



COMSATS Newsletter

Commission on Science and Technology for Sustainable Development in the South (COMSATS)

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Director-General UNESCO and Executive Director COMSATS after Signing an MoU at UNESCO Headquarters, Paris, France

Inside this Issue

From the Executive Director's Desk	01
News/Activities/Highlights from COMSATS Secretariat	02
Special Section: Executive Director's Visits to Jamaica and Kazakhstan	06
S&T Indicators of Member State: Nigeria	10
Activities/News of COMSATS' Centres of Excellence	13
Opinion: ICTs for Sustainability, Climate Action and Development	15
Science, Technology and Development	18
Profile of Head of Centre of Excellence: Dr. Widad Hassan Abdel Halim Hassan, Director General, IRCC, Sudan	19
COMSATS' Brief and Announcements	20

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Contributions from readers are welcome on any matter relevant to the mission of COMSATS, namely the promotion of South-South cooperation in science and technology for sustainable progress of the developing countries. The responsibility for the accuracy of any information rests with the original source. Views expressed in this publication do not necessarily reflect those of its editors, publisher or COMSATS.

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From the Executive Director's Desk

Among the leading agencies of the United Nations system, UNESCO stands out as one having the most expansive scope of activities. Its mandate is the kernel of the objectives of all other international bodies, in that it helps in 'building peace in the minds of men and women'. Established 70 years ago, at the close of a devastating world war, there could have been no better way to seek peace among nations than focusing on common factors that unite mankind as the highest form of living species. The intellect that is transferred from generation to generation through "education", the curiosity to understand the physical world that gives rise to "science", and codes of social behaviour that define "culture" and ethical standards, all these human values merged in the mandate of an ambitious international architecture, which mankind could regard as its collective asset. Thus, UNESCO deals with the deepest concerns and aspirations of all nations. Not surprisingly, a large number of UNESCO's 193 Members have permanent delegations at its headquarters in Paris, and maintain national commissions to deal with UNESCO related activities.

The signing of an MoU with UNESCO in Director-General Irina Bokova's office, on 18th March 2015, was a momentous occasion for COMSATS (page 2). It reflects the expanding outreach of COMSATS in line with its policy of seeking collaboration and synergy with international organizations having common objectives. It also shows UNESCO's recognition of the fact that organizations like COMSATS, which have been established by developing countries themselves, are useful partners because of their close connections with indigenous stakeholders. Such a partnership is also consistent with UNESCO's profile as an independent and democratic institution, working for the peace and prosperity across the globe, through all available means and resources. It is incumbent upon the major beneficiaries of UNESCO's programmes to realize that the non-political character of UNESCO would be guaranteed only when its financial position cannot be made hostage to the dictates of big donors. The institutions that are subject to manipulation for creating desired

continued on page 03

NEWS/ACTIVITIES/HIGHLIGHTS FROM COMSATS SECRETARIAT

COMSATS and UNESCO Sign a Cooperation Agreement

COMSATS and UNESCO have reached a new level of mutual cooperation through signing of a Memorandum of Understanding (MoU) at UNESCO Headquarters, Paris, France, on 18th March 2015. Dr. I. E. Qureshi, Executive Director COMSATS, and H.E. Ms. Irina Bokova, Director-General UNESCO, on behalf of their respective organizations, signed the Memorandum which provides a framework for cooperation between UNESCO and COMSATS to jointly organize science and technology programmes for sustainable development in the South. The MoU was signed subsequent to the approval by COMSATS Coordinating Council (in its 17th meeting; May 2014) and UNESCO Executive Board (in its 195th session; October 2014). Preparations to this effect had been underway since early 2014.

Along with other distinguished guests, the ceremony was witnessed by H.E. Mr. Ghalib Iqbal, Pakistan's Permanent Delegate to UNESCO and Ambassador to France; Dr. Maciej Jan Nalecz, Director & Executive Secretary of the UNESCO's International Basic Sciences Programme (IBSP); and Dr. Yoslan Nur, Programme Specialist, Division of Science Policy and Capacity-Building, UNESCO.

On this auspicious occasion, Dr. Qureshi recounted the achievements of COMSATS in areas of education and training, workshops and symposia, thematic research, as well as advocacy and policy advice for its Member States. Pointing out the unique strength of COMSATS in having an affiliated degree-awarding institution, the COMSATS Institute of Information Technology (CIIT), he noted that UNESCO has established a Chair at the Institute's Wah Campus on 'Knowledge Systems for Integrated Water Resources Management' and has agreed to establish a Category-2 Centre on Water Research at its Abbottabad

Campus, subsequent to the endorsement of the Intergovernmental Council of UNESCO's International Hydrological Programme (IHP).

The Director-General UNESCO appreciated the international programmes of COMSATS. She thanked Dr. Qureshi for his efforts in S&T sector based on South-South cooperation to work closely with UNESCO. Ms. Bokova added that the past cooperation and trust between COMSATS and UNESCO has led to the unanimous decision of the UNESCO Executive Board to enter into cooperative ties with COMSATS.

First Meeting of COMSATS-UNESCO Working Group

After the MoU was signed between the two intergovernmental organizations, the first meeting of the Working Group of COMSATS and UNESCO was held on the same date. The delegations of COMSATS and UNESCO led by the Executive Director COMSATS and the Director IBSP, UNESCO, respectively, met at latter's office in UNESCO Headquarters, Paris. The preliminary discussions were held on joint future activities inline with the provisions of MoU. Dr. Qureshi was accompanied by the Director (International Affairs) COMSATS, Dr. Majid Khan, while Dr. Yoslan Nur, Programme Specialist IBSP, Dr. Ahmed Fahmi, Programme Specialist IBSP, and Dr. Jean-Paul Ngome Abiaga, Assistant Programme Specialist IBSP, UNESCO, assisted Dr. Nalecz.

The deliberations of the Working Group touched upon mechanisms to undertake joint activities in areas of mutual interest related to Science, Technology and Innovation. The Executive Director gave a brief introduction of COMSATS, its programmes and activities conducted through a network of 19 S&T Centres of Excellence, as well as COMSATS International Thematic Research Groups (ITRGs). Dr. Nalecz was informed about the past, current and planned

future activities of ITRGs. He appreciated the approach and methodology behind the ITRGs and considered it a good strategy for strengthening South-South Cooperation.

The Working Group held extensive discussion on the purpose and outcome of a two-day symposium to be organized in connection with International Year of Light (IYL) that COMSATS is planning to organize in October 2015. Considering that UNESCO's support would be necessary to make the event successful, the Executive Director sought the support of the Working Group for inviting international experts and



Executive Director COMSATS and Director-General UNESCO signing the MoU

participants to attend the symposium, apart from local researchers and graduate students. Dr. Qureshi informed the Group about the suggestions for IYL event put forward by Dr. Joseph Niemela, Head Applied Physics ICTP, during a meeting in Islamabad on 16th March 2015. It was agreed that the two organizations will work closely for organizing the IYL event and other science-related commemorative days of UNESCO.



Members of COMSATS-UNESCO Working Group

The Group designated Dr. Yoslan Nur to present the scope and possibilities of work under the present MoU, and undertake consultations with COMSATS Coordinating Council members on the sidelines of the 18th Coordinating Council Meeting.

The meeting ended on a note of optimism for stronger cooperative ties between COMSATS and UNESCO in the areas of capacity building and policy-

making relevant to Science, Technology and Innovation.

The Working Group was informed that COMSATS had launched its Science Diplomacy programme on 25th February 2015 in Islamabad, Pakistan. This new initiative, it was noted, would be geared towards improving international relations among developing countries and supporting their efforts to achieve foreign policy objectives through cooperation in Science & Technology. UNESCO delegation was appreciative of COMSATS' timely initiative on Science Diplomacy. Dr. Nalecz opined that such initiatives will be very useful for strengthening science policies, and putting together a comprehensive reference data for preparing development plans for COMSATS' Member Countries.

UNESCO-CIIT Cooperation Discussed at UNESCO Headquarters

Following the signing ceremony of MoU and first Working Group meeting held at the UNESCO Headquarters, Paris, the Executive Director COMSATS, held meetings with Dr. Siegfried Demuth, Chief Hydrological Systems and Climate Change, Division of Water Sciences, Natural Sciences Sector, UNESCO (on 18th March) and Mr. Kishore Rao, Director, UNESCO's World Heritage Centre (on 19th March). In his meetings, Dr. Qureshi introduced CIIT and its various campuses and faculties, and shared details of international

contd. from page 1 ... 'From the Executive Director's Desk'

economic and political world-order are rapidly losing relevance and would be thrown in the dustbin of history. The developing world needs institutions like UNESCO that can prevent injustice and diminish inequalities.

Education, in general, and scientific know-how, in particular, is the greatest equalizer in the present-day world. In these two sectors, COMSATS has been making relentless efforts with minimal financial resources over the last twenty years to create partnerships among developing countries, irrespective of their political and social systems. One aspect of such efforts is the annual meetings of COMSATS' Coordinating Council that bring together leaders of R&D institutions to exchange information about their programmes and explore avenues of cooperation with one another.

