



COMSATS Newsletter

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

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*Participants of the 20th Meeting of COMSATS Coordinating Council
National Research Centre, Cairo, Egypt (14-15 May 2017)*

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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

The globe, the North and the South alike, is under a constant transition in a number of ways. The current changes in the leadership in the West and apparently shifting influence provides an interesting insight into the developed nations' commitment to important global issues. For example, while the US' opting out of the Paris Agreement on Climate Change alarmed the world, the unity and renewed commitment from other world leaders has been reassuring with regard to global environmental concerns. Such is the power and sense of security in international cooperation.

The role of international state-level cooperation is therefore undeniable. They provide for nations of various political, religious and economic backgrounds the necessary platforms to deliberate in conducive environment and reach agreements on important issues with due consideration towards interests of all. Moreover, they also serve as a sanctuary for ideas of greater good that would most likely die in isolation without creating an impact.

COMSATS realizes the importance of cooperation among nations based on common challenges and their S&T-based solutions. The organization creates a focused group of countries driven by the potential of South-South cooperation as a means to bridge the developmental gap between the North and the South.

With S&T at the core of its operational strategy, the organization stands firm with support of 24 Member States and has a combined scientific and technical strength of 21 scientific institutions in different Member and non-member States. The Heads of these organizations and institutions, working under the patronage of their governments, are a part of COMSATS' most active and dynamic statutory body, the Coordinating Council. This year's annual meeting of the Coordinating Council (20th) was held in the land of the Pyramids, at a very hospitable Centre of Excellence of COMSATS, the National Research Center (NRC). I would like to thank the Chairman Coordinating Council, Dr. Ashraf Shaalan (President NRC) and all the participants of the meeting for keeping the tradition of fruitful deliberations and real-time South-South Cooperation alive. Their intellectual inputs made my responsibilities as the Secretary to the Council an absolute pleasure. The inner pages (05-09) of the issue would provide a slightly comprehensive view at the meeting deliberations.

I take this opportunity to thank the distinguished visitors of COMSATS Secretariat, especially the Federal Minister for S&T, Pakistan, and the foreign missions in Islamabad who hosted COMSATS' officials visits during the reporting period. With a commitment to the organization's mandate, I welcome feedback from all stakeholders of COMSATS.

NEWS/ACTIVITIES/HIGHLIGHTS FROM COMSATS SECRETARIAT

Minister for S&T, Government of Pakistan, Visits COMSATS Secretariat

The Minister for Science and Technology, Government of Pakistan, H.E. Rana Tanveer Hussain, visited COMSATS Secretariat, on June 21, 2017. The Minister heads COMSATS' Focal Ministry in Pakistan, and has been supportive to COMSATS' programmes since assuming charge.

Speaking to the officials of COMSATS in a meeting later, Mr. Tanveer Hussain expressed support to COMSATS' operations and efforts to expand the organization's membership. The Minister recalled his efforts in the recent years to increase the allocated budget for S&T and R&D. He considered it important for the relevant institutions to make more efforts and execute effective projects of applied nature that would have a positive effect on development. He considered it important to effectively engage the private sector for a more coherent and inclusive approach towards development and have more research centres in Universities.

Officials of COMSATS Secretariat hold Meetings in Ghana

A three-member delegation of COMSATS headed by Ambassador Fauzia Nasreen visited Accra, Ghana from 21st to 24th May 2017. Ms. Fauzia was accompanied by two other officials of COMSATS', Mr. Nisar Ahmad and Mr. Basit Rehman. The purpose of the visit was to strengthen relations with the country hosting the Chair of COMSATS through interactions with its partner institutions in the country. In this regard, meetings were held at COMSATS' focal ministry in Ghana, the Ministry for Environment, Science, Technology and Innovation (MESTI) and Centre of Excellence, the Council for Scientific and Industrial Research (CSIR).

On 22nd and 24th May 2017, discussions were held at CSIR with its Director-General, Dr. Victor Agyeman, on scientific activities that COMSATS intends to hold in collaboration with CSIR in the near future. A meeting was held with Prof. Kwabena Frimpong Baoteng, Hon. Minister for Environment, Science, Technology and Innovation in his office on May 23, 2017. The Minister was apprised about the activities of COMSATS and its future plans. The likelihood and arrangement of a meeting between the Chairperson

of COMSATS, the Hon. President of Ghana, Hon. Nana Addo Dankwa Akufo-Addo, and the Executive Director COMSATS was also discussed. The delegation also met the Chief Director of the Ministry of Foreign Affairs, Dr. Yankey in order to brief him about COMSATS and its multi-layer relationship with Ghana.

The delegation also visited other institutions in Ghana, including the Water Research Institute, Food Research Organization, Policy Research Institute, and Ghana Atomic Energy Commission in order to get better insights into Ghana's scientific and research infrastructure.

COMSATS' Liaison Officer from TUBITAK MAM, Turkey, Visits COMSATS Secretariat

On May 29, 2017, the Vice President of TUBITAK Marmara Research Centre (MAM), Dr. Murat MAKARACI, visited COMSATS Headquarters, Islamabad, and discussed avenues for strengthening cooperation between COMSATS and MAM. The meeting at COMSATS Secretariat was attended by senior officials of COMSATS, including Advisor (Programmes), Mr. Tajammul Hussain; Deputy Director (Systems), Mr. Nisar Ahmed, and Sr. Assistant Directors, Mr. Farhan Ansari, and Ms. Huma Balouch.

During the meeting, the two sides discussed ways to enhance cooperation between COMSATS and TUBITAK MAM in the areas of common interest, particularly in the field of Cyber Security. Dr. Murat informed that the agenda of scholarship programme customized for PhD and Postdoc for students from COMSATS' member countries will be presented for approval in the upcoming meeting of TUBITAK Board of Directors to be held in July 2017. Further, he also informed that agenda for secondment from TUBITAK MAM at COMSATS Secretariat and consideration of payment of



H.E. Rana Tanveer Hussain with COMSATS' Officials

Annual Membership Contribution to COMSATS Secretariat for operational expenses will also be presented to the Board.

After the meeting, Dr. Murat met Mr. Jamshed Masood, Chief Executive Officer, COMSATS Internet Services at CIS Technology Park.



COMSATS' Liaison Officer from TUBITAK MAM meeting with Officials from COMSATS Secretariat

First Secretary, Chinese Embassy in Islamabad, Visits COMSATS Secretariat

Mr. Jia Wei, First Secretary (S&T), Embassy of China in Islamabad, visited COMSATS Headquarters on 12th June 2017, and held a meeting with Dr. S. M. Junaid Zaidi, Executive Director COMSATS. Mr. Tajammul Hussain, Advisor (Programmes) and Mr. Farhan Ansari, Sr. Assistant Director (Programmes) also attended the meeting.

During the meeting, the Executive Director praised the Chinese R&D organizations and universities for their excellent research activities and achievements. The officials of the two organizations discussed avenues of COMSATS' collaboration with R&D organizations working under the Chinese Ministry of Science and Technology (MoST) as well as the Chinese Academy of Sciences (CAS). The potential areas of collaboration that were identified included: setting-up of joint laboratories and establishment of an S&T Park in Pakistan. The Executive Director also requested the Chinese Embassy to arrange a brief meeting with the honourable Minister for Science and Technology, Government of China, in near future.

Links with Tunisian Embassy Strengthened

On June 15, 2017, a meeting was held between the Executive Director COMSATS and the Ambassador of the Republic of Tunisia to Pakistan, H. E. Mr. Adel Elarbi at the

Embassy of Tunisia, Islamabad. Mr. Tajammul Hussain, Advisor (Programmes) was among the senior officials accompanying Dr. Zaidi. H.E. Mr. Elarbi and Dr. Zaidi shared similar views on developing further cooperation and partnerships between COMSATS and Tunisia, particularly for boosting academic cooperation between Tunisian S&T institutions and COMSATS' COEs. The matters discussed during the meeting included a proposal for establishing R&D Centre in Tunisia, financial cooperation, faculty and student exchange, and cooperation for establishing technology parks.

The Executive Director apprised the Tunisian Ambassador about the post-graduate and doctoral scholarships, and post-doctoral fellowships offered at COMSATS' Centres of Excellence in China, Pakistan, Iran, and Bangladesh. He sought the support of Tunisian Ambassador for inviting the international students of Tunisia for short-term student exchange at two Centres of Excellence of COMSATS in Pakistan, CIIT and ICCBS. During the meeting, Dr. Zaidi also proposed the establishment of COMSATS-Tunisian R&D Centre in Tunisia that could cater to the relevant needs of Tunisia and assured him of every possible technical and financial support from COMSATS.

The honourable Ambassador extended gratitude for COMSATS' proposal to bring the academic communities of Pakistan and Tunisia closer, and share experiences and good practices relating to training and research. His Excellency informed that strong political will already exists in Tunisia for purposeful international cooperation and urged COMSATS to maintain high-level engagements with the country.

