



**South-South and
Triangular Cooperation
COMSATS' Experience**

Member States



Bangladesh



China



Colombia



Egypt



The Gambia



Ghana



Iran



Jamaica



Jordan



Kazakhstan



Korea, D.P.R.



Morocco



Nigeria



Pakistan



Palestine



Philippines



Senegal



Somalia



Sri Lanka



Sudan



Syria



Tanzania



Tunisia



Turkey



Uganda



Zimbabwe

June 2018

South-South and Triangular Cooperation

COMSATS' Experience



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

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Foreword

The terms 'South-South Cooperation' and 'Triangular Cooperation' are well-known in the development narrative. The United Nations, its agencies and development arms are doing a remarkable job in keeping them highlighted, and creating relevant synergies and collaborations across the globe. The former term represents one of the core ideas that led to the creation of COMSATS during the last decade of the 20th century. The visionaries that helped materialise this ambitious plan of bringing together the countries of the South were conscious of how important involvement of the North is in the success of such a plan, which resulted in the inclusion of triangular cooperation as a cardinal part of COMSATS' statutes.

COMSATS' Commission, Consultative Committee and Coordinating Council, all three forums make COMSATS an ideal platform for all stakeholders in the South and world over to benefit from. Since its inception in 1994, COMSATS has contributed fairly well to the sustainable development of the South, both at the regional and sub-regional levels. However, given the size of the area, population and scarcity of resources, South has been striving except for a few countries which have made good progress.

Our past experience has taught us a lot of lessons and has shown the fault lines which must be addressed if sustainable progress is to be made in science and technology at the national, sub-regional and regional levels. Some of the critical areas in which the South has been lagging behind are: shortage of good human resource of researchers and scientists, absence of a steady supply of financial and ancillary resources, paucity of the state-of-the-art laboratories and



infrastructure, political will at the national, sub-regional and regional levels and lack of effective mechanism of support from the north, international organisations and funding agencies.

In order to address these critical issues, the Commission has remained cognizant of the importance of universities in providing an enabling environment for addressing the critical challenges. Improvement of human resource and infrastructure in the education sector, not only advances efforts for SDGs but also helps build a repository of knowledge for future research and academic pursuits. COMSATS University, a flagship project of the Commission, has rendered remarkable services to the member countries in the areas of critical inquiry and human resource development. Its facilities are open to all member states of COMSATS through scholarships, internships, joint research and capacity building. The education and research outreach, and technical and human resources available through COMSATS University and other Centres of Excellence are not only contributing to their countries'

socio-economic development but also to COMSATS' efforts towards 2030 global agenda.

Present day challenges in science and technology are national, sub-regional, regional and global in nature. For country specific challenges and priorities, governments are obliged to be more responsive to the needs of their populations in view of the global agenda. At sub-regional and regional levels, problem identification, consensus building for joint action, political will, human and financial resources become more daunting. Challenges like Climate Change, Health, Education and work force redundancy in the wake of 4th industrial revolution need a collective response at all levels. This will not be possible without meaningful and effective partnerships between the North and the South, as well as due involvement of international organisations like the UN, European Union, Commonwealth, and international financial institutions.

We at COMSATS are committed to developing synergies with the international

community and the governments in the South to help achieve sustainable development through science and technology. Our unique character facilitates partnerships and dialogue among willing nations through relevant tiers of engagement. It also provides an effective platform for knowledge creation and sharing.

The current focus of the United Nations and other organizations working on South-South and triangular cooperation attempts to explore new and innovative opportunities for cooperation on sustainable development goals. To this end, COMSATS remains committed to supporting all relevant initiatives at regional and global levels through uncompromising efforts for a brighter and self-reliant South.

I am sure this publication will help sensitize the readers of our past, present and future vision relating to south-south and triangular cooperation.

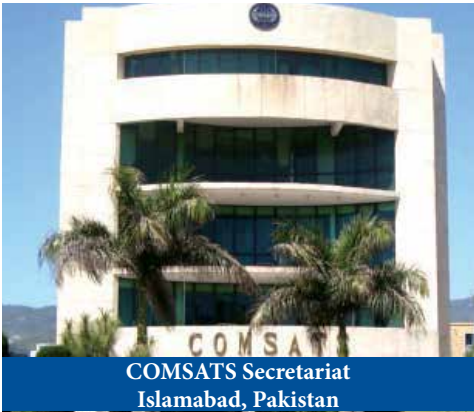
Dr. S.M. Junaid Zaidi, H.I., S.I.
Executive Director COMSATS



Introduction

The Commission on Science and Technology for Sustainable Development in the South (COMSATS) was established in 1994, as a realization of an ambitious plan envisaged by the Nobel Laureate from Pakistan, Prof. Dr. Abdus Salam, to catalyze the socio-economic uplift of the developing countries by promoting and inculcating S&T culture.