The 18th meeting of the Council will be held on 12th & 13th May 2015 in Colombo, Sri Lanka. There will be representatives of 14 S&T centres belonging to developing countries, including Jamaica and Kazakhstan. These two Member States of

COMSATS are actually and literally poles apart. Their histories, cultures, and ethnic backgrounds could not have been more dissimilar. However, visits to the University of West Indies, Mona Campus in Kingston, and Al-Farabi Kazakh National University in Almaty (pages 6-9) revealed a striking similarity of educational programmes and strategic plans of preparing young generations to help create knowledge- societies in their respective countries. In both places one finds a common focus on self-reliance in terms of human and natural resources. Based on these commonalities of aspirations, what COMSATS aims to achieve through its capacity-building programmes is to create academic and scientific links among its Member States. COMSATS needs both partners and patrons to keep its mission afloat.

The readers of this Newsletter who endorse COMSATS' vision are requested to kindly send their inputs by way of advice or criticism that could help us improve our performance. More elaborate inputs in the form of short articles about COMSATS' areas of interest are also welcome.

activities undertaken in cooperation with UNESCO.

In his meeting with Dr. Demuth, it was agreed that the feasibility study of the Category-II center will be carried out with the support of UNESCO's designated experts based in South Asia Office, and that Ministry of Science and Technology, Government of Pakistan, will facilitate the feasibility study as well as support the establishment of the Category-II Regional Water Research Centre (RWRC).

In the other meeting, Mr. Rao appreciated COMSATS and CIIT's educational activities and initiatives on heritage conservation, and assured UNESCO's full cooperation for CIIT's on-going and planned activities. He added that COMSATS should continue to work closely with UNESCO Office in Islamabad, and collaborate with the World Heritage Institute of Training and Research for Asia and the Pacific Region (WHITR-AP), Shanghai, China. The meeting ended on a note of optimism for stronger cooperative ties between CIIT and UNESCO in areas related to heritage conservation.

Palestinian Ambassador to Pakistan Visits COMSATS Secretariat

On 11th March 2015, the Ambassador of the State of Palestine to Pakistan, H.E. Mr. Walid Abu Ali, visited COMSATS Secretariat, and held a meeting with Executive Director COMSATS, Dr. I.E. Qureshi, in the presence of senior officials of COMSATS, including Advisor (Programmes), Mr. Tajammul Hussain, and Director (International Affairs), Dr. Majid Khan. The Ambassador was accompanied by the Cultural and Educational Attaché of the Palestine Embassy, Mr. Husni Abu Ghoush.

Welcoming the Palestinian diplomats to the Headquarters, Dr. Qureshi expressed his desire for having cooperation between COMSATS' Member Countries and institutions, and the State of Palestine. He opined that Palestine should

join COMSATS as one of its Member States to benefit from the international activities of the organization.

Dr. Qureshi highlighted the role of COMSATS as an intergovernmental organization, promoting the cause of science-led sustainable development in its 21 member countries. He highlighted the fact that COMSATS is an apolitical organization having no religious and ethnic associations. Dr. Qureshi informed H.E. Mr. Abu Ali that COMSATS Network of Centres of Excellence undertake scientific cooperative projects internationally for the developing countries, in addition to serving their national research interests. In this regard, Dr. Qureshi quoted examples of some of COMSATS' Centres of Excellence, including National Mathematical Centre (NMC), Nigeria, for offering excellent programmes in mathematics; Bangladesh Council for Scientific and Industrial Research (BCSIR), Bangladesh, for having a reference laboratory for chemical metrology; and International Centre for Physics (CIF), Colombia, for its research activities in the inter-disciplinary fields involving physics and biology, chemistry, earth sciences, etc. Dr. Qureshi underscored the contributions of COMSATS as a facilitator of South-South cooperation through its Network of Centres of Excellence. In this regard, the significance of COMSATS Coordinating Council's annual meetings was also highlighted.

The Ambassador inquired whether there is a possibility of scholarships for Palestinian students under the aegis of COMSATS. He informed COMSATS' officials that in spite of being under siege, Palestine pays highest attention to education. The Ambassador was informed about the offer of a hundred post-graduate scholarships at CIIT allocated for students from COMSATS' Member Countries. It was noted that the State of Palestine can benefit from such an offer by joining COMSATS as a Member State.

A letter of invitation for the State of Palestine to join COMSATS as a Member State, along with COMSATS' Draft Accession Agreement and other relevant documents were handed over by Dr. Qureshi to H.E. Mr. Walid Abu Ali for onward submission to the honourable Palestinian Minister for Education and Higher Education, H.E. Ms. Khawla al-Shakhsheer. The Palestinian Ambassador pledged to forward the Membership documents to the relevant Ministry and assured to personally follow-up the case of Palestine's membership to COMSATS. With regard to post-graduate scholarships to Palestinian students, the Executive Director COMSATS expressed his willingness to process the case of four to



Palestinian Ambassador to Pakistan meeting COMSATS officials at COMSATS Secretariat

five students as the first batch to be enrolled at CIIT under the scheme after Palestine's Membership of COMSATS.

At the end of the meeting, the Executive Director presented a set of COMSATS' publications to the Palestinian Ambassador, who thanked Dr. Qureshi for inviting him for the meeting and sharing useful information on the benefits of enhancing future cooperation between COMSATS and the State of Palestine.

Nigerian High Commissioner to Pakistan Briefed about COMSATS' Programmes

The High Commissioner of the Federal Republic of Nigeria to Pakistan, H.E. Mr. Dauda Danladi, visited the Islamabad campus of COMSATS Institute of Information Technology (CIIT), on 3rd March 2015. Accompanied by senior officials of the Nigerian High Commission, Mr. Danladi was received by CIIT officials. After his formal reception, the Ambassador held a meeting with the Executive Director COMSATS, Dr. I. E. Qureshi. Officials from COMSATS and CIIT present during the meeting included: Advisor Programmes COMSATS, Mr. Tajammul Hussain; Director (International Affairs) COMSATS, Dr. Majid Khan; Dr. Arshad Saleem Malik, Head International Office (IO) of CIIT; Dr. Abdul Aziz Khan, and Dr. Tariq-ur-Rahman, Advisors at IO of CIIT. Fourteen Nigerian students pursuing their post-graduate studies at CIIT were also present.

After a formal welcome to the Nigerian High Commissioner, Dr. Qureshi gave a brief introduction of COMSATS and informed about COMSATS' international programmes and activities conducted through a network of 19 Centres of Excellence. The joint research activities being conducted by COMSATS International Thematic Research Groups (ITRGs), which are clusters of some of COMSATS' Centres of Excellence and scientific institutions from other developing countries, were also highlighted.

While overviewing the previous and ongoing collaboration between COMSATS and its Centre of Excellence in Nigeria, the National Mathematical Centre (NMC), the Executive Director shared that NMC is leading the COMSATS' ITRG on 'Mathematical Modeling', which was formally launched during its foundation meeting held on December 02, 2014, in Abuja, Nigeria. It was informed that the Group is conducting joint research for assessing the impacts of air and water pollution and proposing their remedies. It was noted that NMC is regularly represented during the annual meetings of COMSATS Coordinating Council, and has also hosted its 12th meeting, and the 1st meeting of COMSATS Consultative Committee in April 2009 in Abuja. The Executive Director also recounted COMSATS' support extended to the scientific community of Nigeria over the years.

After the briefing, the Nigerian High Commissioner expressed his personal gratitude to Dr. Qureshi for inviting him to visit the Institute that allowed him to meet the Nigerian students pursuing post-graduate studies mostly in the field of Mathematics. During the course of discussion, H.E. Mr. Danladi requested if COMSATS could assist Nigeria with the tools and equipment that could be utilized to detect and treat viruses, such as Ebola, that played havoc in West Africa. He also sought CIIT researchers' assistance in helping to mitigate pollution in Nigerian cities, such as Lagos. To this, Dr. Qureshi apprised him about the research work being done by COMSATS International Thematic Research Group on 'Climate Change and Environmental Protection'. Quoting CIIT's top most ranking in 'Research Productivity' by the Higher Education Commission (HEC) of Pakistan, Dr. Qureshi informed the Nigerian officials about the meaningful research work of the Institute's Departments of Pharmaceutical sciences; Bio-sciences; and Center for Micro and Nano Devices; and their search for solutions to address developmental challenges faced by COMSATS' Member States.

The High Commissioner appreciated the quality of post-graduate education the Nigerian students are receiving at CIIT. He requested if COMSATS could also help explore the possibility of providing educational opportunities to undergraduate students of Nigeria. Touching on the matter of the Member States' Annual Membership Contribution (AMC) towards COMSATS, Dr. Qureshi informed that these contributions are voluntary in nature and are used as trust fund for the contributing country. The High Commissioner was also informed about the correspondence made with the relevant government institutions of Nigeria in this regard. Mr. Danladi pledged to pursue the matter with relevant Nigerian officials, and also to encourage them to visit COMSATS Secretariat and CIIT.

The meeting ended on a note of understanding for more cooperation between COMSATS and Nigerian institutions.