Meeting with Jordanian Ambassador in Islamabad

On June 14, 2017, the Executive Director COMSATS visited the Jordanian Embassy, Islamabad, Pakistan, in order to hold a meeting with the Ambassador of Jordan to Pakistan, H. E. Nawaf Khalifa Ibrahim Saraireh. The COMSATS' delegation comprised of senior officials including Advisor Programmes, Mr. Tajammul Hussain; Mr. Laeeq H. Jaswal, Manager (Strategic Partnerships); and Mr. Shahzad Ahmad. The Ambassador was assisted by his colleagues at the Embassy, Mr. Falah al Ghafari, Deputy Head of Mission; and Mr. Abdul Aziz, Cultural Attaché.

During the meeting, Dr. Zaidi expressed COMSATS' desire to have better working relationship with Jordanian institutions in order to carry out a large number of events and capacity-building activities in Jordan. His Excellency was requested to write to the Secretary General, Higher Council for Science and Technology, Jordan, Dr. Khaled

Eishuraydeh, to seek his help in identifying the country's national priorities for possible collaborations with COMSATS. It was further informed that a few the Centres of Excellence of COMSATS, including the CIIT and ICCBS, Pakistan, offer several scholarships to the students from Member States, and Jordanian students should take full benefit from these. The possibilities regarding Jordanian students' admission in other institutions of Pakistan were also discussed and it was assured that COMSATS will provide all possible facilitation in this regard.

Appreciating the support of the President of Royal Scientific Society, HRH Princess Sumaya, towards COMSATS' undertakings pertaining to Jordan, both Dr. Zaidi and Mr. Hussain expressed a strong desire to have Her Highness as a Chief Guest at CIIT's upcoming convocation (Oct. 2017).

Executive Director COMSATS calls upon the Ambassador of Sudan to Pakistan

On 19th June 2017, a delegation from COMSATS headed by Executive Director COMSATS, Dr. Junaid Zaidi, visited the Embassy of the Republic of Sudan in order to hold a meeting with the Ambassador of Sudan to Pakistan, H.E. Mr. Tageldin Elhadi Eltahir. Dr. Zaidi was accompanied by Mr. Tajammul Hussain (Advisor Programmes); Mr. Laeeq H. Jaswal (Manager Strategic Partnerships); and Mr. Shahzad Ahmed (Manager at CIIT's International Office). Also present during the meeting was the First Secretary Ms. Ebtihal Mohammed Osman Bashir.

The Executive Director expressed his desire to further strengthen COMSATS' working relations with Sudan. He mentioned the active participation of the Industrial Research and Consultancy Centre (IRCC), Sudan, in COMSATS' programmes. He also appreciated the Annual Membership Contribution made by Sudan on regular basis. Dr. Zaidi expressed COMSATS' desire to replicate the institution building success in the form of CIIT in Sudan by establishing a university under the umbrella of COMSATS. Dr. Zaidi also invited the Sudanese Professors to visit Pakistan and share their best practices and carry out research in CIIT, to which His Highness showed keen interest. Dr. Zaidi also apprised the Ambassador about the scholarship offers from COMSATS' Centres of Excellence.

Meeting at the Malaysian High Commission in Islamabad

On 19th June 2017, the Executive Director COMSATS, Dr. S. M. Junaid Zaidi, with other officials of COMSATS called on Dato' Dr. Hasrul Sani Mujtabar, High Commissioner of Malaysia to Pakistan, at his office in Islamabad. Other officials from COMSATS were Ambassador (R) Fauzia

Nasreen, Advisor to the Executive Director in International Relations; Mr. Laeeq Jaswal, Manager Strategic Partnerships; and Mr. Shahzad Ahmed, Manager International Relations. Also present during the meeting were Sy. Nauzer IDID Dato' SY. Yossoff IDID, First Secretary/HOC; and Incharge Education Programmes at High Commission of Malaysia. The meeting was primarily held to follow up the matter of Malaysia's membership to COMSATS. Also discussed were issues such as establishing a ministerial Focal Point in Malaysia, nomination of a suitable Malaysian institution to become the organization's Centre of Excellence.

Briefing the High Commissioner, Dr. Zaidi highlighted the benefits of joining COMSATS as Member State and affiliating a Malaysian institution with COMSATS' Network, based on which he requested the High Commission to continue to pursue the matter of Malaysia's accession to COMSATS. He further informed the High Commissioner about the Annual Membership Contribution, which is kept in separate account as a trust fund for activities related to the contributing country. It was also mentioned that the Secretariat operations are financially supported by the Government of Pakistan. The High Commissioner affirmed all possible support of the High Commission of Malaysia towards COMSATS. He also pledged to facilitate meetings of COMSATS' delegation with officials of relevant Government departments in Malaysia. His Excellency praised the Executive Director's efforts for consolidating ties between the universities of Malaysia and Pakistan.

COMSATS Signs MoU with Institute of Peace and Diplomatic Studies

COMSATS signed an MoU with the Institute of Peace and Diplomatic Studies (IPD), Islamabad, Pakistan. The signing ceremony was held at COMSATS Headquarters, Islamabad on 22nd June 2017. Based on the understanding reached, COMSATS and IPD will work together to enhance cooperation in the following areas of common interests:

- Exchange of Expertise and Intellectual Resources;
- Capacity Building in various fields of Sustainable Development;
- Promoting Programmes and Activities;
- Policy Advice and Strategy Formulation;
- Any other areas deemed appropriate with mutual consultation.

On COMSATS' behalf, Mr. Bilal Chouhan, Director (A&E), signed the MoU while the signatory from IPD was its Director, Muhammad Asif Noor. The signing was witnessed by the Executive Director COMSATS and President IPD, Mrs. Farhat Asif.

SPECIAL SECTION: 20TH MEETING OF THE COORDINATING COUNCIL, CAIRO, EGYPT

COMSATS organizational structure was designed to suitably serve all its objectives. While South-South cooperation is at the core of the whole operational strategy and hence a crucial part of the activity of all the statutory bodies of COMSATS, the technical aspect of such cooperation under the organization's umbrella is most apparent in the deliberations of its Coordinating Council. That is mainly due to the scientist-level interaction and the frequency of these meetings that take place annually.

The 20th Meeting of COMSATS Coordinating Council was held on 14-15 May 2017, in Cairo, Egypt, hosted by COMSATS' Centre of Excellence in Egypt, the National Research Centre (NRC). The meeting was attended by the Council members or their representatives from 14 Centres of Excellence of COMSATS: BCSIR-Bangladesh, ICCES-China, NRC-Egypt, CSIR-Ghana, KazNU-Kazakhstan, NMC-Nigeria, ICCBS-Pakistan, CIIT-Pakistan, ITI-Sri Lanka, IRCC-Sudan, UCAD-Senegal, TIRDO-Tanzania, CERTE-Tunisia and TUBITAK MAM-Turkey, as well as the honorary life-time member of the Council, Prof. M.H.A. Hassan, Executive Director TWAS. The representative of UNESCO also attended the meeting as observer. Moreover, the meeting was attended by a two-member delegation of the Al-Quds University (Palestine) led by its President, in connection with the university's request for induction in COMSATS' Network of International S&T Centres of Excellence.

Inauguration

The meeting was inaugurated on 14th May 2017, by H.E. Prof. Khaled Kassem, Senior Assistant Minister for Strategic Plans and Supporting Systems, Ministry of Higher Education and Scientific Research, Arab Republic of Egypt. In addition to the senior officials of NRC and COMSATS, the ceremony was attended by the senior officials of the

diplomatic missions of Jordan, Pakistan and Kazakhstan in Cairo; as well as universities, R&D institutions, ministries and government departments of the country.

In his inaugural address, H.E. Prof. Khaled Kassem stressed the need for determining research priorities and strategizing accordingly to fulfill their national developmental needs, especially in view of the limited financial resources available with the developing countries. Appreciating the ongoing programmes and activities of COMSATS, he urged the organization to continue providing opportunities of exchange of human and technological resources among the developing countries.

COMSATS is an effective platform for facilitating networking and scientific collaborations among the developing countries.

H.E. Prof. Khaled Kassem, Senior Assistant Minister for Strategic Plans and Supporting Systems, Ministry of Higher Education and Scientific Research, Egypt

Our global competitiveness depends on our ability to create, develop and make practical use of new scientific discoveries. In brief: our capacity to innovate... innovation is at the heart of our ability to find solutions that are economically, socially, and environmentally sustainable.

**Prof. Dr. Ashraf Shaalan
Chairperson COMSATS Coordinating Council**

Earlier, in his speech, Prof. Dr. Ashraf Shaalan, President NRC, Egypt, Chairperson COMSATS Coordinating Council, welcomed the participants and congratulated Dr. S. M. Junaid Zaidi on his appointment as the Executive Director COMSATS. He expressed pleasure on hosting this year's





A Technical Session of the Council Meeting in progress

Council meeting, which makes NRC the only Centre of Excellence to have hosted three Council meetings. He hoped that the Council meeting shall be successful in enhancing the scientific collaborations among the Centres for jointly addressing the afore-mentioned challenges.

Speaking on the occasion, Dr. Zaidi expressed gratitude towards the National Research Centre for generous hospitality and excellent arrangements for the meeting. He thanked the honourable Senior Assistant Minister for gracing the ceremony with his presence, which is indicative of the Government of Egypt's solidarity with COMSATS. He considered the Coordinating Council "COMSATS' functional arm" that enables it with "an effective mechanism of South-South Cooperation and scientist-to-scientist level interactions". Dr. Zaidi also announced that the Turkish Parliament has endorsed the ratification of the Accession Agreement to join COMSATS.

