Lab grown plague infected rats and spreading them into enemy territories (China) through aerial routes using aircrafts during World War I; and using Burkholderia mallei, causative agent of Glanders disease (highly contagious bacterial disease characterized by respiratory, cutaneous, lymphatic nodular lesions), in horses, and mules by Germans, Japanese and Russians during World War I, II as well as Afghan War, are two such examples. Similarly, fomites/blankets contaminated with pathogens, such as small pox and

measles virus, were used by colonial powers to reduce native population for greater control. During the World War II, even more advanced scientific tactics were employed, where deadly pathogens, such as anthrax, typhoid, cholera, were dropped in enemy territories through various natural routes and aerial bombs. More recently, the involvement of non-state actors and religiously motivated groups driven by vested interests, in using various strains of pathogens as weapons has also been observed. The pathogens used included ATCC strains ranging from Bacillus anthracis to Salmonella typhimurium resulting in Pulmonary Anthrax and Diarrhea.

There is a general agreement on the idea that science should be used for bringing improvement in the quality of life rather than harming the humanity. However, preparation for the worst in view of the aforementioned facts should remain one of the most important priorities of the states, i.e., to protect their borders as well as their public from the intended or unintended introduction of any biological or chemical hazards. In the past, more emphasis was given to the routine forensic sciences in crime investigations, where the scale of harmful impact was limited.

The new paradigm shift, where science can be used to introduce pathogens deliberately in order to cripple societies, can have devastating, and uncontrollable outcomes at global level. Given the gravity of the scenario, the least we can do is to prepare ourselves by strengthening our capacity in terms of training human resource in the field of microbial forensics; coming up with the solutions of decoding the bug; and developing antidotes/vaccines to control the damage.

Microbial Forensics is still in its early developmental stage in Pakistan and other developing countries. The development is multi-directional and fast-paced in the developed world where many universities have Microbial Forensics Centers. The number is increasing as the technological development, journal papers, and patent applications in the area are rising quickly worldwide. Lack of skilled people, especially the ones which can fit in the existing organizational infrastructure, is still a major bottleneck for the development of Microbial Forensics as a discipline in developing countries. Moreover, this is further exacerbated due to lack of: integration and optimal utilization of the available resources; planned expansion based on actual market

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demand; transfer of technology from laboratory to the human health and diagnostic and livestock and agriculture industry. Furthermore, this also requires enhanced accountability of the participating institutions for better check and balance.

In addition to molecular approaches based on genome sequencing, the study of interaction between the microbes, and their corresponding bacteriophage, antisera, molecules, such as lectins, can help in rapid diagnostics. On the other hand, biomolecules, such as nucleic acids, lipids, and proteins, may serve as the primary source of information along with other physical evidences pointing towards the potential source.

Bioreporter technology for sensing biological and chemical agents may provide a robust, cost-effective, and quantifiable method for quick and selective detection and tracking in applications ranging from medical diagnostics, water monitoring, environmental monitoring, food safety, security monitoring and surveillance, and criminal investigations. Therefore, parallel development of technologies in diagnostics combined with nanotechnology may allow developing a range of biosensors for various microbial forensics purposes, such as to prevent and reduce the likelihood of natural, accidental, or intentional outbreaks; to detect threats early to save lives; and to respond rapidly and effectively using consolidated multi-sectorial coordination.

An enabling technology that could help in developing sensitive biosensor materials to detect the presence of very small amounts of toxins, pathogens, volatile compounds, various organic compounds and hazardous materials in environmental samples with high specificity may be termed as 'Nanodiagnostics'. Because of its small dimension, most of the applications of the nanotechnology fall into the category of 'biochips or microdevices'. Bacterial cells, their toxins, toxic and hazardous materials, metabolites and nucleic acids have been detected using the state-of-the-art

Nanotechnology-based techniques, using intelligent nanomaterials. Such nanomaterials when used in developing biosensors they will be useful in diverse applications, including real-time detection of toxins, pathogens, and monitoring spoilage in foods and foodprocessing facilities, tracking diseases in humans and animals, detection of bio-threat agents, detection of environmental toxins, hazardous materials, volatile compounds, and various organic compounds present in body fluids or environmental samples and assessing effectiveness of remediation processes. Hence, biosensors are the promising tool for rapid, inexpensive, label free and point-of-use (POU) detection of bacteria or their products from a range of diverse samples. It is mainly because of its robustness that biosensors technology is one of the fastest growing technologies, ranked fourth in pathogen detection,

and is among the available types optical biosensors that are most widely used.