Executive Director COMSATS presenting a souvenir to the Nigerian High Commissioner in Pakistan

SPECIAL SECTION: VISITS TO JAMAICA AND KAZAKHSTAN

Continuous coordination with member countries and institutions, as well as efforts for enhancing the membership of both the Commission and the Network of Centres of Excellence, constitute major activities of COMSATS Headquarters. Among these are visits of COMSATS' officials to the existing and potential Centres of Excellence. These visits help COMSATS in understanding the technical strengths and weaknesses of these centres for harnessing their scientific potential for COMSATS' programmes aimed at socio-economic development of the South. During March-April 2015, two such visits were undertaken by the Executive Director COMSATS: one to Jamaica, where meetings were also held with high government officials, apart from consultations at International Centre for Environmental and Nuclear Sciences (ICENS), Kingston; and the second was to Kazakhstan, which although a member country is yet to have its representation in COMSATS' Network of International Centres of Excellence. Accounts of the meetings and discussions held during these visits are covered in this section.

Visit to Jamaica (21st to 25th March 2015)

ICENS-Jamaica Welcomes Executive Director COMSATS (23rd March 2015)

In connection with the Coordinating Council's advice to Executive Director COMSATS to visit COMSATS' Centres of Excellence, Dr. I.E. Qureshi undertook his maiden visit to the International Centre for Environmental and Nuclear Sciences (ICENS), Kingston, Jamaica, on 23rd March 2015.

Welcoming the Executive Director, the Director-General ICENS, Mr. Charles Nathaniel Grant, thanked him for his visit to the Centre. Detailed discussions were held between the two officials on the avenues of increasing participation of ICENS in COMSATS' International Programmes. Dr. Qureshi recalled the strong role played by ICENS founder Director-General, Prof. Gerald Lalor, in establishing the COMSATS' Centre of Excellence in Jamaica as a result of

his close affiliation with Prof. Abdus Salam. He informed that the Council comprising the Heads of 19 R&D organizations affiliated with COMSATS meets annually, and provides excellent opportunity for exchange of scientific and technical information and capacities amongst COMSATS' Member States and institutions. Such exchanges open possibilities of bilateral or multilateral cooperation in areas of common interest and help build new research programmes and devise new approaches for undertaking existing projects for the socio-economic progress of developing countries. The Executive Director emphasized the need to have representation of ICENS in these annual meetings, in particular, the upcoming 18th meeting to be hosted by the Industrial Technology Institute in Colombo, Sri Lanka, on 12-13 May 2015. Dr. Qureshi recounted some of the benefits that ICENS can draw from the membership of COMSATS' Network, such as:

- participation in capacity-building activities;
- joint multilateral research under COMSATS International Thematic Research Groups; and
- graduate degree scholarships at COMSATS Institute of Information Technology (CIIT), Pakistan.

The Executive Director invited the Director-General ICENS to identify scientific areas of interest in which he would like to seek help from COMSATS' Member Countries, and also to indicate the kind of assistance and training ICENS would be willing to offer to other Member countries. He offered to provide financial support in the form of travel grant in case of exchange visits of scientific personnel for the purpose of training or joint research activity.

The discussions were later joined by the Honourable Chairman of the Board of Directors of ICENS, Prof. Gerald Lalor. He endorsed the proposal floated earlier during the discussions that ICENS should act as COMSATS' regional hub. He opined that the international events held in Jamaica under the aegis of COMSATS would help invigorate local scientific community and attract attention of authorities responsible for the development of S&T sector in the region.



Dr. Qureshi with Prof. Gerald Lalor and Mr. Charles Grant

A tour to the ICENS laboratories was also arranged for the visiting Executive Director COMSATS. ICENS houses three laboratories dedicated to its core activities pertaining to the chemical analyses of environmental media and food stuff, using nuclear and atomic spectroscopic methods. During the tour, the three laboratory Heads explained their analytical studies being conducted with the help of X-ray Diffraction, X-ray Fluorescence, Atomic Absorption Spectrometry, Neutron Activation and Inductive Coupled Plasma Spectroscopy. It was observed that a large number of samples of soils and food-items are routinely studied to map the distribution of hazardous elements and their pathways to agricultural produce in the country. Mr. Grant, who was accompanying the Executive Director, explained



Visit to Lab facilities of ICENS

that a complete atlas of elemental distribution in Jamaican soils, covering the entire land area, has been prepared with samples taken over a grid of 8x8 kilometers, and that the work is being further refined over a grid of 2x2 kilometers. The exchange of ideas with researchers and technicians in the laboratory resulted in an understanding that there should be more interaction with other laboratories doing similar work in COMSATS' Member Countries.

Later, the Executive Director made a presentation on COMSATS' international activities, which was attended by ICENS personnel, as well as faculty members of the University of West Indies. During all the aforementioned interactions, Dr. Qureshi highlighted the benefits Jamaican scientists and researchers can get from COMSATS' international programmes and activities. They were also urged to write articles for COMSATS' journal, *Science Vision*.

Meetings with High Government Officials of Jamaica (24th - 25th March 2015)

On 24th and 25th March, 2015, Dr. Qureshi held two high-level meetings with the Minister of State, Ministry of Science, Technology, Energy and Mining (MSTEM), Government of Jamaica, Honourable Julian J. Robinson, MP; and the Director-General of Jamaica's National Commission on Science and Technology (NCST), Hon. Professor Errol Morrison, OJ. Dr. Qureshi was accompanied by Mr. Grant during both these meetings.

Mr. Robinson was also accompanied by Permanent Secretary of the Ministry, Ms. Hillary Alexander, JP. Welcoming the Executive Director, the Honourable Minister expressed his appreciation for COMSATS' activities aimed at fostering scientific cooperation among developing countries. He showed keen interest in the opportunities of scientific capacity-building available from the platform of COMSATS, especially the offer of scholarships for

undertaking graduate studies at CIIT, Pakistan. CIIT's academic collaborations with the University of Illinois, Urbana-Champaign (UIUC), were of special interest to His Excellency, who is himself one of the alumni of UIUC.

Elaborating the role played by the Network of International S&T Centres of Excellence (COEs) towards COMSATS' international programmes, Dr. Qureshi dubbed the annual meetings of the Heads of these Centres as an effective mechanism of South-South cooperation. Dr. Qureshi noted that ICENS has so far not been able to tap the opportunities of entering into bilateral or multilateral scientific exchanges with other Centres.

The Honourable Minister was informed that another mechanism of integrating with COMSATS' programmes is through participation in its International Thematic Research Groups (ITRGs). The areas covered by these groups and highlighted by Dr. Qureshi include: Information and Communication Technologies (ICTs), Climate Change, Natural Products Sciences, and Mathematical Modelling. The Minister was taken on board regarding the Jamaica's Annual Membership Contribution to COMSATS.

The Permanent Secretary informed Dr. Qureshi that Ministries and universities of Jamaica are entrusted with S&T related work, and the government related specific areas of focus include renewable energy, food security and mineral resources. Ms. Alexander advised that Jamaica's NCST – the national authority responsible for devising policies and overseeing the development of S&T sector in the country – may be consulted for the execution of planned joint activities of COMSATS and ICENS. The Executive Director assured her that COMSATS would use the services of Director-General ICENS to identify and recommend scientific workers of different laboratories in Jamaica, including those in ICENS, for their participation in COMSATS' initiatives and activities, which include workshops, exchange visits, trainings, invited lectures, and



A Group Photo with Hon. Minister of State MSTEM and the Permanent Secretary MSTEM

thematic research.

The Honourable Minister instructed Director-General ICENS to fully utilize COMSATS' platform for the Centre's interactions with regional and international counterparts. The Director-General expressed his commitment to do so, inter alia, by:

- sending a representative of ICENS to attend the 18th COMSATS Coordinating Council meeting;
- selecting students for admission in CIIT; and
- seeking COMSATS' help in organizing IAEA-supported upcoming symposium on the use of mini neutron-source reactors.

During the meeting with Director-General NCST, Hon. Professor Errol Morrison, OJ, discussion was made on broader issues of failure of developing countries to set aside adequate financial resources for R&D in order to achieve scientific capacity in crucial areas of economic importance. Dr. Qureshi informed Prof. Morrison about COMSATS' initiatives in the fields of ST&I policy, Science Journalism, and Science Diplomacy, which was lauded by him. He encouraged the Director-General ICENS to open up the Centre and venture into new interdisciplinary areas with COMSATS' support. The Director-General ICENS assured him that he would be willing to play the role of a coordinator in fully exploiting all areas of S&T supported by COMSATS.

Visit to Kazakhstan (23rd to 26th April 2015)

A two-member delegation of COMSATS' International Technical Advisory Committee (TAC) visited Al-Farabi Kazakh National University (KazNU), Almaty, Kazakhstan, on 24th and 25th April 2015. The visit was made in response to the University's nomination as prospective Centre of Excellence of COMSATS by the Ministry of Education and Science, Government of Republic of Kazakhstan. Dr. I. E. Qureshi, Executive Director COMSATS, and Prof. Katijah Mohamad Yusoff, Dean, Faculty of Biotechnology and

Biomolecular Sciences, Universiti Putra Malaysia (UPM), Malaysia, in their capacities as members of TAC, visited KazNU for technical evaluation to determine the university's suitability to become COMSATS' Network member.