Adequate investment for capacity building of scientific human resources is of paramount importance. The developing countries must also pay attention to devising effective national policies and action plans for development of adequate infrastructure and facilities for productive research and development.

Dr. S. M. Junaid Zaidi, Executive Director COMSATS

Prof. Mahmoud Sakr, President of the Academy of Scientific Research and Technology (ASRT), Egypt, stated that COMSATS is an excellent platform for internationalization of research efforts being made by Member States/Centres of Excellence. He expressed interest in having collaborations between ASRT and COMSATS in capacity-building and joint research projects.

Technical Deliberations

The technical sessions of the two-day meeting were chaired by Prof. Shaalan. The meeting deliberated on a 13-point agenda. Under one of the agenda items, the Advisor (Programmes) COMSATS presented COMSATS' Annual Activity Report (May 2016 – April 2017), while the Executive Director presented the future plans of the organization. Moreover, the heads/representatives of the Centres of Excellence made presentations on the scientific activities of their respective Centres during the period since the last Council meeting, in order to identify areas of potential cooperation among the Council members. The Advisor (Programmes) COMSATS also briefed the Council about the implementation status of the decisions taken by the Council in its previous meeting, while Director (Finance and Accounts) presented the administrative and financial matters of COMSATS. The Council expressed satisfaction on the annual activity report (2016-17), future plans, and



administrative and financial affairs of COMSATS.

During the meeting, the Coordinating Council accorded unanimous approval on induction of Al-Quds University, Palestine, in COMSATS' Network as its 21st member, in light of the formal application received from the university as well as the detailed presentation by the President of the university. During another agenda-item, progress reports of the International Thematic Research Groups (ITRGs) on 'Climate Change and Environmental Protection', 'Information and Communication Technologies', 'Natural Products Sciences', 'Mathematical Modeling' and 'Agriculture, Food Security and Biotechnology' were presented to the Council by the Group Leaders/representatives of the Lead Centres.

During an agenda-item regarding the discussion on the possible offer of five post-doctoral fellowships by each Centre of Excellence to COMSATS' Member States, ICCBS-Pakistan and CIIT-Pakistan, offered 10 post-doctoral fellowships each, while NRC-Egypt offered 5 fellowships to COMSATS Member States. Other Centres of Excellence also expressed willingness to offer such fellowships to COMSATS Member States, and agreed to send the details to COMSATS Headquarters along with the terms and conditions soon after the meeting.

Discussion on the completion of three-year tenures of the members of COMSATS' Technical Advisory Committee (TAC) led to a pledge of 2-3 nominations from the Centres of Excellence of renowned scientists/experts in their countries.

It was agreed that COMSATS' ministerial Consultative Committee shall be activated to hold regular meetings at appropriate level, and their agenda shall be prepared in consultation with the Coordinating Council. The Executive Director shed light on the need of strengthening the existing Centres of Excellence with adequate human and technological resources, as well as inducting new state-of-the-art Centres in the Network. It was recommended that following the success of the establishment of CIIT-Pakistan, COMSATS may establish a few new Centres of Excellence in interested Member States.

Participants of the 20th Coordinating Council Meeting, Cairo, Egypt

- Prof. Dr. Ashraf Shaalan, National Research Centre (NRC), Egypt (Chairperson)
- Dr. S. M. Junaid Zaidi, Executive Director COMSATS (Secretary to the Council)
- Dr. Md. Sarwar Jahan, Bangladesh Council of Scientific and Industrial Research (BCSIR), Bangladesh
- Prof. Lin Zhaohui, International Center for Climate and Environment Sciences (ICCES), China
- Ms. Wencheng Chen, International Center for Climate and Environment Sciences (ICCES), China
- Prof. Hosam El-Sayed, National Research Centre, Egypt
- Prof. Dr. Victor Kwame Agyeman, Council for Scientific and Industrial Research (CSIR), Ghana
- Dr. Eugene Atiemo, Council for Scientific and Industrial Research (CSIR), Ghana
- Prof. Tlekkabul Ramazanov, Al-Farabi Kazakh National University (KazNU), Kazakhstan
- Prof. Ejugwu Stephen Onah, National Mathematical Centre (NMC), Nigeria
- Prof. Dr. M. Iqbal Choudhary, International Center for Chemical and Biological Sciences (ICCBS), Pakistan
- Prof. Dr. Farzana Shaheen, International Center for Chemical and Biological Sciences (ICCBS), Pakistan
- Prof. Dr. Raheel Qamar, COMSATS Institute of Information Technology (CIIT), Pakistan.
- Prof. Izhar Hussain, COMSATS Institute of Information Technology (CIIT), Pakistan
- Prof. Dr. Imad F. S. Abukishek, Al-Quds University, Palestine
- Prof. Dr. Radwan F. H. Qasrawi, Al-Quds University, Palestine
- Dr. Sirimal Premakumara Galbada Arachchige, Industrial Technology Institute (ITI), Sri Lanka
- Dr. Einas Elmughira Hamad Mohamed, Industrial Research & Consultancy Center (IRCC), Sudan
- Prof. Ibrahima THIOUB, University Cheikh Anta Diop of Dakar (UCAD), Senegal
- Prof. Mkumbukwa Madundo Angelo Mtambo, Tanzania Industrial Research and Development Organization (TIRDO), Tanzania
- Mr. Mohamed Ben Amor, Water Researches and Technologies Centre of Borj-Cedria (CERTE), Tunisia
- Dr. Orkun Hasekioglu, TUBITAK Marmara Research Centre (MAM), Turkey
- Prof. Dr. Mohamed H. A. Hassan, The World Academy of Sciences (TWAS), Italy
- Mr. Nazar Hassan, UNESCO Office, Egypt
- Mr. Tajammul Hussain, COMSATS Secretariat, Pakistan
- Mr. Amanullah Khattak, COMSATS Secretariat, Pakistan
- Mr. Farhan Ansari, COMSATS Secretariat, Pakistan



The Centres of Excellence were urged to enhance networking with each other and share their human and technological resources for the benefit of Member States. The Council wished to have representatives of Member States/Centres of Excellence at COMSATS Headquarters for enhancing the efficacy and impact of its programmes and activities. The meeting also issued a Communiqué that encourages the Centres of Excellence, inter alia, to:

- enhance cooperation with other Network members for launching new projects and programmes for the benefit of Member States;
- become creators of knowledge in addition to being users of the same;
- sensitize their respective governments regarding the benefits of regularly making AMC for the financial sustainability of COMSATS.

The participants appreciated the efforts of COMSATS Secretariat in fulfilling the objectives of the organization. Recognizing the sincere efforts and contributions of the previous Executive Directors of COMSATS, the Council welcomed Dr. S. M. Junaid Zaidi as the new Executive Director of COMSATS, and expressed confidence in his abilities.

Conclusion

After due deliberations of two days the Council meeting concluded on May 15, 2017. A general consensus remained on all major issues and decisions of the meeting.

The Al-Farabi Kazakh National University (KazNU), Kazakhstan was decided as the host for the 21st Coordinating Council Meeting Scheduled for May 2018. Moreover, TUBITAK Marmara Research Centre (MAM), Turkey, and the International Center for Chemical and Biological Sciences (ICCBS), Pakistan, were selected as alternative venues.

During the closing ceremony, the Executive Director COMSATS paid gratitude to the organizing committees of NRC and COMSATS for making excellent arrangements for the meeting. He hoped that the decisions of the meeting shall be actively followed-up by the concerned Centres of Excellence for enhancing meaningful collaborations within the Network. The Chairman of the Council thanked the foreign delegates for their active participation in the meeting. He also thanked the local organizing committee members for their tireless efforts for organizing the meeting.

Communiqué of the 20th Meeting of COMSATS Coordinating Council (14 – 15 May 2017, Cairo, Egypt)

The participants of the 20th meeting of COMSATS Coordinating Council, including the representatives of fourteen Centres of Excellence, deliberated upon the thirteen-point agenda of the meeting on 14-15 May 2017, and are pleased to unanimously adopt the following statement:

1. The Coordinating Council pays gratitude to the National Research Centre (NRC) for making excellent arrangements for the meeting and for providing warm hospitality to its participants. The administrative support of COMSATS Secretariat to NRC for the successful organization of the meeting, including active correspondence with the invitees and preparation of necessary documentation, is highly appreciated.
2. The excellent moderation of the discussions during various technical sessions of the meeting by the Chairperson Coordinating Council, Prof. Dr. Ashraf Shaalan, President NRC, is lauded.
3. The Coordinating Council is immensely pleased to welcome Dr. S. M. Junaid Zaidi as the new Executive Director of COMSATS, who has previously made outstanding contributions towards the organization as the founding Rector of COMSATS Institute of Information Technology (CIIT). It is hoped that under the leadership of Dr. Zaidi, the programmes of COMSATS will be further enhanced in order to achieve the objectives of the organization. The Council also expresses gratitude to all of the previous Executive Directors of COMSATS for their sincere efforts and contributions towards fostering the programmes and activities of the organization.
4. The Coordinating Council is pleased to welcome the Al-Quds University (Palestine) as a member of COMSATS' Network of Centres of Excellence. It is hoped that Al-Quds University will actively participate in the programmes and activities of COMSATS and will establish strong collaborative ties with other members of the Network.
5. The Council is pleased to learn about the nomination of the National University of Science and Technology (Zimbabwe) for induction in COMSATS' Network of Centres of Excellence. It is desirable that the necessary formalities for induction of the

Mohamed V University (Morocco) and the National University of Science and Technology (Zimbabwe) in COMSATS' Network are completed before the next Council meeting. COMSATS Secretariat is encouraged to continue its efforts to extend the membership of COMSATS' Network to all Member States.