Optical biosensors, capable of exploiting surface plasmon resonance (SPR), waveguides and resonant mirrors are used to analyze biomolecular interactions in real-time, without the need for a molecular tag or label based on unique surface properties of pathogens.

The critical needs for the future of Microbial Forensics in developing countries can be summarized as below:

- i. Developing and updating educational programmes and curricula in Microbial Forensics, at certificate, undergraduate, graduate, and postdoctoral levels;
- ii. maintaining a technical infrastructure that allows fast and efficient solutions to the biological questions;
- iii. Creating an organizational structure that integrates education, research and service missions, and garners requisite institutional resources, leadership, and infrastructure to realize these goals;
- iv. Bridging the gaps between different cultures of biological and physical sciences to establish a Microbial Forensics identity and fostering an environment of communication among biological scientists, physicists, chemists and material scientists. Thus, the need to train scientists whose primary professional identification and disciplinary affiliation is in Microbial Forensics must be addressed effectively at all levels.
- v. Encouraging pharmaceutical/biotechnology, medical, environmental protection agencies, agriculture and food packaging industries, etc. to support the research based Microbial Forensics infrastructure to address indigenous health-related, environmental and food security problems. This will not only lay the foundation of Microbial Forensics but also create avenues of research-oriented jobs in academia, law enforcement agencies and industry.
- vi. Establishing and updating a library of Expert Lectures in Microbial Forensics;
- vii. Launching a regional journal to promote the research in Microbial Forensics;
- viii. Commissioning of roadmaps and foresight studies by various science administrations to analyze technological and implementation perspectives of this emerging field;
- ix. Establishing more Microbial Forensics facilities, such as National/Regional center for Microbial Forensics accessible to all stakeholders;
- x. Creating a critical mass of interdisciplinary scientists, such as microbiology, biochemistry, material sciences, physical chemistry, microscopy, and engineering, under the same roof for developing cutting edge nanodiagnostic technologies for the monitoring and surveillance purpose.

SCIENCE, TECHNOLOGY AND DEVELOPMENT

Focus on Parasite Control Helps Sri Lanka Eliminate Malaria from the Country

The region of South Asia is faced with vector-borne diseases

and malaria prevalence remains significantly high. Sri Lanka has been successful in eliminating malaria from the island nation due to shift in its strategy focused on parasite control instead of controlling the mosquito vector.



World Health Organization (WHO), formally

declared Sri Lanka malaria-free on September 6, 2016, taking over 25 years to achieve this status. The only other country in South Asia to have eradicated malaria is Maldives, which was declared malaria-free in 1984.

In its edition of 16 September 2016, SciDev.Net reported that experts and authorities attribute Sri Lanka's success in eliminating malaria to a concerted effort by multiple programmes acting in concert with a robust national healthcare system. This included operating mobile malaria clinics in high transmission areas to prompt provide effective treatment to reduce the parasite reservoir and the possibility of further transmission. The report quoting deputy director of Sri Lanka's anti-malaria campaign, states that malaria cases were drastically reduced from 264,549 in 1999 to the last one reported in October 2012. The official noted that the long-term eradication strategy was combined with effective web-based surveillance, whereby citizens travelling from countries with a history of malaria transmission were tracked. These in particular included security forces personnel, immigrants as well as tourists.

Continuous surveillance has been a key factor in elimination of malaria from the country and it has to be maintained to ensure that malaria does not return.

New Method Developed to Heal Wounds

With growing interest and research in nanotechnology, cost effective and innovative means are being introduced to

improve the quality of human life. As reported on 26 September 2016 in *SciDev.Net*, Egyptian researchers from Zewail City of Science and Technology have developed a bandage embedded with nanoparticles for the treatment of



wounds using the anti-epilepsy drug, Phenytoin, which is recognized for its capacity to treat skin injuries. The controlled release of drug on soft tissues using nanotechnology helps heal wounds that otherwise may take several days or even months. This nanoparticle based bandage also helps limit formation of dead cells and scars, which maximizes its effectiveness. According to the report, the lead researcher and Director of the Center for Materials Science, Zewail City of Science and Technology, Ibrahim El-Sherbiny, explained that a wellcontrolled release and distribution of phenytoin on the surface of skin boosts the healing efficiency of the bandage that has the drug embedded into nanoparticles and loaded on nanofibers. Its design increases the surface area available to kill the bacteria, as well as increases porosity of skin, thus absorbance of the drug.