Upon invitation from the First Vice-Rector of KazNU, Prof. Mukhambetkali Burkitbayev the delegation reached Almaty to conduct its first tour of various faculties of the University on 24th April 2015. Prof. Burkitbayev personally showed the delegation around the Central Administrative block of the University that also houses a museum in which the eighty years' history of the University is documented and displayed in an impressive manner. The works of the great 10th century scholar, Abu Nasr Al-Farabi, was one of the eye-catching and inspiring exhibits available in the Museum.

Discussions and Interactions

During an introduction of the on-going programmes of the University, Prof. Burkitbayev explained that the university has been undergoing a rigorous process of modernization that was started in 2012. To effectively govern the operations of the University, some departments were merged thereby reducing the total number of departments from over 100 to about 60. The second important feature of the modernization was the delegation of certain administrative powers from Rector to Vice-Rectors and on to Deans of Faculties. Thirdly, the University started concerted efforts for enhancing academia-industry relations. Through a University Technology Park and faculty-based incubation centres, greater emphasis is being laid on commercializing the intellectual property holdings of the faculty members. The young graduates are also being encouraged to launch start-up companies, by providing them office facilities and initial financial support. The fourth component of modernization involves the focus on internationalization, through students and faculty exchanges on bilateral basis,



Visiting TAC Members and KazNU Vice-Rector in front of Al-Farabi Portrait at the University's Museum



A Visit to Technical Facilities



COMSATS Delegation with Rector and Senior Officials of KazNU

as well as involvement with international educational cooperation platforms. The research infrastructure is also being enhanced to make it consistent with the requirements of international collaboration. The Executive Director noted that by virtue of its status as COMSATS' Centre of Excellence the objectives of university's modernization with respect to internationalization will be achieved more effectively.

The preliminary discussions were followed by a formal meeting with the honorable Rector, Prof. Galimkair Mutanov, and deans of KazNU's fourteen faculties related to Science and Technology. In his opening remarks, Prof. Mutanov acknowledged the importance of the visit of distinguished guests and considered it an honor for KazNU to be considered for COMSATS' Network Membership. He recalled that KazNU already has strong research collaboration with International Center for Chemical and Biological Sciences (ICCBS), which is one of the two Centres of Excellence located in Pakistan. The Executive Director highlighted the significance of Centres of Excellence in achieving the objectives of South-South cooperation. It was noted that KazNU could be the third University to join the Network. In view of several areas of scientific interest common between CIIT and KazNU, collaboration between the two was felt desirable. The Rector KazNU welcomed such suggestions.

The other visiting member of TAC, Prof. Khatijah M. Yusoff, also introduced her university, the Universiti Putra Malaysia (UPM), and invited KazNU deans to consider research collaboration with her group, which is involved in research on viruses.

On 25th April 2015, a presentation by Executive Director COMSATS covering the history, organizational structure and key initiatives of COMSATS, was attended by senior faculty members and Directors of S&T-related research institutes of the University.

Technical Evaluation

The TAC members were given a tour of major laboratories in the Faculty of Physics and Technology, Faculty of Biology and Biotechnology, and Faculty of Chemistry and Chemical Technology, along with its two independent institutes. The evaluation process, spanning two sessions on 24th and 25th April 2015 comprised of inspection of experimental facilities and general working conditions of the staff; inquiries about scientific projects being undertaken; and the prospects of future work that could provide basis of international collaboration. The brief but intensive interactions with scientific workers during the visits revealed the following strengths of the University:

- well-equipped laboratories with advanced instruments for research, as well as for teaching;
- both senior researchers and graduate students engaged in research projects of world-wide contemporary interests, such as natural products based pharmaceuticals, chemical processes for coal liquefaction and gasification, and uses of new materials in renewable energy sector;
- all scientific staff and researchers fully capable of utilizing the available analytical instruments in Chemistry, Biology and Physics laboratories, while maintaining the equipment in prime working condition;
- pleasant and conducive work environment in the laboratories and work stations that were eco-friendly and well-organized.

The courtesies and cooperation at all levels of the administration extended to the delegation conveyed an impression of commitment to participate in COMSATS' future programmes. The case of KazNU's induction in COMSATS Network as its 20th member will be considered during the 18th Coordinating Council meeting in Colombo, Sri Lanka, on the basis of a technical evaluation report from the TAC members, and a presentation by the KazNU Vice-Rector for Research and Innovative Affairs.

S&T INDICATORS OF MEMBER STATE

In Spectrum: Federal Republic of Nigeria

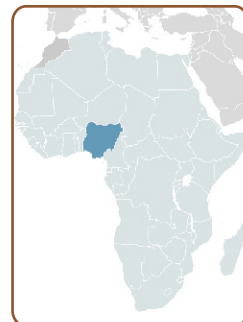
Question-1: Please briefly introduce Nigeria as an important member of the World Community, its current standing in terms of Human Development Index and other socio-economic indicators.

Nigeria became independent in October 1960 and Republic in 1963. The country has a population of about 170 million people and shares boundaries with Republic of Cameroon and Chad in the East, Republic of Benin in the West, Republic of Niger in the North and Atlantic Ocean in the South.



Nigeria being a large country in Africa and the most populous black nation in the world has contributed immensely to the emancipation of Southern African Countries. Its peace keeping role cannot be underestimated. A clear demonstration was its role in Liberia, Sierra-Leone, Côte d'Ivoire, D.R. Congo, Sudan, Chad, and Bosnia, to name but a few. Currently, Nigeria is a non-permanent member of the UN Security Council. It is equally a member of many international organizations like Commonwealth, OIC, D8, G77, AU, and ECOWAS.

Companies (Gencos), One (1) Transmission Company and eleven (11) Distribution Companies (Discos). The government also licensed thirty four (34) Independent Power Projects (IPPs). The sustained implementation of the power reforms has increased in the average hours of power availability throughout the country. In addition, construction of 10 MW wind-energy generation companies in Katsina State serves as booster to the national energy grid.



- ii. Generation of employment: Unemployment is a global issue, especially among the youth. The Federal Government has created employment schemes through the re-invigoration of the National Directorate of Employment Programme and also uses proceeds realized from the Subsidy Reinvestment and Empowerment Programme (SURE-P) to fund various schemes and programmes for unemployed youths.
- iii. Nigeria with 84 million acres of arable land, two of the largest rivers in Africa, and a young low-cost labour force, the Federal Government has initiated a Transformation Agenda with the aim of achieving 20 million metric tonnes

An Interview with the High Commissioner of Federal Republic of Nigeria to Pakistan, H.E. Mr. Dauda Danladi, mni

Nigeria's nominal Gross Domestic Product (GDP) now stands at US\$ 509.9 billion, making the nation's economy the largest in Africa and the 26th in the world. Nigeria's economy is mainly petroleum driven and the country is the 7th largest producer of oil in the world. Nigeria's proven gas reserve is 184 trillion cubic metres awaiting investors. Other sectors of the economy like agriculture, mining and manufacturing are also getting the much desired attention from the government.

Question-2: Please highlight the vision of the Government of Nigeria for Sustainable national development and the role it envisages to play in science, technology and innovation for its development.

The outgoing Federal Government was sworn in 2011 with a Transformation Agenda as its cardinal programme in the following areas:

- i. Stabilize and increase power supply in Nigeria: In order to achieve this goal, the government setup a power sector roadmap which led to the unbundling of Power Holding Company of Nigeria (PHCN) into six (6) Generating

of food to our domestic supply and create thousands of jobs in the process by the end of 2015.