6. The Council highly appreciates the contributions made by the members of COMSATS' Technical Advisory Committee (TAC) who have served the organization on voluntary basis during the period 2014-17. The Technical Advisory Committee shall be reconstituted since the three-year tenure of its members has been completed. The decision regarding the induction of new members shall be taken jointly by the Chairperson Coordinating Council, Executive Director TWAS and Executive Director COMSATS. The Council looks forward to the valuable advices and guidance of the new members of the Technical Advisory Committee regarding various programmes and activities of the organization.
7. The Council gratefully acknowledges the financial and in-kind contributions by the Member Countries towards COMSATS' activities. The payment of Annual Membership Contribution (AMC) by China, Jordan, Kazakhstan, Nigeria, Pakistan, Sri Lanka and Sudan, is noted with appreciation.
8. The Council is pleased to learn about the high quality of research and academic activities being undertaken at the Centres of Excellence, including NRC. The offers of collaboration and exchange of scientific and technological resources made by various Centres of Excellence are highly appreciated. The Network members are encouraged to make the best utilization of these offers with a view to contribute towards the socio-economic development of the South.
9. The offer of scholarships and post-doctoral fellowships to COMSATS' Member States by various Centres of Excellence is a welcome step, which is acknowledged with appreciation. The Member States are encouraged to make the best use of these offers for capacity building of their scientific workforce.
10. The proposals for new initiatives presented by ICCES-China, ICCBS-Pakistan and TIRDO-Tanzania, for the socio-economic uplift of COMSATS' Member States are gratefully acknowledged.
11. The Council appreciates the efforts of COMSATS Secretariat to fulfil the objectives of the organization, and acknowledges the following achievements:
 - (i) Organization of 12 capacity-building events, in collaboration with other international organizations and Centres of Excellence, which benefited various scientists, engineers and technicians belonging to Member States;
 - (ii) Launching of the sixth International Thematic Research Group (ITRG);
 - (iii) Steady growth of the Flagship Projects in Pakistan, i.e. the COMSATS Institute of Information Technology (CIIT) and COMSATS Internet Services (CIS).
 - (iv) Increased utilization of postgraduate scholarships at CIIT, Pakistan, by Member Countries;
 - (v) Continuous expansion of membership of COMSATS' Network of Centres of Excellence;
 - (vi) Increase in the Annual Membership Contributions by Member States; and
 - (vii) Regular publication of COMSATS' Newsletter, journal 'Science Vision' and other information material about the organization.
12. The Council encourages the Network members to make efforts for the following:
 - (i) Enhancing cooperation with other Network members for launching new projects and programmes for the benefit of Member States;
 - (ii) Examining and availing the opportunities of fellowships available with TWAS;
 - (iii) Exploring the possibility of becoming Category-2 Centres of UNESCO;
 - (iv) Launching the remaining two ITRGs on 'Materials Science' and 'Construction Materials';
 - (v) Sensitizing their respective governments regarding the benefits of regularly making AMC for the financial sustainability of COMSATS; and
 - (vi) Keeping COMSATS Headquarters aware of new developments and major achievements of their organizations.
13. The Coordinating Council reiterates that every country must strive to build S&T capacity, as we cannot simply be the users of technology but have to generate new knowledge.
14. Lead Centres of ITRGs are encouraged to approach their respective governments in order to obtain funds for the activities of the groups.
15. The Coordinating Council reiterates its recommendation for the Member States to increase their Gross Expenditure on Research and Development to a level of 2% of GDP.

S&T INDICATORS OF A MEMBER STATE

In Spectrum: Arab Republic of Egypt



The Arab Republic of Egypt commonly known as Egypt is a Mediterranean country. It is a transcontinental country which spans at the northeast corner of Africa and southwest corner of Asia and joins both the continents with a land bridge formed by Sinai Peninsula. The country is bordered on the northeast by Gaza strip and Israel, on the east by Gulf of Aqaba, on the east and south by Red Sea, on the south by Sudan, and on the west by Libya (CIA World Factbook).

Egypt is the world's 30th largest country. It has an extreme arid climate due to which population is concentrated along narrow Nile River and its delta. Around 98% of the Egyptian people live on 3% of the territory. Most of the rainfalls in Egypt are in moderate winter months.

Egypt is famous for one of the longest histories of any modern countries in the world. It was considered as the cradle of civilization since it experienced the earliest development of writing, agriculture, urbanization, religion, and central government. Egypt constitutes of classic iconic monuments which include Giza Necropolis and its Great Sphinx, ruins of Memphis, Thebes, Karnak, and the valley of Kings.

Egypt is one of the earliest centres of Christianity, however, it was Islamized in 7th Century and is now predominantly a Muslim country with a significant Christian minority.

Egypt is a presidential republic, with Cairo as the capital. The legal system of Egypt is based on Islamic law, civil law (especially Napoleonic codes), and judicial review by Supreme Court. Military expenditure of Egypt as of 2015 is 1.73% of the GDP. Egypt has the oldest continuous parliamentary tradition in the Arab world. The official language of the Republic is Modern Standard Arabic.

Egypt is the most populous country in the Arab world and third most populous country in Africa. As per the World Bank estimates, the population of Egypt was 94,666,993 as of July 2016. The annual population growth rate of Egypt in 2016 is estimated to be 2.51%. The largest segment of Egyptian population (37.47%) is between the age 25-54 years followed by population segment (33.21%) aged under 14 (CIA World Factbook, 2016).

Egypt is a recognized cultural trend setter of Arabic world. Egyptian literature, television, music and film have a large impact in Middle Eastern culture. The culture revolves around Islam, Christianity and Judaism.

Tourism is one of the most important economic sector in Egypt. The tourism sector comprises of about 12 percent of Egypt's workforce. Most well-known tourist attraction in Egypt is Giza Necropolis which is the only one of the seven wonders of ancient world still in existence. The beaches on Red sea and Mediterranean sea are also popular tourist destinations.

According to the Human Development Index, Egypt ranks at 111 out of 188 countries with an HDI value of 0.691 (UNDP Human Development Report, 2016). Between 1990 and 2015, Egypt's HDI value increased from 0.547 to 0.691, which is an increase of 26.4%. Table-A indicates Egypt's progress in each of the HDI indicators from 1990 to 2015. Between 1990 and 2015, Egypt's life expectancy at birth increased by 6.7 years, mean years of schooling increased by 3.6 years and expected years of schooling increased by 3.3 years. Egypt's GNI per capita increased by 71.5 percent between 1990 and 2015.

The reported public expenditure on education in the country is 3.8% of its GDP (World Bank, 2015). About 73.8% of the



Table A: The Egypt's HDI Trends Based on Consistent Time Series Data

	Life Expectancy at Birth	Expected Years of Schooling	Mean Years of Schooling	GNI per Capita (2011 PPP\$)	HDI Value
1990	64.6	9.8	3.5	5,869	0.547
1995	66.8	10.4	4.1	6,437	0.577
2000	68.6	11.1	4.8	7,629	0.612
2005	69.4	11.5	5.6	8,175	0.636
2010	70.4	12.4	6.6	9,906	0.671
2011	70.5	12.4	6.7	9,813	0.673
2012	70.7	12.8	6.8	9,834	0.681
2013	70.9	13.1	6.9	9,791	0.686
2014	71.1	13.1	7	9,807	0.688
2015	71.3	13.1	7.1	10,064	0.691

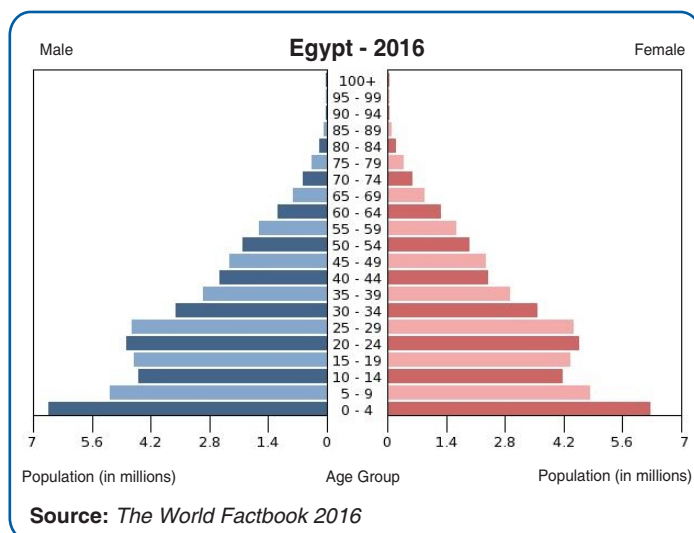
Source: Human Development Report 2016, UNDP

Egyptian population is considered to be literate. The adult literacy rate as of July 2014 was estimated at 73.9%. The illiteracy rate is highest among those over 60 years of age being estimated at around 64.9%, while illiteracy among youth between 15 and 24 years of age showed a stark contrast at 8.6 percent.