This innovation is seen beneficial especially for the diabetic patients, whose healing process is slow. It also will be advantageous to health institutions, who can save overhead costs due to reduced hospitalization periods.

Delivering Drugs Made Easy with the Help of Drones

Costa Rica, which was ranked 36th in 2000 amongst the 191

countries by World Health Organization (WHO) in terms of health systems, aims to provide convenience to its rural populations for healthcare service using drone



technology. The public health authority of the country chalked out a new prorgramme whereby eight communities in remote towns of the country will be set to receive drugs via pilotless aerial vehicles starting from 2017.

This was reported in the October 19, 2016 edition of *SciDev.Net*. The programme will link basic health centers in these remote communities with distribution points operated by the Costa Rican Social Security Fund (CCSS).

This innovative programme will basically help reduce the drug delivery time. Under this activity, the drugs would be transported within 45 minutes of the order placement. Reportedly, the patients in remote areas wait anywhere from several hours to three days to receive the medicine in the target communities that live under difficult economic conditions and cannot travel repeatedly. Each month the programme hopes to deliver 13,200 medical packages using this technology with a cost close to US \$26.000.

Modus operandi to have order placed would involve a CCSS-affiliated doctor in the community, this will ensure the fact that drugs are used appropriately. A worker will then prepare the package at a medical center nearby, and the 10 kg drone operated by a private company will deliver it to its desired destination.

This technology will also be used by another developing country, Rwanda, to deliver blood samples to remote parts of the country from October 2016. The learnings made from this drone-based project will ascertain if such services can be initiated for other parts of the country, or in emergencies.

PROFILE OF MEMBER COMSATS' TECHNICAL ADVISORY COMMITTEE

PROF. M.H.A. HASSAN, EXECUTIVE DIRECTOR (a.i.) TWAS, ITALY

Prof. Mohamed Hag Ali Hassan is honourary life-time Member of COMSATS Coordinating Council and a member of

COMSATS Technical Advisory Committee (TAC). He is currently serving as the Executive Director (a.i.) of The World Academy of Sciences (TWAS).

Mohamed M.A. Hassan was born and bred in Sudan. Having completed his B.Sc. with special honours in Mathematics from the University of Newcastle-upon-

Tyne, U.K., in 1968, he went on doing M.Sc. in Advanced Mathematics from the University of Oxford, U.K., in 1969. His thirst for academic excellence did not stop there, he obtained D.Phil in Mathematics from the University of Oxford in 1974. Thereafter, he returned to Sudan to serve as a Lecturer at the University of Khartoum (UoK), and later became Professor and Dean of the School of Mathematical Sciences at the University. There he taught undergraduate and postgraduate courses in the Faculty of Science and the School of Mathematical Sciences.

Prof. Hassan has the honour of being the founding Executive Director of TWAS. He has served TWAS (formerly was the Third World Academy of Sciences) from 1983 to 2011. He is also the President of the InterAcademy Partnership (IAP); Chairman of the Governing Council of the United Nations Technology Bank for the Least Developed Countries; and President of the Sudanese National Academy of Sciences (SNAS).

Prof. Hassan's major contributions to science include his efforts to establish a number of S&T institutions and promoting their programmes and activities. He contributed towards the establishment of TWAS (1983); Third World Network of Scientific Organizations (TWNSO) (1988); Third World Organization for Women in Science (TWOWS) (1989); International Centre for Science and High Technology (ICS) technical committees (1989); African Academy of Sciences (AAS) (1985); and COMSATS (1994). Moreover, he helped develop potential guidelines for the activities of ICTP for the ten year period (1983 – 1993); assisted in setting up the Secretariat of the InterAcademy Panel on International Issues (2000); and InterAcademy Medical Panel (IAMP) (2004).

He also served as the President of the African Academy of Sciences (AAS) (2000-2011); Chairman of the Council of the United Nations University (UNU); President of the Network of Academies of Science in Africa (NASAC) (2001-2011); Chairman of the Advisory Board of the United Nations University/Institute of Natural Resources in Africa (UNU/INRA) (2003-2010); and Chairman of the Honorary Presidential Advisory Council for Science and Technology, Nigeria (appointed by the President of Nigeria) (2001-2009). He has also been the Chairman, Coordinating Council of the COMSATS (1995-2010) and Co-chair of IAP - The Global Network of Science Academies (2011-2015).