To this end, the Federal Government has embarked on the following:

- a. Tighter control of fertilizer distribution processes. Today all sales of fertilizers are made directly by producers to farmers;
- b. Creation of a comprehensive farmers' database and using our Electronic Wallet Scheme;
- c. Using Electronic Wallet Scheme, delivers subsidized Electronic Fertilizer Vouchers directly to our farmers;
- d. Attracting private-sector agri-businesses and encouraging investment in processing plants by putting in place appropriate physical, investment and infrastructural policies;
- e. Launching of Nigeria Incentives-based Risk-sharing System for Agricultural Lending (NIRSAL) to reduce the risks of lending to the agricultural sector, and trigger much needed agricultural industrialization process with a hope of generating an extra US\$ 3

billion of bank lending within the next decade. Increase in rice-seedling production making Nigeria self-sufficient in rice production by the end of 2015, among others. All these policies introduced by the Government are beginning to manifest. Nigeria is now the largest producer of cassava in the world, thereby developing cassava value-chains for value-added products like high-quality cassava flour, cassava chips, ethanol, starch, sweeteners. Cassava Bread Development Fund was recently established to complement the achievements so far recorded. Nigeria recently secured US\$ 3.2 million MT contract orders from China for export of dried cassava chips for ethanol production. Now export opportunities for Cassava exist in Nigeria more than ever before. Sorghum, Cocoa and palm-oil production have equally been given attention by the government.

iv. The petroleum industry remained the single largest contributor to Nigeria's economy. An average of 2.5 million barrels of oil is produced per day with proven reserves of 36 billion barrels, which is expected to last for about 46 years, the Federal Government has also set a goal of achieving 4 million barrels of production per day by 2020. In relation to gas, the President has launched Gas Revolution Agenda with a national gas infrastructure blue print.

v. Provision of infrastructure and transportation: Because of the importance of Infrastructure in development, the Federal Government of Nigeria has spent a lot of money in this sector. The government has rehabilitated the main Western railway line from Lagos-Kano of about 1,124 km. This Western line has not been functioning for more than fifteen (15) years. Meanwhile, the Eastern line, from Port-Harcourt to Maiduguri is expected to be completed before the end of this year. A total of 651 kilometres of roads was paved with bitumen in 2012, including Apapa-Oshodi Expressway, Benin-Ore Shagamu Highway, Abuja, Abaji-Lokoja dualization, Kano-Maiduguri dualization, Onisha-Owerri expressway, Vom-Manchok Road in Plateau State. There was also movement of 1,200 tonnes of cargo from Lokoja to Onisha by inland waterways for the first time. The Federal government has also remodeled four strategic international airports in Abuja, Kano, Lagos and Port Harcourt. Government also installed several automated devices and equipments, such as Terminal Radar Approach Control (TRACON) and the Aeronautical Information Service (AIS). Government also provide very High Frequency Radio Coverage and Control Tower Modernization. World Geodetic Survey-84 (WGS 84) and other navigational aids, ICU enhancement and mobile control towers were

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
1980	45.6	6.7	-	4,259	-
1985	46.4	8.6	-	3,202	-
1990	46.1	6.7	-	2,668	-
1995	46.1	7.2	-	2,594	-
2000	46.6	8	-	2,711	-
2005	48.7	9	5	3,830	0.466
2010	51.3	9	5.2	4,716	0.492
2013	52.5	9	5.2	5,353	0.504

Source: Human Development Report 2014

also provided.

- vi. Healthcare is a Federal government's priority, which has worked extremely hard to demonstrate its enduring commitment by providing a higher standard healthcare across the country. The launch of the 'Saving One Million Lives by 2015' initiative is a proof of its commitment. This scheme includes a plan for improving nutrition nationwide, which has led to the mobilization of four thousand (4,000) midwives across rural primary healthcare centres (PHCs). In addition, a scheme has been initiated to provide conditional cash transfer for pregnant women using the money saved from the Federal government's subsidy refund. The Federal government has also pledged to increase healthcare spending at Federal, State and local level governments. The government is also working towards strengthening our healthcare structure, including expanding the National Health Insurance Scheme (NHIS) to cover all segments of the society.
- vii. In 2013, the Government established twelve (12) new universities to enhance access to university education in all States. Government also refurbished and equipped 51 Federal and state polytechnics with modern laboratories to encourage technical and vocational education and training. Furthermore, 352 science and technical laboratories in 104 Federal Unity Colleges were refurbished in addition to providing 62 ICT Centres.
- viii. Provision of security for lives and properties was also given maximum attention by Nigerian government. The Nigeria police and other security outfits were equipped with modern equipments. Training and re-training of security personnel were also given priority.

Question-3: What major achievements have been made in terms of S&T during the last 10 years?

In the last 10 years Nigeria has improved its level of Science

and Technology with launching the first African Communication Satellite in Africa in 2007 to complement the fibre connectivity and provide more Internet bandwidth.

Question-4: What Government body is chiefly responsible for promoting the S&T Culture and implementing the ST&I Policy in Nigeria?

The only body responsible for promotion of Culture of Science & Technology in Nigeria is the Federal Ministry of Science and Technology with other related subsidiary institutions under it. Some of the subsidiary institutions are: National Board for Technology Incubation (NBTI); Energy Commission of Nigeria (ECN); Nigerian Institute of Science Laboratory Technology (NISLT); Nigerian Institute of Trypanosomiasis and Onchocerciasis; and National Biotechnology Development Agency (NABDA).

Question-5: What is the existing S&T capacity of the country?

Like many other developing countries, Nigeria does not have enough capacity and manpower to develop Science and Technology. To this end, Nigeria has signed many MOUs and Agreements with many countries to improve S&T in the country.

Question-6: What role are the R&D Institutions under the Ministry of Science and Technology playing to support operations of the Ministry?

The Federal Ministry of Science and Technology was created to provide the essential support and synergy for research work in Nigeria. Many research institutions and bodies were created and funded by government to support this development.

Question-7: What has been Nigeria's performance in achieving MDGs? What are Nigeria's priorities on this front in remaining timeframe of the MDGs?

The eight Millennium Development Goals (MDGs) established after the United Nations Millennium Summit in 2000 has defined priorities for Nigeria, and other countries, especially in the developing world. Nigeria like other countries had resolved to address the following MDG goals: (a) Poverty and hunger reduction; (b) Provide primary education for all; (c) Promote gender equality; (d) Reduce child mortality and

Socio-economic and S&T Indicators of Nigeria				
Indicator Name	1990	2000	2010	2013
Population, total (In Million)	95.62	122.88	159.71	173.62
GDP per capita (current US\$)	321.67	377.5	2,310.86	3,005.51
GDP per capita growth (annual %)	9.89	2.71	4.92	2.49
Agriculture, value added (% of GDP)	31.52	26.03	23.89	21
Industry, value added (% of GDP)	45.27	52.21	22.03	21.99
Services, etc., value added (% of GDP)	23.21	21.76	54.07	57.01
Merchandise trade (% of GDP)	62.5	64.02	34.75	30.47
FDI, net inflows in Million (BoP, current US\$)	588	1,140	6,049	5,609
Exports of goods and services (% of GDP)	35.34	51.73	25.26	18.04
High-tech exports (% of manufactured exports)	-	0.59	1.09	2.74
Mobile cellular subscriptions (per 100 people)	-	-	55	73
Internet users (per 100 people)	-	-	24	38
Immunization, measles (% of children ages 12-23 months)	54	33	56	59

Source: World Development Indicators, Country : Nigeria

improve maternal health; (e) Combat HIV/AIDS and malaria; (f) Improve environmental sustainability; and (g) Develop a global partnership for development.

We have made significant progress in the achievement of human capital related MDGs in the last two years. Remarkable increase achieved in the area of net enrolment ratio and net attendance ratio in primary education from 62.1% in 2008 to 70.1% in 2012. Appreciable progress has also been made in reduction of under-five year mortality rate (per 1,000 live births) from 157 in 2008 to 141 in 2011. Also the Government has institutionalized early childhood care development education to reduce the number of out-of-school children and take advantage of other important aspects of early childhood education. In a related development, Government has completed 124 Almajiri schools and will soon hand them over to State governments to address the high number of out-of-school children. Government also constructed schools dedicated to girls in 13 States of the Federation to improve girl-child education in Nigeria.

In the area of health, a lot of achievements have been recorded. Over 1,500 primary health-care facilities have been refurbished and supplied with essential commodities to increase skilled birth-attendants for delivery. In 2012, about 1.044 million antenatal care visits were made in the 1,000 midwives service scheme (MSS) facilities across the 36 States and the Federal Capital Territory (FCT).

Over 141,929 deliveries were carried out by skilled birth-attendants and 145,990 women attended family planning clinics in 2012 alone. Nigeria has also achieved a lot in other areas. For instance, the present Federal Executive Council

continued on page 14

ACTIVITIES/NEWS OF COMSATS' CENTRES OF EXCELLENCE

Bilateral Agreements Signed at BCSIR-Bangladesh

During the reporting period, Bangladesh-Belarus Joint Committee Meeting on Science and Technology was held on 8th March 2015 in BCSIR, Dhaka, under the leadership of Mr. Petr Baltrukovich, Deputy Chairman of the State Committee for Science and Technology (Belarus) and Mr. Kazi Salauddin Akber, Additional Secretary, Ministry of Science and Technology (Bangladesh). Two cooperation agreements were signed in the meeting, namely 'Regulation of the Joint Commission on Science and Technology Cooperation' and 'The Executive Programme of Belarus-Bangladesh Cooperation in Science and Technology for the year 2015-16', opening the door for greater bilateral cooperation in the field of Science and Technology.

Honours for Scientists of BCSIR-Bangladesh

Ms. Shirin A. Jahan, Senior Scientific Officer, Institute of Glass and Ceramic Research and Testing (IGCRT), Bangladesh Council of Scientific and Industrial Research (BCSIR), Bangladesh, participated in the '7th HOPE Meeting with Nobel Laureates 2015,' held in Tokyo, Japan (1-5 March 2015). She was given the "HOPE award" by Prof. Makoto Kobayashi (Nobel Laureate in Physics) for best poster presentation, entitled 'Hydroxyapatite from Waste Materials for Treatment of Heavy Metals in Aqueous Medium'.