Egypt's economy depends mainly on agriculture, tourism, media, natural gas and petroleum imports. Agriculture contributes to 11.3% of the GDP and industries contribute to 35.8% of the GDP. The frontline agricultural products include cotton, vegetables, rice, fruits, corn, beans, wheat, cattle, goats, water buffalo and sheep. Industrial production growth rate of Egypt is 0.6%. The industrial sector is standing on industries including textiles, light manufactures, food processing, metals, tourism, cement, chemicals, construction, pharmaceuticals, and hydrocarbons. Currently, Egypt is planning to develop its first nuclear power plant with Russian financing.

Major exports of the country include crude oil, petroleum products, processed food, fruits and vegetables, chemicals, cotton, metal products, and textiles, whereas the imports include machinery and equipment, fuels, foodstuffs, wood products, and chemicals. The major trade partners of Egypt are Saudi Arabia, Italy, Turkey, United Arab Emirates, United States, United Kingdom, India, China, Germany, and Russia.

Egypt has made significant progress towards achieving education for all. The Ministry of Higher Education and Scientific Research (MHESR) was established in 1963 with an aim to contribute effectively to harness scientific research for development of education. One of the main objectives of this Ministry is to determine research strategies at national levels, design, develop and launch plans to promote science, technology and innovation in Egypt. In scientific research,



Egypt ranks 4th among Middle East and the Mediterranean countries and 41st among the world. As a result of establishment of this Ministry, higher education expanded considerably with respect to universities. The Minister of MHESR acts as the focal point of COMSATS. The National Research Centre (NRC) of Egypt, presided by Professor Dr. Ashraf Shaalan, is one of the 21 research and development institutions in the Network of COMSATS Science and Technology Centres of Excellence and hosted this year's Annual Coordinating Council Meeting of COMSATS. The President of NRC is also the incumbent Chairperson of COMSATS Coordinating Council.

Ancient Egyptians were leaders in scientific discoveries and innovation, which turned Egypt into world cradle of civilization. It is time for Egypt to take steps and work in order to shape the future to make its future as glorious as its past.

The policies of Egyptian government regarding science and

technology need to be more systematic and aligned to meet its national needs. It is important to support industrial capacity building, and collaboration with international institutions for science, technology and innovation, as well as research and development in Egypt. There is a need to invest more in education and applied scientific research to set the stage for true prosperity.

Key Development Indicators of Egypt

Development Indicator	1990	2000	2010	2016
Population, total (millions)	57.41	69.91	84.11	95.69
Population growth (annual %)	2.5	1.8	2	2
Urban Population Growth (annual %)	2.2	2	1.9	2.2
Agriculture, value added (% of GDP)	19	17	14	12
Industry, value added (% of GDP)	29	33	38	33
Services, etc., value added (% of GDP)	52	50	48	55
Exports of goods and services (% of GDP)	20	16	21	10
Imports of goods and services (% of GDP)	33	23	27	20
Mobile cellular subscriptions (per 100 people)	0	2.1	90.5	111
Individuals using the Internet (% of population)	0	0.6	21.6	37.8
High-technology exports (% of manufactured exports)	-	0	1	1
Merchandise trade (% of GDP)	37	20	36	24

Source: World Bank Indicators, 2016

ACTIVITIES/NEWS OF COMSATS' CENTRES OF EXCELLENCE

CIIT-Pakistan Strengthens linkages with Foreign Institutions

The Jordanian Cultural Counsellor, Mr. Mahmoud Oglah Baniata, visited COMSATS Institute of Information Technology (CIIT) on 23rd May 2017 to explore possibilities of collaboration between CIIT and Jordanian Universities. He was cordially welcomed by Dr. Tariq Ur Rahman, Acting Head (IO) and Mr. Kashif Masood, Deputy Registrar (IO). After a briefing about CIIT's strengths, its rankings and internationalization efforts, the discussion focused on various modes of collaboration between CIIT and Jordanian universities, scope of scholarships offered by CIIT to member countries of OIC and COMSATS as well as students and faculty exchange, admission of Jordanian students in graduate and undergraduate programmes at CIIT.

A six-member delegation from Hainan Tropical Ocean University, China, including Mr. Song Wu, Associate Professor, Mr. Zhang Luping, Admin Officer, Office of International Cooperation and Exchanges, Mr. Liu Xianping, Professor, Ms. Liu Xuan, Professor, Mr. Xu Guoai, Associate Professor and Mr. Ma Yiming, Lecturer, visited CIIT on 9th May, 2017. HTOU very kindly extended an invitation to the faculty of CIIT to participate in the upcoming One Belt One Road summit to be held in China this year.

Events Organized by the International Office, CIIT-Pakistan

The International Office of COMSATS Institute of Information Technology (CIIT), Islamabad, Pakistan, organized a talk by the Country Representative of the World Bank in Pakistan, Mr. Patchamuthu Illangovan, on May 11, 2017 in collaboration with Career Pakistan, Islamabad. Mr. Patchamuthu described Pakistan's development journey through the decades leading to a question what would Pakistan look like in 2047? He said that two very different Pakistans were possible thirty years from now: one that looks similar to Pakistan today or the other that looks more like Malaysia or China.

A Seminar on Environmental and Climate Change on 9th May 2017 at CIIT to observe the Earth Day 2017. Besides the students and Faculty from CIIT, the seminar was attended by students from other leading universities of Pakistan. The Guest of Honour, H.E. Mr. Joao Sabido Costa, Charge de Affairs of the Portuguese Embassy in Islamabad, expressed the need for joint responsibility of the developed and the developing countries to initiate joint action for the protection of the Earth.

TUBITAK-MAM, Turkey, Collaborates with PMD, Pakistan

TUBITAK Marmara Research Center (MAM) received a delegation from Pakistan Meteorological Department (PMD) on May 2017 to follow up the developments in the joint "Reverse Linkage Project between Pakistan and Turkey on Earthquake Seismological Research" in collaboration with Turkish Cooperation and Coordination Agency (TİKA) and Islamic Development Bank (IDB). The project aims to eliminate three main deficiencies in the field: (1) the deficiency in collecting data about seismic activities in Pakistan, (2) the deficiency in analyzing seismological data, and (3) the deficiency in turning seismological data into useful information for governmental institutions.

Center of Biological Resources of Embrapa Agrobiologia-Brazil Inaugurated

The Embrapa Agrobiologia's Johanna Döbereiner Biological Resource Center was inaugurated in Rio de Janeiro on May 10, 2017 that, besides gathering microorganisms of recognized agricultural importance, will offer various services and activities related to bioprocesses, production and analysis of microbial inoculants.

Dr. Gustavo Xavier, Head of Embrapa Agrobiologia, considered the inauguration a realization of a joint effort of many years, encompassing the dedication and the work of current and previous teams to its management. He introduced Embrapa Agrobiologia as an institution that works from basic research to the actual production and distribution of inoculants, to get where the industry cannot reach. It is the only institution today, he noted, recommended by the Brazilian Ministry of Agriculture as an official provider of bacteria of interest to the industry. Currently, CRB-JD conserves more than 3,000



Inauguration of the Johanna Döbereiner Biological Resource Center

microorganisms, in addition to providing more than 300 microorganisms and more than a thousand doses of inoculants annually for research and technology projects. A microbial DNA bank has also been structured to be used for studies without the need of cultures, shortening the time of research and guaranteeing quality material.

Capacity-Building Events at ITI-Sri Lanka

During the reporting period, Industrial Technology Institute (ITI), Sri Lanka, became a part of the following events:

- Hands-on Training on Advanced Scientific Instruments for Material Characterization (18th & 19th May 2017);
- Workshop on Troubleshooting in Cottage based Herbal Drugs & Cosmetics Industries (18th May 2017);
- Awareness program for the stakeholders on Residue Analysis (30th May 2017);
- 3rd Meeting of Medicinal Plants focal points of Indian Ocean Rim Association (IORA) member states, Jakarta, Indonesia (10th – 12th May 2017);
- International training workshop on Advanced Technology of Herbal Medicine for South and South East Asia, China (11th – 30th June 2017);
- 2017 South and Southeast Asia Technology Transfer Matchmaking Conference, Yunnan Province, China (12th – 16th June 2017);
- 2017 Seminar on B and R Governance Corporation for China, Southeast Asia, China (5th - 18th June 2017).

ICCBS-Pakistan Signs Cooperation Agreements with Chinese and Palestinian Institutions

The International Center for Chemical and Biological Sciences (ICCBS) and National Economic and Technical Development Zone in Liuyang, Hunan Province, China (NETDZLY) signed a MoU, on June 21, 2017. The MoU aims at cooperation on Research and Development (R&D) in the field of drug, health food, including efficacy and safety evaluation, quality control, as well as registration in both of Pakistan and China. The Director ICCBS, Prof. Dr. M. Iqbal Choudhary, and Chairman Administrative Committee of NETDZLY, Mr. Guo Lifu, signed the MoU on behalf of their institutions signed the agreement.