He also sits on a number of boards of international organizations worldwide, that include:

- International Science Programs (ISP) (1998-present);
- Science Initiative Group (SIG) (2004-present);
- Millennium Ecosystem Assessment (MA) (2000-2006);
- Grand Challenges Canada (GCC) (2011-present).

Throughout his career, Prof. Hassan has greatly contributed to various science academies and institutions. His role for some of the academies are enlisted as follows:

- Fellow of The World Academy of Sciences (from 1985);
- Founding Fellow of the African Academy of Sciences (from 1985);
- Fellow of the Islamic World Academy of Sciences (from 1992);
- Member, Academia Colombiana de Ciencias Exactas, Fisicas y Naturales (from 1996);
- Corresponding Member, Académie Royale des Sciences d'Outre-Mer, Belgium (from 2001);
- Foreign Fellow, Pakistan Academy of Sciences (from 2002);
- Cavaliere Ufficiale dell'Ordine al Merito della Repubblica Italiana, Italy (2003);
- Classe da Grã-Cruz na Ordem Nacional do Mérito Científico (from 2005);
- Honorary Member, Palestine Academy of Science and Technology, Palestine (from 2005); and
- Honorary Member, Academy of Sciences of Lebanon (from 2007).

As a researcher, Prof. Hassan worked in the areas of Plasma Physics, Environmental Modelling of Soil Erosion in Drylands; Geophysics, Astrophysics, and Space Physics. He has a long list of publications in these areas and published several articles focusing science and technology in the developing world.

Among the honours and recognition he received are: Comendator, Grand Cross, and National Order of Scientific Merit, Brazil; and Officer, Order of Merit of the Italian Republic.

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COMSATS' BRIEF AND ANNOUNCEMENTS

Selected Forthcoming Scientific Events in **COMSATS**^{*}Countries

28-30 November 2016	International Workshop on Nanotechnology for Young Scientists (IWYS-2016), Putrajaya, Malaysia (http://www.ukm.my/iwys)
05-08 December2016	International Conference on Research and Enterprise on Food Safety in Developing World, Islamabad, Pakistan (<i>islamabad.comsats.edu.pk</i>)
19-21 December 2016	14 th International Conference on Frontiers of Information Technology (FIT), Islamabad, Pakistan <i>(www.fit.edu.pk)</i>

Scholarships offered by the COMSATS' Centres of **Excellence for Member States**

COMSATS Institute of Information Technology (CIIT), Pakistan, offers 100 scholarships for students/researchers for postgraduate studies in all disciplines offered by the university at its 7 campuses, as well as five post-doctoral fellowships.

The Iranian Research Organization for Science and Technology (IROST), Iran, offers 7 Ph.D scholarships [4 fully paid and 3 partially paid (50%)] and five-postdoctoral fellowships in disciplines offered by the Organization.

The International Center for Chemical and Biological Science (ICCBS), Pakistan, offers scholarships for MS and Ph.D studies in disciplines offered by the Center.

For more details, please write to Mr. Tajammul Hussain, Advisor (Programmes), COMSATS Secretariat at husseint@comsats.net.pk.

6th Five-day International Workshop on 'Internet Security: Enhancing Information Exchange Safeguards' 19-23 December 2016, Rabat, Morocco

The COMSATS-ISESCO joint Workshop on Internet Security would serve as a forum for relevant young scientists and professionals from the developing countries to learn about the latest advancements in the field; promote use of stateof-the-art technologies for protection of network and network-accessible resources against different types of malicious attacks; and identify effective Internet/ information security solutions for governmental organizations, commercial ventures and general public, through rigorous risk-analyses and security management approaches.

For more information, please write to Mr. Tajammul Hussain, Advisor Programmes, COMSATS, at hussient@comsats.net.pk.

Science Vision - Call for Papers

COMSATS invites scholarly contribution for Volume 21 of its biannual journal, Science Vision, which aims at highlighting the important scientific and technological developments having a bearing on socio-economic conditions of the people.

For more information, please visit the journal's website: www.sciencevision.org.pk

A BRIEF ON COMSATS

The Commission on Science and Technology for (COMSATS) is an intergovernmental organization, with its Secretariat located in Islamabad, Pakistan.

COMSATS, currently, has 24 developing countries as its members, spread across three continents, i.e., Latin America, Africa and Asia. A Excellence, is also affiliated with COMSATS to Member States. The mission of COMSATS is to help create a world where all nations are at peace with one another and capable of providing good quality of life to their populations in a sustainable way using modern S&T resources.

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