Another honour for BCSIR came with the election of Dr. Md. Sarwar Jahan, Principal Scientific Officer, BCSIR Laboratories, Dhaka, as the Fellow of International Academy of Wood Science (IAWS).



Signing Ceremony of the Memorandum of Understanding at BCSIR

CIIT-Pakistan welcomes Foreign Delegations

With a view to expand its international cooperation and outreach, COMSATS Institute of Information Technology (CIIT), Pakistan, welcomes and encourages officials of academic institutions and diplomatic missions in Pakistan to visit the various campuses of CIIT and have first-hand assessment of educational and R&D facilities and potential of CIIT. During the reporting period, a number delegations and dignitaries visited CIIT with a view to advance research and academic cooperation. The following visited CIIT:

- i. Officials of Italian Development Committee (IDC), Italy,

- on 4 March and 21 April 2015;
- ii. Delegation of Macquarie University, Australia, on April 15, 2015;
- iii. Delegation of Otto-von Guericke Universität Magdeburg, Germany, on April 1, 2015;
- iv. H.E. Andrei Ermolovich, Ambassador of the Republic of Belarus, on March 17, 2015;
- v. H.E. Mpendulo Jele Kumalo, High Commissioner of the Republic of South Africa, on March 12, 2015; and
- vi. H.E. Dauda Danladi, High Commissioner of the Federal Republic of Nigeria, on March 3, 2015.

Honours for CIIT-Pakistan

On March 4, 2015, Dr. Zulfiqar Ahmad Bhatti, Assistant Professor, Department of Environmental Sciences, CIIT Abbottabad, won the 'Innovation Award' for his project, titled "Industrial Water Treatment" at the 4th Invention to Innovation Summit 2015 of the University of Punjab, Lahore, Pakistan.

Dr. Arshad Mehmood Abbasi, Assistant Professor, Department of Environmental Sciences, CIIT Abbottabad, won the "Best Book Award" for his book, titled "Medicinal Plant Bio-Diversity of Lesser Himalayas-Pakistan", on March 13, 2015. The award was given under the programme of Higher Education Commission (HEC) of Pakistan, titled "HEC Outstanding Research Awards".

Capacity Building of TIRDO-Tanzania

During the reporting period, Tanzania Industrial Research and Development Organization (TIRDO), Tanzania, has received laboratory equipment for carrying out food proximate analysis, under the UNIDO's

Industrial Upgrading and Modernization Programme (IUMP) in Tanzania. The equipment includes, Kjeldahl and Soxhlet apparatuses, Rotary evaporator, Oven and Muffle furnace.

Also under collaboration with Swedish International Development Cooperation Agency (Sida), two of TIRDO staff members received three-week long training in Sweden. Dr. Mihayo Musabila attended the Advanced International Training Programme (ITP) on 'Strategies for Chemicals Management', from 2 to 24 March 2015, in Stockholm. The training was aimed at formulating organizational arrangements for conducting chemical control, as well as developing an action plan at country-level. The TIRDO researcher, Dr. George Oreku, attended training on the 'Use

of ICT in Education' (Primary and Secondary education) under a similar programme of Sida.

NMC-Nigeria and NITDA Sign MoU

The National Mathematical Centre (NMC), Nigeria, and the National Information Technology Development Agency (NITDA) of Nigeria signed an MoU, on February 16, 2015, for training and developing the Nigerian youth to become world-class software developers. Under this collaboration, world-class Information Technology (IT) infrastructure shall be put in place at NMC for intensive training of youth in IT. NMC had over the years selected and trained participants for 'International Olympiad in Informatics' (IOI), and 'International Collegiate Programming Contest' (ACM-ICPC), among others.

IROST-Iran holds 28th Khwarizmi International Award Ceremony

The award ceremony of the 28th Khwarizmi International Award (KIA) was held by IROST, on March 3, 2015. H.E. Dr. M. Farhadi, Minister of Science, Research and Technology; Dr. Sorena Sattari, Vice President of Science and Technology; Dr. Ahmad Akbari, Vice Minister and President IROST; and Dr. M. Mehdi Zahedi, Head of Education and Research Commission of Iranian Parliament, graced the occasion with their presence. COMSATS is one of the sponsors of KIA.

During his inaugural speech, the Minister noted that over the last three decades, KIA has become an internationally known award, which is reflected with the presence of

international researchers from 47 countries. The Chairman of the 28th KIA, Dr. A. Samimi, in his speech, informed that 594 applications were submitted to the KIA Secretariat. Among these, 351 applications belonged to the National Section and the other 243 to the International Section submitted from 47 countries in different fields of science and technology. He noted that after careful deliberations and detailed evaluation by the KIA Selection Committee, 10 Iranian and 7 foreign researchers (one each from Canada, Japan, France, Chile, Taiwan, and two from Germany) were selected for the Khwarizmi Award.

IROST Researcher briefs the Iranian President on his visit to QMAB, Tehran

Prof. Nasrin Moazami of IROST, a distinguished Iranian biotechnologist had the honour of briefing the Iranian President Mr. Hassan Rouhani on his visit to Qeshm Microalgae Biorefinery (QMAB) in Tehran. The briefing was also attended by the Head of the Supreme Council of Iran's Free Trade, Industrial and Special Economic Zones, Minister of Health and Medical Education, and the Heads of Qeshm Trade-Industrial Free Zone. Prof. Moazami greatly stressed the significance of developing QMAB as the first and largest microalgae biotechnology company in the Middle East.

It is worth mentioning that the technical know-how of biofuel production from microalgae at QMAB was a result of intensive efforts made by Prof. Moazami over the past few years. While citing the relevant global assessment reports, Prof.

Moazami apprised that Iran has the potential to become a leading country in production of bioproducts as the demand for these products continue to grow in the global market.



Distinguished Guests and Khwarizmi Laureates at 28th KIA Anniversary

contd. from page 12 ... 'S&T Indicators of Member State: Nigeria

comprises of over 30% women as Ministers.

Question-8: How is the Government employing South-South Cooperation mechanism in its development agenda and in what areas of S&T is the support of International Community required? What can COMSATS specifically do for the national development of Nigeria?

Nigeria is already collaborating with other countries especially under the auspices D8 and Group of 77 to address

many challenges confronting our societies. Nigeria needs collaboration and assistance from the international community and friends in the areas of defence industry, power generation, preventive medicine, flood control and desertification, among others.

The management of COMSATS should offer Nigerians more scholarships and also partner with other research institutions in Nigeria.

OPINION: ICTs FOR SUSTAINABILITY, CLIMATE ACTION AND DEVELOPMENT

Richard Labelle*

From MDGs to SDGs

In 2000, the international community, under the aegis of the United Nations, agreed that the focus and priorities for development assistance should be captured by the Millennium Development Goals (MDGs). The idea was that everything possible should be done to meet basic human needs. The post-2015 development agenda goes beyond this by recognizing that poverty reduction and meeting basic human needs requires dealing first with urgent planetary and societal issues, and places sustainability at the core of development.

The pressure of growing populations, in general, and middle classes, in particular, is undermining the carrying capacities of ecological systems and contributing to global warming. This and the need to ensure fair and equitable access to energy and natural resources, as well as the benefits of development for all, women especially, are not only linked to poverty but to planetary and thus human well-being, if not its survival.

Under the MDGs, technology and ICTs were incidental. ICTs were to be 'mainstreamed' under other development investments and used specifically to enhance collaboration and partnerships (MDG 8.F). Today technology is at the centre of new approaches and developments because of the recognition of the changing nature of challenges we face, and the dramatic advances in technology, in general, and in digital technology and materials science and nanotechnology, in particular. As a result, two technology groups are especially important for achieving the Sustainable Development Goals (SDGs): ICTs, and cleantech, also known as sustainable technologies. These technology groups complement each other in many ways.

Information and Communications Technologies (ICTs)

ICTs are potent and transformative because they are not only ubiquitous, they are constantly growing in their potential and use. Broadband Internet accelerates economic development^{1,2}, and now reaches nearly all major capitals around the world, including the ones in least developed

countries (LDCs). Mobile communications technologies, including mobile broadband, continue expanding to reach the rest of the world populations. ICTs enhance service delivery in advanced and developing countries in sectors such as, health (e/m-health), education (e/m-education), research, governance, and trade & commerce.

Public and private sectors across the globe recognize that ICTs are transformative. In the pre-MDG era, IT was considered to help reduce costs and increase the efficiency of business processes. The rise in competitive advantage of the USA in the 1980s and 1990s was due to a rapid adoption of IT that relatively increased productivity and corporate efficiency to the detriment of countries and regions that were less rapid adopters. The adoption of ICTs worldwide created competitive advantage even in developing countries³. Today, ICTs are used to do things differently, to improve and help transform businesses⁴, while developing innovative ways to deliver public (e-government) and private-sector services (e-commerce) to all wherever they may be. That was not the case at the turn of the century when the MDGs were agreed.