Earlier in May, ICCBS also signed an Intent of Cooperation with the Al-Quds University, Palestine, to promote scientific and educational collaborative activities between the two institutions. Director ICCBS and President Al-Quds University, Prof. Imad Abu Kishek, signed the agreement on behalf of their institutions.



Director ICCBS and Chairman Administrative committee of NETDZLY at the signing ceremony

Institutional Capacity of ICCBS-Pakistan Enhanced

The Industrial Analytical Center (IAC) of International Center for Chemical and Biological Sciences (ICCBS), Karachi, has been awarded the 'certificate of accreditation' by Pakistan National Accreditation Council (PNAC), Federal Ministry of Science and Technology, this June. The IAC offers a range of professional analytical and consultancy services. The IAC offers a range of analytical and consultancy services to more than 500 industries and other private and public sector organizations. It also provides world-class trainings on analytical instruments.

ICCBS also acquired ISO 9001:2015 for its all five research units, whereby the Bureau Veritas Certification Pakistan Branch certifies that the management system of the ICCBS has been audited and found to be in accordance with the requirements of the said certification.

TIRDO-Tanzania Acquires Important Equipment for Coal Analysis

The Energy Division of Tanzania Industrial Research Development Organization (TIRDO), Tanzania, has acquired state-of-the-art equipment (including CHS Analyzer and Bomb Calorimeter Parr 6400) for analyzing coal (and other energy materials) quality. The energy Division's Coal Laboratory is capable of analyzing materials with respect to proximate, ultimate and heating value parameters. It is further capable to analyze the inorganic content (trace metals) from materials. To date, the laboratory has analyzed over 60 Coal samples from mining companies in Tanzania.

TIRDO scientists have published 11 papers and chapters in two books during the reporting period.



UNDER THE GRACIOUS PATRONAGE OF HM KING ABDULLAH II IBN AL HUSSEIN OF JORDAN

SCIENCE FOR PEACE



Under the patronage of His Majesty King Abdullah II Ibn Al Hussein, the World Science Forum (WSF 2017) will be hosted in the Hashemite Kingdom of Jordan, from November 7th to 11th, 2017, under the management of the Royal Scientific Society.

Under the theme of “**Science for Peace**”, World Science Forum 2017 will present a vision of a world in which science plays an increasingly important role as an enabler of equitable and sustainable development for all people.

“**Science for Peace**” marks a recognition of the global nature of the challenges that face all humankind, and underlines our global responsibility to tackle these challenges through science and policy for the benefit of all. The definition of ‘*Science for Peace*’ will encompass energy, food, water and climate change, the alleviation of poverty and inequality, greater cultural and economic understanding between peoples, and the potential for science and research to create wealth and provide layers of opportunity within all societies.



Over 1,200 scientists, decision -makers from the world of politics and industry, and representatives of civil society and the media will meet at WSF 2017 to share their views on the common challenges facing all humankind, and on how those challenges can be tackled through science and policy for the benefit of all. WSF 2017 calls on scientists, researchers and policymakers from all disciplines and backgrounds to contribute their talents and ingenuity so that we may all build a future that promotes unity and opportunity.

2017 marks the first time that the World Science Forum will be held in the Arab World or wider Middle East. This presents a wonderful opportunity for WSF 2017 in Jordan to dramatically increase participation by African, Middle Eastern and Asian scientists. WSF 2017 will also highlight the role of science in building and fostering a culture of peace at all levels, and the potential of science to create mechanisms to enable lives enriched by peaceful opportunity.

HRH princess Sumaya bint El Hassan, President of the Royal Scientific Society, extends an invitation to all scientists and science policymakers who stand at the forefront of the debate on the role of science in building a future that promises greater equality, stability, security, and opportunity for all.

To find out more: <http://worldscienceforum.org/>

Contact: wsf2017@rss.jo

WATER CRISIS AND DEPLETING AQUIFERS CHARACTERIZATION IN THE MIDDLE INDUS BASIN, RAWALPINDI CITY, PAKISTAN

Prof. Dr. Zulfiqar Ahmad*

1. Introduction

Pakistan is in the grip of a water crisis. This involves a hydroelectric power shortfall, per capita water availability less than 1,100 cubic meters, falling levels of groundwater, and limited water supplies in metropolitan areas, including the twin cities of Rawalpindi and Islamabad. The combined population of these cities is about 2.8 million, with a density of 880 persons/km² (2,279/sq. mi). The growing need of water supplies, both for domestic and irrigation purposes, has led to the exploitation of surface and groundwater resources in this area. Surface water supplies are maintained from Rawal and Simly reservoirs within the federal capital territory of Islamabad, which provide 21 MGD (79.5 ML) to Rawalpindi city and 17 MGD (64.4 ML) to Islamabad city. Water supplies are 24 MGD from about 250 public tube-wells in Islamabad, and 27 MGD from about 300 public tube-wells in Rawalpindi. The average needs of Islamabad and Rawalpindi are 65 MGD (246 ML) and 175 MGD (662.8 ML), respectively, which exceed the capacity of available water resources. Because pumping exceeds recharge, groundwater reserves are becoming significantly depleted.

2. Physiography and Geology

The Islamabad watershed is located near the southern foothills of the sub-Himalayan region in the Potwar plateau of Pakistan. Topographic sheets at 1:50,000 scales acquired from the Survey of Pakistan were used along with Landsat-TM satellite data to delineate the boundary and drainage network of the watershed. The Islamabad watershed covers an area of about 906 km² with its longitude 72° 54' to 73° 22' E and latitude 33° 44' to 33° 49' N and consists of undulating plain to mountainous terrain. In the north and northeast, it is bounded by the Margalla and Murree hills, which are covered with permanent mixed scrub and forest. The altitude in the watershed increases gradually from the southwest (< 500 m) towards the northeast, near the Murree hills (> 1500 m).

The area is characterized by gentle to steep slopes dominantly towards the southeast. The main perennial

stream in the watershed is the Soan, whose primary tributaries are the Ling, Gumrah Kas, Kurang and Lei Nullah (a local term that refers to a stream also carrying sewage). The Kurang and Soan rivers are dammed at Rawal and Simly reservoirs, respectively.

Rawalpindi city falls in the Salt Range and Potwar plateau. The terrain surrounding the city is rolling to hilly, cross-crossed by ravines and nullahs. The high altitude areas lie in the northwestern and southeastern parts (1043 and 660 m above sea level, respectively). The terrain of Rawalpindi gradually falls off toward Lei Nullah in the West and the Korang River in the East.

Lei Nullah extends approximately 30 km from the Margalla hills in the northwest to the Soan River at the southeastern edge. The basin is located between 33° 33' and 33° 46' N and 72° 55' and 73° 07' E. The Lei catchment area is comprised of 239.8 km² (169.0 km² in Islamabad and 70.7 km² in Rawalpindi). The land-surface elevation of the basin ranges from 1240 m at the upstream end to 420 m at the downstream end. Occasionally Lei Nullah overflows during the rainy season, causing considerable damage.

A thin soil cover of sand, clay and silt lies over the area except in some narrow valleys. The dominant lithology exposed in the watershed area belongs to the Rawalpindi Group of Miocene age, which consists of the Murree and Kamliyal Formations. These formations are composed of sandstone, shale and lenses of conglomerates. The Lei Nullah conglomerates of Quaternary age consist of poorly sorted pebbles and boulders of mostly Eocene limestone strata. The most important aquifers are composed of gravels and boulders in the unconsolidated sediments of Pleistocene and Recent age. Alluvium (the channel fill deposits) consists of dominantly silt and clay with subordinate amount of gravel and sand.

3. Hydrogeologic Framework

The alluvial deposits are heterogeneous in nature. Silt and clay dominate the subsurface lithology. Gravel deposits are present in discontinuous layers with silty clay. The gravel

*** About the Author:** Zulfiqar Ahmad is a Professor and Director of the Office of Research Innovation and Commercialization (ORIC) in the University of Wah. He also served as Chair Mari Petroleum Company Ltd. from 2013 to 2016, and Professor and Chairman at the Department of Earth Sciences, Quaid-i-Azam University (QAU), Islamabad-Pakistan from 2005 to 2013. He obtained his Post-Doc, PhD and MSc degrees from Australia, USA, and England, respectively. He has about 50 impact factor owing to his publications in ISI Journals. Email: Dir.oric@uow.edu.pk.



beds are generally 1 m to 20 m (60 feet) thick and are composed of limestone and sandstone pebbles mixed with sand. The maximum thickness of the alluvium is more than 200 m (600 feet), as encountered in test holes RWP-6 and 8 in Dhok Khabba and Dhok Ratta, respectively. The thickness of alluvium probably exceeds 300 m (1000 feet), as indicated by a deep resistivity survey. The thickness of the gravel beds decreases in the south and west.

In contrast to the gravels, the bedrock is usually considered to act as an aquitard rather than an aquifer since well yields are much lower than encountered in the gravels. The Margalla Limestones do appear to have a minor amount of solution openings. However, the springs at the contact with the alluvium show only minor base flows, which suggests that recharge and permeability within the limestone is restricted.

Detailed groundwater investigations were carried out by WAPDA (1965) and by the Hydrogeology Directorate of WAPDA (1980) in the Islamabad and Rawalpindi areas. Data from test holes and wells drilled in these investigations have been used in this study.

4. Groundwater Recharge

There are two major source of recharge to groundwater: precipitation and infiltration from surface streams. Direct infiltration to the water table from precipitation is likely to occur especially in July and August, when rainfall is highest, although evaporation and soil moisture deficit in these months are also high. Recharge is also possible during the winter rains in February and March. We assume 30% of rainfall is lost through runoff into the Soan and Korang rivers, 40% is lost through evapo-transpiration from the surface and soil zone, and 15% is lost through the capillary and deep roots. Therefore, about 15% of rainfall, or 1.83×10^{-8} ft/sec (5.58×10^{-9} m/sec), will be available to recharge the shallow groundwater. In the Margalla hills, 7 to 15% of the precipitation tends to recharge the aquifer system through deep fractures of variable sizes in the limestone. Recharge within the urban areas of Islamabad and Rawalpindi is limited by impervious cover.

Discharge data for the Soan and Korang rivers were obtained from the Water and Power Development Authority (WAPDA) and Surface Water Hydrology Project (SWHP).

Both the Soan and Korang rivers recharge the aquifer system during rainy months and are sustained by base flow at other times. Besides Lei Nullah, other small streams in the drainage area are ephemeral or intermittent.

5. Numerical Simulation of Groundwater Flow

The software package Visual MODFLOW (SWS 1910) has been used for three-dimensional numerical simulations of groundwater flow and drawdown within the study area. A finite-difference rectangular grid was constructed by establishing a network of nodal points. The model computes drawdown, direction of flow with vector lines and hydraulic heads on each nodal point. The flow model requires a boundary array for each cell. A positive value in that array defines an active cell (the hydraulic head is computed), a negative value defines a fixed-head cell (the hydraulic head is kept constant throughout the simulation), and the zero value defines an inactive cell (no flow takes place within the cell). A fixed-head boundary exists whenever an aquifer is in direct hydraulic contact with a river, a lake or a reservoir in which the water level is known. Such a boundary provides an inexhaustible supply of water, which in some situations may be unrealistic. For transient flow simulations, the initial heads must be the actual values.

Concluding Remarks

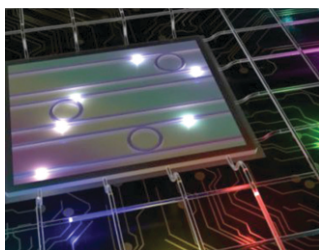
Based on the interpreted results and modeling studies, the following features of the Rawalpindi aquifer potential and its drawdown behavior have been drawn. The inferences have been made after the model is calibrated with the heads of 2003 and projected in future up to 2012.

- i. The aquifer consists of varying proportions of gravel, boulder, and sand deposits with layers of clay/silt. The physical properties of the aquifer are favorable for development of groundwater with moderate values of transmissivity and specific yield.
- ii. There is a continuous drop in hydraulic heads in the vicinity of pumped tube-wells in Rawal Town and adjacent areas. Simulations indicated a maximum drawdown of 20 meters.
- iii. Existing tube wells could be safely pumped for a period of 5 years at the existing rate of discharge. However, drawdown could reach as deep as the fifth layer of the aquifer.
- iv. Velocity vectors indicate the groundwater in Rawalpindi city moves southeast toward the Korang River.
- v. Groundwater flow pattern in the layers 3, 5, and 7 is almost identical, but the velocity of flow is different for different layers.
- vi. Pumping of water wells in the western part of the study area needs to be stopped, at least temporarily, in order to enable water levels in the aquifer to recover.
- vii. More water wells could be constructed along the Korang River where the underlying aquifer layers have good potential yield.

SCIENCE, TECHNOLOGY AND DEVELOPMENT

Quantum Information Science at Verge of Change with Multicolored Photons

The power of quantum technologies is immense and is still unravelling. Regarding this, the researchers from Institut national de la recherche scientifique (INRS), Canada, have come out with a breakthrough in light weight photonic system which is created on chip devices and telecommunication components. The team of scientists has described that the photons can be an accessible and powerful quantum resource if they are generated in color entangled quDits form (*ScienceDaily*, 28th June 2017). In the demonstrated system, photons are emitted in pairs, which share a complex quantum state, by excitement from laser on an on chip micro ring resonator. These photons have several colors simultaneously and the colors of each photon in a pair are entangled regardless of their separation distance.



The photons are emitted in high dimensional quantum state (quDit). The use of such quantum states is in frequency domain as they enable easy transmission within the optical fibre systems. The research is a game changer because up till now advances in telecommunication technologies were based on manipulation of classical signals. Quantum technologies can be applied in large-alphabet fibre-based quantum communications, and the future development of frequency-domain, high-dimensional quantum logic gates and optical fibers.

Small RNA Fragments Involved in Naked Genome Defense

Our genome is constituted of potentially damaging DNA sequences which are guarded by epigenetic marks. These epigenetic marks are attached to the DNA double helix and prevent the damaging sequences from destructive actions. More than half of the human genome is composed of these damaging sequences. These are basically the places where viruses or parasites have incorporated themselves during the evolution. These elements are known as transposons or retrotransposons. During two of the most crucial processes of division in life cycle, the epigenetic marks are removed from DNA, making it naked. Transfer RNA (tRNA) can easily be hijacked by retrotransposons at primer binding sites which can lead to genome parasitism.

A team of scientists at Cold Spring Harbor Laboratory has discovered the emergency replacements of these epigenetic marks, the shock troops which are pressurized into service across the genome only during these undefended moments (*ScienceDaily*, 29th June 2017). These defenders are naturally embedded in the wall of maternal uterus and are protecting the embryonic genomes. These defenders are RNA fragments consisting of 18 and 22 nucleotides and are complementary to

the sequences present in retrotransposons. Their structures match the sequences within tRNA. This research can be used to inhibit retrotransposons from getting activated at crucial life cycles and will help in protection of embryonic genome from the viruses.

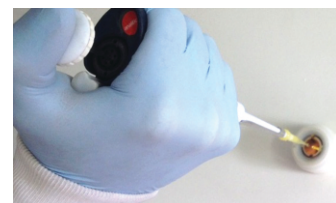
Disease Detection becomes Easier with Miniatures

Simpler, faster and cheaper technologies in medical science enhance patient treatment outcomes. However, the diagnostic sciences and tools are based on expensive technologies including microfluidic assays. These assays require immobilization of bioreceptors which is a daunting as well as damaging process. Currently, microcontact printing is used for immobilization of bioreceptors which uses a rubber stamp and is a robust method for a variety of assays. However, micro-contact printing cannot be used on nano scale- the scale where proteins and DNA are present.

In a recent research, performed in Okinawa Institute of Science and Technology Graduate University (OIST), Japan, a new sequence of printing steps has been described (*ScienceDaily*, 30th June 2017). The micro contact printing requires a stamp, an ink, and a surface to create a pattern. The stamp is made up of polydimethylsiloxane which is a flexible solid, ink is made of silicon and oxides containing molecules which are known as APTES and the surface is composed of glass. The stamp is coated with ink and is pressed on the glass and then removed after small incubation. A patterned layer of APTES on the glass is obtained which is then used in a microfluidic device. The device as a whole is about the size of a postage stamp. This system is now ready to use as a diagnostic assay. A fluid sample from patient is delivered through microfluidic device attached to the glass and if the pertinent disease biomarker is present, the molecule will stick to the bioreceptors.

Dengue Detection with a Biosensor

Brazilian researchers have developed a biosensor which can diagnose Dengue fever in few minutes (*SciDev.Net*, 12th June 2017). The biosensor is currently being tested. It is made up of quartz-crystal microbalance which measures small differences in mass. The sensors generate electric current when hit with mechanical pressure which is able to detect minimum amount of Dengue antigen present in blood. The protein in Dengue virus reacts with bacterial cellulose nanocrystals and indicate the presence of virus in blood sample. This detection method is much faster as compared to conventional methods. Researchers are working on the reduction of production cost of the device as well as its applications in diagnosis of other viral diseases.



PROFILE OF MEMBER COMSATS' TECHNICAL ADVISORY COMMITTEE

DR. ISHFAQ AHMAD (N.I., H.I., S.I.), NATIONAL CENTRE FOR PHYSICS, PAKISTAN

Dr. Ishfaq Ahmad (N.I., H.I., S.I.) is a nuclear physicist and well-known educationist of Pakistan. As a versatile theoretical particle physicist, Dr. Ishfaq Ahmad made significant contributions in the field of nuclear physics, particle physics and quantum electrodynamics. He played an important role in establishing major research institutes in Nuclear sciences in Pakistan.



Dr. Ishfaq Ahmad was born on November 3, 1930, in Gurdaspur, Indian Punjab state of the British India, to a Muslim family. His early education was in Jalandhar (Indian Punjab), Faisalabad (then Lyallpur) and Lahore, Pakistan. Ahmad enrolled in the Punjab University, Lahore, to study Physics, and earned his undergraduate, B.Sc. degree in Physics in 1949.