Analysts today consider 'Cloud Computing' as a tool that allows everyone to access digital resources in the "as a service economy". In the private sector, the importance of data and information is such that technology comprises 40% of the total businesses spend. It is projected that 80% of enterprise's incremental investment will be on digital resources because of the perceived need to ride the digital bandwagon in order to ensure and increase comparative and competitive advantage⁵. It should not come as a surprise that in the matter of development action in the present-day ICTs should occupy a larger place than they did in early 2000.

Better Integrating Environment and Sustainability in Development Planning

Under the SDGs, 'environment', 'energy', and 'inclusion' are some of the key words and new areas of emphasis. The increased concern about global warming has seen one of the major changes since the MDGs were adopted. It is likely to continue as a growing concern according to the Intergovernmental Panel on Climate Change (IPCC), and to

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multilateral institutions, such as the International Energy Agency (IEA).

In terms of environment, ICTs have a major role to play⁶ to help track environmental sustainability. The last 15 years have seen development of more powerful and more readily available microprocessors, memory and storage devices, and arrays, such as solid state drives (SSDs), as well as massively parallel processors integrated and working together in cloud accessible server-farms linked by high bandwidth fiber optic connections. These increasingly ubiquitous facilities rapidly digest large amounts of data, such as digital imagery and very large data sets (big data) required to model and analyze ecological and weather systems, as well as for a variety of other applications. Indeed, application development has become an industry of its own, powering tools that help people, things and places come together in ways that could only be imagined previously. Large server-farms underpin the operations of the Internet, the cloud and social media.

These digital assets along with high-resolution digital imaging and signal processing systems facilitate observing, analyzing and modelling biological, as well as human systems, such as cities. Increasingly, this is being done in real time and can be used for predictive analysis – an essential tool for forecasting, in general, and for disaster early warning (DEW) and disaster risk reduction (DRR), in particular. This data is essential to better understand and mitigate the impacts of growing human populations on communities and on the planet. This is one of the reasons why they will be of key importance in implementing the SDGs.

Smartphones, and especially social media, are transforming the way people and investors contribute to development. Crowdsourcing is rapidly becoming a key way for micro and even larger scale investors to support development initiatives and outcomes, and, conversely, a way to empower innovators, people and communities to help better tailor investments to suit local needs and circumstances.

Nanotechnologies and miniaturization along with innovations in material science have led to creation of embedded devices, including sensors and sensor fields, such as wireless sensor networks (WSNs), that can be deployed anywhere, including in smartphones. It is now increasingly possible to track sounds and images; chemical, physical and logical variables; and people and places, in a way that can help us better understand the state of people and places, and by extension, the natural and human environments often in real time. Dashboard type softwares, such as Supervisory Control And Data Acquisition (SCADA), provide system-wide control and allow the integration of the devices and data for visualization and rapid analysis and decision-making. Smart transportation systems integrate

smartphones and data from motorists, public transit vehicles, and embedded devices along roadways, to dynamically plot best route scenarios in real time to alleviate traffic congestion in cities.

WSNs can remotely monitor forest fires and report their occurrence very rapidly. Also these can help monitor soil stability, seismic activity, riverbank erosion, air and water-flow and quality, flood conditions; help monitor and prevent damage due to landslides; and provide distant early warning about downstream flooding events or disasters.

In a built environment, smart embedded microprocessors monitor and control production-lines automatically and manage building energy systems without the need for human intervention. Machine to machine (M2M) communications and the broader concept of the Internet of Things (IoT) will help to plan and monitor the production, transportation and use of energy and water in fashions that will optimize their use, limit waste, and enhance energy and water conservation. Smart technologies, such as WSNs and the IoT are now a growing part of a broad range of sustainable management system that will be increasingly called upon to achieve the SDGs⁷.

Promoting Greater Inclusion

The advent of ICTs and especially of inexpensive mobile phones and mobile services, such as Short Message Service (SMS), have helped usher in a new era of inclusiveness by opening up opportunities in all sectors of the economy and at all levels of society in the developing world. The popular M-Pesa⁸ (mobile money application) developed by M/s Safaricom in Kenya, with the assistance of the national telecommunications regulator, is a far reaching initiative that has allowed greater access to financial services for Kenyans, while helping to monetize the economy by increasing liquidity and helping people and businesses put money to better use.

With the expansion of mobile money and of variants, such as 'PAYGO' financing, the developing world is experimenting with creative financing mechanisms that "allow the poorest consumers to maximize their purchasing power and begin building credit history"⁹. Similar applications are helping to enhance health and education service delivery, as well as knowledge sharing and learning. E-commerce in general and m-commerce in particular are enhancing access to markets, and increasing the effectiveness of aid delivery. ICTs facilitate the inclusion of developing countries in the international trade and financial systems, and help markets operate more efficiently.

The use of mobile phone enabled data acquisition and analysis applications, such as Akvo-FLOW and m-Water in parts of Africa. For instance, Liberia¹⁰ is making piped water

infrastructure more manageable and valuable. Data from these applications makes evidence-based development funding, also known as 'payment by results' easier, and completely changes the way monitoring and evaluation is undertaken.

Smart Tech for Sustainable Development

The transition to sustainability and low emission development is a major objective of the SDGs and a significant business opportunity. The technology and management practices required for this have been valued at USD 2.5 trillion in sales in 2012, with the potential of growing to USD 5 trillion by 2020¹¹.

Of greatest promise are technologies that can help reduce energy consumption and greenhouse gas emissions by promoting greater energy efficiency and by replacing fossil fuels with low carbon sources of energy. ICTs will play a key role in ensuring this transition and for getting the most out of energy efficiency. Smart energy technologies, including the 'Internet of Energy', also known as the smart grid along with smart buildings, smart logistics, smart machines and motors, smart transport technologies, electric vehicles and smart energy storage, are all technologies that will greatly enhance energy efficiency, reduce energy use and limit greenhouse gas emissions by allowing better and more transparent operation and management of energy flows and markets.

Solar and wind technologies will continue to increase in efficiency while costs continue to fall. Electricity produced from solar and wind is expected to be competitive with fossil-fuel generated electricity in the near future and already is so in locations that rely on diesel generators, as well as a few others where the price of electricity is high. The integration of variable energy sources with existing electrical energy infrastructure, such as solar and wind, will be made possible by ICTs through technologies like the smart grid.

Design for sustainability is getting easier and more cost advantageous as a result of the greater use of technologies such as building information modeling (BIM) that are used for designing climate and energy-smart buildings and infrastructures. The promise of technology and of digitization will continue for many years to come. One should expect a much greater role for renewables, especially for solar photovoltaic (PV) technologies. Like ICTs, solar PV is a technology not a resource. With falling solar panel prices and increasingly efficient solar panels, further gains and improvements in the use of solar power are expected. Solar and wind could become, in the near future, dominant sources of energy, and ICTs will make these even more accessible to all¹².

The promise of technology is not all positive. Cyber threats

and the potential for machines displacing humans in the workforce and otherwise are issues. The private sector is observing now how increased levels of automation introduced by the widespread adoption of cloud computing and the "as a service economy" are opening the door to the replacement of knowledge workers with microprocessors, while offering advantageous cost reductions for the global corporations involved. Even Bill Gates has raised concerns about the negative aspects of increasing digitization while others mention the threat of artificial intelligence and the "Rise of the Machines".

ICTs and other technologies will continue to have a major and increasing role to play in delivering the promise of the SDGs.

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SCIENCE, TECHNOLOGY AND DEVELOPMENT

Prototype of Low-cost X-ray Machine Unveiled

Despite being essential for diagnostics in road side accidents, as well as the treatment of tuberculosis, X-ray imaging remains a luxury for almost two-thirds of the world's population. Hospitals in the developing world mostly rely on donated imaging equipment that have either reached expiry or broken down, which remain mostly useless as a very few countries have the capacity to repair X-ray diagnostic machines.

To address these issues researchers in Switzerland have developed a prototype low-cost X-ray machine designed for hospitals in developing countries (*SciDev.Net*, April 17, 2015). Developed at the Federal Institute of Technology in Lausanne (EPFL), the device, known as *GlobalDiagnostiX*, is expected to cost around US\$ 50,000. This price also covers 10-year maintenance cost, making it around ten times cheaper than conventional X-ray machines over a decade of use.

The team of researchers managed to lower the machine's lifetime cost by using digital photography, instead of the images being printed and then illuminated. By doing this, the costs of developing images have been taken out of the equation, which are becoming increasingly expensive as developed countries are abandoning this technology in favour of digital X-ray systems.

Tesla's Low Cost Batteries

On April 28, 2015, a tweet from Elon Musk, Founder of Tesla Motors, an American automotive and energy storage company, started a buzz around the world in anticipation of the company's new venture into home batteries and cleantech solutions. The new Tesla batteries, also known as Powerwall home, come in two capacities of seven and ten kilowatt hours (kWh), but the differences extend beyond capacity to the chemistry of the batteries. The 7 kWh version is made for daily use, while its extended module is intended to be used as occasional backup only.

The company plans to open source its patents for the entire range of batteries. According to the company, Tesla Powerwall is a rechargeable lithium-ion battery designed to store energy at a residential level for load shifting, backup power and self-consumption of solar power. The battery consists of lithium-ion battery pack, liquid thermal control system and software that receive dispatch commands from a solar inverter. The unit mounts seamlessly on a wall and is integrated with the local grid to harness excess power and give customers the flexibility to draw energy from their own reserve.