After entering in the post-graduate school at the Punjab University, Ahmad obtained his M.Sc. degree, in 1951. His master's thesis on nuclear physics showed his ambitions and set grounds for his future academic pursuits and career in nuclear science. With his master's degree, he obtained Honours diploma and secured a gold medallion for the recognition of his work in physics.

He taught various undergraduate physics laboratory courses at the Government College, Lahore (now Government College University, Lahore) while conducting his research work on fundamental concepts of nuclear physics with his university mentor.

In 1954, he won the scholarship under the Colombo Plan fellowship program and went to Quebec, Canada for his doctorate studies, where he pursued his Ph.D. In 1959, he was awarded a D.Sc. in Nuclear Physics from Université de Montréal. During his doctoral studies, he joined the Montreal Laboratory and served there as lead senior scientist.

Upon his return to Pakistan, he joined the Pakistan Atomic Energy Commission (PAEC) as a senior scientist.

During his career, Dr. Ishfaq Ahmad led the reactor technology related government projects in different countries, and served as lead project coordinator on behalf of International Atomic Energy Agency (IAEA).

Among the prominent posts he has held over the years are:

- Chairman, Pakistan Atomic Energy Commission

(PAEC), from 1991 to 2001;

- Senior Member, PAEC, from 1988 to 1991; Member, PAEC, from 1976 to 1988;
- Director and Chief Scientist, Pakistan Institute of Nuclear Science and Technology, from 1971 to 1976;
- Director, Atomic Energy Centre (AEC), Lahore, from 1969 to 1971;
- Head, Physics Division, AEC, Lahore, from 1962 to 1963;
- Advisor S&T to the President of Pakistan;
- Deputy Chairman, Planning Commission, Government of Pakistan;
- Life time Chairman, Board of Governors, National Centre for Physics (NCP), Islamabad;
- Member Syndicate, Quaid-i-Azam University, Islamabad.

In 1961, Dr. Ishfaq Ahmad went to Copenhagen, Denmark, where he became a visiting post-doctoral fellow at the Niels Bohr Institute for Theoretical Physics. From 1963–1964, he traveled to Canada and joined his Alma mater, Université de Montréal and University of Ottawa as a post-doctoral research fellow. There, he began to carry out his research in the field of nuclear physics at the Montreal Laboratory. Prior to 1960s, he also worked at Risø DTU National Laboratory for Sustainable Energy of Denmark and the Meuse/Haute Marne Underground Research Laboratory of France.

In 1969, Dr. Ishfaq Ahmad became a post-doctoral fellow at the University of Paris. However, on Dr. Abdus Salam's request, he came back to Pakistan where he was appointed as a director of the Pakistan Atomic Energy Center, Lahore. In Lahore, Ishfaq Ahmad carried out his work in the theory of proton decay. He introduced the Chiral anomaly to calculate the pion decays in his work. He also pioneered the theory of beta decay where he successfully converted the proton, via weak force into neutron. He later contributed in P-P chain reaction, and built the first Ion track along with Naeem Ahmad Khan and Noor Muhammad Butt.

Dr. Ishfaq Ahmad is renowned for his research and contribution to the theory of nuclear emulsion. He spent his career studying and pioneering the work in the field nuclear emulsions. At PINSTECH Laboratory, Ahmad developed a classified nuclear emulsion that provided information about the mass, charge and velocity of the particles producing the track.

As Chairman of PAEC, he supervised the second commercial nuclear power plant, CHASNUPP-I, built with the assistance of People's Republic of China. During the tenure in the Commission, he supervised and developed the

peaceful programmes of PAEC for the defence, energy, agriculture, medicine, industry and hydrology.

Dr. Ishfaq Ahmad has been associated with IAEA since 1960s, where he lobbied for Pakistan's peaceful nuclear energy programme. He has also advocated for peaceful use of nuclear energy at many other international forums. He, at IAEA, helped Pakistan to lead an agreement between PAEC and IAEA in which IAEA allowed Pakistan to construct and build its nuclear power plant for civil purposes.

Dr. Ishfaq Ahmad led Pakistan's delegation to the United Nation to the Board of Governors of International Atomic Energy Agency and the General Conference of the United Nations.

In 1986, Dr. Ishfaq Ahmad visited People's Republic of China where PAEC reached a civil nuclear technology agreement with China. Later on he, along with his fellow Chinese nuclear scientists, helped Pakistan and China to form a joint-nuclear company which is known as Sino-Pak Nuclear Technology Consortium.

In 2000, Dr. Ishfaq Ahmad was awarded the Honorary Degree of Doctorate in Engineering by the Punjab University of Engineering and Technology. In the same year, he was elected as a Fellow of the International Nuclear Energy Academy.

In 1994, as Chairman PAEC, Dr. Ishfaq Ahmad visited CERN. Thereon, he struggled to reach useful contract between CERN and PAEC.

In 1997, Dr. Ishfaq Ahmad headed PAEC to reach a contract between PAEC and CERN after elaborate discussions an in-kind contribution worth one million Swiss Francs for construction of eight magnet supports for the CMS detector.

In 1998, as Chairman PAEC, Dr. Ishfaq Ahmad reached another contract with CERN. The signing of the agreement was followed by the Dr. Ishfaq Ahmad and Dr. Christopher Llewellyn Smith's visit to Pakistan in 1998. The agreement provided an entry point for Pakistani scientists and engineers into the CMS collaboration.

In 2000, Dr. Ishfaq Ahmad reached another agreement between PAEC and CERN during the official visit of Prof. Luciano Maiani, to Pakistan. This new agreement covered the construction of the resistive plate chambers required for the CMS muon system. Recently, a protocol has been signed enhancing Pakistan's total contribution to the LHC programme to \$10 million.

Dr. Ishfaq Ahmad also served as a Council Member of IIASA which specializes in mathematical modeling and simulation. Dr. Ishfaq Ahmad has played a significant role in the following fields in Pakistan: scientific manpower training, establishment of Research and development facilities, indigenous production of nuclear materials, peaceful uses of nuclear technology as well as classified applications of nuclear technology.

Dr. Ishfaq Ahmad has been an administrative presidential figure and encouraged physics and mathematics talent test programmes in Pakistan leading to participation of Young Pakistani Students in the Physics Olympiad.

Dr. Ishfaq Ahmad played an instrumental role for the establishment of the National Center for Nuclear Physics (NCP) at QAU Campus, Islamabad. In honour of his services to the Centre, he is serving as the life-time Chairperson of NCP's Board of Governor (BoG).

Dr. Ishfaq Ahmad has been a great advocate for the strengthening the subject of mathematics in the universities and research organizations.

Dr. Ishfaq Ahmad's efforts have led to the creation of the Global Change Impact Studies Centre (GCISC) in Islamabad where, for the first time, research on Climatic Change is being undertaken in Pakistan. GCISC serves as the Secretariat of the Prime Minister's Committee on Climate Change.

After the 2005 Kashmir earthquake, the Government has decided to establish a Center for Earthquake Studies (CES) in Islamabad, under the technical direction of Dr. Ishfaq Ahmad. At present, CES is functioning at the National Centre for Physics (NCP), Islamabad.

Dr. Ishfaq Ahmed is the recipient of the highest Civil Awards in Pakistan, namely *Sitara-i-Imtiaz*, *Hilal-i-Imtiaz* and *Nishan-i-Imtiaz*, the last of which was awarded to him in 1998.

Contact Details:

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COMSATS' BRIEF AND ANNOUNCEMENTS

Selected Forthcoming Scientific Events in COMSATS' Countries

18-20 September 2017	16 th CTWF International Symposium on Advances in Seasonal to Decadal Prediction, Beijing, China (http://2017ctwf.csp.escience.cn/dct/page/1)
24-26 October 2017	Seminar of Quelonicultura in the Amazon: Production for the conservation of the species, Amapá, Brazil (https://www.embrapa.br/)
6-9 November 2017	6 th International Symposium-cum-Training Course on Molecular Medicine and Drug Research, Karachi, Pakistan (http://www.mmdr-symposium.org/)
8-10 November 2017	International Symposium on Food Security in Africa, Dakar, Senegal (https://www.ucad.sn)
6-10 December 2017	TECNOVITIS 2017 - Technology Fair for Viticulture, Park Biological Station, Rio Grande do Sul, Brazil (https://www.tecnovitis.com.br/)
18-20 December 2017	15 th International Conference on Frontiers of Information Technology, Islamabad, Pakistan (http://fit.edu.pk/)

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- Ten doctoral scholarships/post-doctoral fellowships at the International Center for Chemical and Biological Science (ICCBS), Pakistan.
- Five post-doctoral fellowships at the National Research Centre (NRC), Egypt, and International Centre for Climate and Environment Sciences (ICCES), China, each.
- One post-doctoral fellowship at Bangladesh Council for Scientific and Industrial Research (BCSIR), Bangladesh.

Contact for more information: Mr. Tajammul Hussain, Advisor-Programmes (tajammul@comsats.org)

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A BRIEF ON COMSATS

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COMSATS, currently, has 24 developing countries as its members, spread across three continents, i.e., Latin America, Africa and Asia. A network, of 21 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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