If this innovation takes off, the cost of storing electricity by individual companies or households could dramatically be reduced.

Innovative Out-of-the-lab Immune Therapy Developed

Immunoglobulins form the first line of defense, by binding themselves to bacteria and viruses in the blood, and are involved in treating infectious diseases, such as Ebola. Doses of such antibodies can be prepared in sophisticated laboratories. The current procedure in the labs requires blood plasma donations from around 30,000 people to produce economically viable amounts of antibodies. A new method may enable more patients with primary immunodeficiencies (PID) to get the regular antibody doses they require (*SciDev.Net*, March 9, 2015).

The method developed by Thierry Burnouf from the Graduate Institute of Biomedical Materials and Tissue Engineering at Taipei Medical University, Taiwan, needs only a centrifuge, some disposable equipment, such as blood bags and filters, and around 20 plasma donations to produce economically viable amounts of immunoglobulins. A description of the method appeared in *PLOS Neglected Tropical Diseases*.

The new process can be used outside the lab as pooled plasma donations undergo two phases of separation. In the first, the frozen plasma is thawed and centrifuged while still in its original bag to maintain a sterile environment. The leftover blood constituents can be used to treat haemophiliac patients, among others. This cheap and simple way to obtain the IgG, which is the main type of disease-suppressing antibody, could help save the lives of patients in developing countries with malfunctioning immune systems.

Shop-based Malaria Kit enables Rational Drug Use

In developing countries, people often seek advice of shopkeepers at pharmacies to treat fevers, perceiving their association with malaria, due to the endemic nature of the disease. However due to the unavailability of malaria testing kits, this practice often leads to unnecessary medicine intake. Since other diseases also cause fever, this practice is creating a burden on availability of Artemisinin combinations, which are now the front-line treatment for malaria. In a medical trial, reported by *SciDev.Net* on March 17, 2015, Ugandan shopkeepers were trained to use subsidized malaria testing kits in order to reduce the misuse of anti-malarial medicine.

The study published in the Bulletin of the WHO, took place at 79 villages in Uganda. According to the report, researchers trained pharmacy staff in these villages for using malaria diagnostic kits and offered them these kits at subsidized rates. According to the results, the number of rapid diagnostic tests doubled due to availability of kits at the local pharmacies from about 9 % to 17.5 %.

PROFILE OF HEAD OF COMSATS' S&T CENTRE OF EXCELLENCE

DR. WIDAD HASSAN ABDEL HALIM HASSAN, DIRECTOR GENERAL – IRCC, SUDAN

Dr. Widad Hassan is the Director General of Industrial Research and Consultancy Centre (IRCC), Sudan, since July 2014. IRCC was inducted into COMSATS Network of International S&T Centres of Excellence in 2008.

Dr. Widad attained her higher education from University of Khartoum, Sudan. In 1985, she did her B.Sc. in Chemistry from the University's Faculty of Education. In 1992, she completed her Master level studies in Biochemistry and Food Technology from the Faculty of Agriculture. Later in 2006, she was awarded a Ph.D in the same discipline from the University of Khartoum.



She has served academia in various positions; at the Department of Biochemistry, Faculty of Science, Islamic University, as a visiting lecturer (1995-1998), and at IRCC, earlier as Researcher (1998-2006) and Assistant Professor, and now as Associate Professor. She has also served as the Registrar of the Coordination Council for Engineering Research and Industrial Technology at the Sudan Academy of Sciences (SAS) from December 2011 to July 2014, and subsequently as Chairperson of the Council and Director General IRCC.

Dr. Widad has research interests in food technology, food fortification, and malnutrition related rehabilitation. Her ongoing research projects include: ready-to-use food from local material designed for nutritional rehabilitation of

malnourished children; food-to-food fortification for combating malnutrition; enhancement of bread using sour-dough; and combating malnutrition in school-going children using high-energy biscuits made from locally available ingredients. She has also participated in a joint international collaborative research project with Prof. Won Mukhtar on 'Ethanol Production from Sorghum Straw' at the Universiti Kebangsaan Malaysia (UKM), Malaysia. As an academician, she has also been supervising post-graduate students.

She has broad experience in Integrated Hazardous Waste Management and Sustainable Industrial Resources Management, and has prepared several feasibility studies for the national industrial sector of Sudan and United Nations Industrial Development Organization (UNIDO).

She has the distinction of launching the initiative for the establishment of National Cleaner Production Center. Dr. Widad provided leadership for the 'Capacity-Building Programme for Nanotechnology' and also served as a member of the 'Preparatory Committee for the Establishment of the Sudanese Nanotechnology Network'. In addition, she has been affiliated with the Ministry of Health, Government of Sudan, as a consultant for 'Food Fortification and Supplementation, Malnutrition and School Feeding Programme'.

She has organized and presented at several regional and international workshops/conferences, and has two international publications to her credit.

Dr. Widad has been a member of several scientific forums including: the Research Council of IRCC; Scientific Committee of the Coordination Council for Engineering, Research & Industrial Technology, SAS; and Central Examination Committee of SAS. She is also a Focal point of Scientific Industry Partnership for Sayga Investment Company, Sudan.

She has also been serving as a member to the Joint Technical Sub-committee for Food Fortification Programme; the Joint Technical Sub-committee for Preparing and Writing National Nutrition Policy Brief 1 and 2; and the Technical Higher Council of the Nationalization of the Engineering Industry.

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IRCC IN BRIEF

Industrial Research and Consultancy Centre (IRCC), Sudan, was established in 1965 with the assistance of the United Nations Industrial Development Organization (UNIDO).

The Centre was established with a vision to become an institution that is competent, confident & innovative in harnessing, utilizing and advancing industrial Research & Development. Its mission statement reads as: "Contribute to the National Economy through Sustainable Development of the Sudanese Industry". The Centre is considered as the main advisor to the public and private industrial sector of Sudan.

The Centre conducts R&D and training through its six departments, focused on food, leather, chemical, economy, I.T, and engineering sectors. Moreover, it has laboratories entrusted with specific functions that include:

- i) quality assurance of the food industry,
- ii) chemical analyses of different materials,
- iii) testing of ceramic and building materials, and
- iv) testing of leather and leather goods

COMSATS' BRIEF AND ANNOUNCEMENTS

Selected Forthcoming Scientific Events in COMSATS' Countries

16-19 July 2015	12 th IEEE International Conference on Electronic Measurement & Instruments, Qingdao, China (www.icemi.cn)
24-25 July 2015	International Conference on Education and Distance Learning, Colombo, Sri Lanka (conference.serendivus.com/index.php/main/loadEducationAndDistanceLearning)
3-15 August 2015	40 th International Nathiagali Summer College on Physics and Contemporary Needs, Nathiagali, Pakistan (www.ncp.edu.pk/insc/insc-new.php)
19-20 August 2015	7 th South Asian International Conference (SAICON), Islamabad, Pakistan (ww2.comsats.edu.pk/saicon2015/)

International Conference on 'Agriculture, Food Security and Biotechnology', 8-9 June 2015, Cairo, Egypt

A two-day International Conference on 'Agriculture, Food Security and Biotechnology' is being organized by COMSATS, in collaboration with the Islamic Educational Scientific and Cultural Organization (ISESCO), and COMSATS' Centre of Excellence in Egypt, National Research Centre (NRC), on 8th-9th June 2015, in Cairo, Egypt. The event would aim to provide an interdisciplinary forum to the academicians, scientists and researchers to deliberate upon the emerging trends and issues related to the theme of the event.

For more information, please visit www.comsats.org, or write to Advisor (Programmes), COMSATS Secretariat (husseint@comsats.net.pk)

Prizes and Fellowship Announcements from TWAS (www.twas.org)

- Atta-ur-Rahman Prize in Chemistry (Deadline: 15 July 2015)
- TWAS-ICCBS Postgraduate Fellowship Programme in Structural, Cell and Molecular Biology; Biological Systems and Organisms; Chemical Sciences (Deadline: 31 August 2015)
- TWAS-CIIT Postgraduate Fellowship Programme in Structural, Cell and Molecular Biology; Biological Systems and Organisms; Chemical Sciences Engineering Sciences; Mathematical Sciences; and Physics (Deadline: 31 August 2015)
- TWAS Prizes for Young Scientists in Developing Countries (Deadline: 31 July 2015)

Call for Papers

COMSATS invites scholarly contribution for Volume 21(1) of its bi-annual journal Science Vision, which aims at highlighting the important scientific and technological developments that have a bearing on socio-economic conditions of the people.

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

Last date for submission of papers/articles: June 15th 2015.



A BRIEF ON COMSATS

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

COMSATS, currently, has 21 developing countries as its members, spread across three continents, i.e., Latin America, Africa and Asia. A network, of 19 International S&T Centres of Excellence, is also affiliated with COMSATS to contribute to scientific development of its 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. For detailed information, please visit COMSATS' website: www.comsats.org.

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