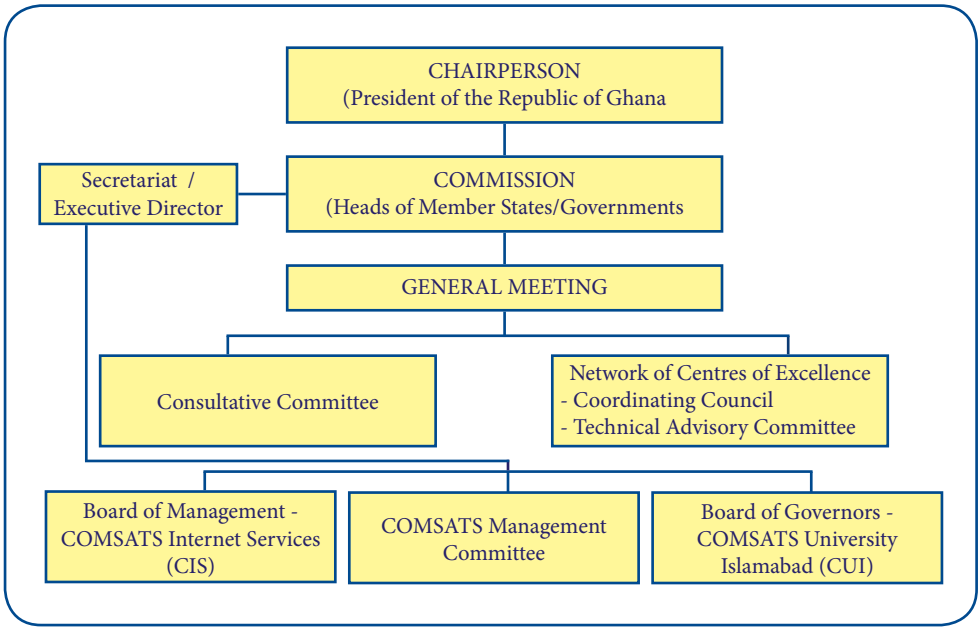
As the name suggests, the foundation of the organization rests on three pillars: Sustainable Development, S&T and the South. The idea of establishing a high-level Commission on Science and Technology as an apex body for countries of the South was conceived in view of the increasingly widening gap of scientific know-how between the North and the South leading to persistent disparities of economic strengths. The establishment of COMSATS was based on the understanding that sustainable socio-economic development in the South cannot be achieved without building and sustaining indigenous capacities in science and technology, and that the strengthening of



South-South and North-South cooperation is necessary for the generation and sustenance of such capacities.

Prof. Salam's enthusiasm and personal contacts motivated a number of Heads of State/Government of developing nations to join hands for the establishment of the Commission. The then Prime Minister of Pakistan, H.E. Mrs. Benazir Bhutto, agreed to the proposal of Prof. Salam and gave her

Organogram





Member Countries



Centres of Excellence

consent to host the foundation meeting of COMSATS on 4th and 5th October 1994, in Islamabad, Pakistan, which was organized by the Ministry of Science and Technology (MoST), Government of Pakistan, in collaboration with Third World Academy of Sciences (TWAS) (now known as The World Academy of Sciences) and the Third World Network of Scientific Organizations (TWNISO) (renamed as the Consortium on Science, Technology and Innovation for the South (COSTIS)). The organization was mandated to work for science-led socio-economic uplift of the developing countries through appropriate applications of science and technology.

One of the key objectives of COMSATS is to sensitize the countries in the South to the centrality of science and technology in the development process, adequate allocation of resources for research and development, and integration of science and technology in the national and regional development

plans. COMSATS also provides an institutional platform for North-South technical cooperation in areas of common interest such as Energy, Health, Education, Information Technology, and Environment. Being signatories of the International Agreement to establish COMSATS, all member countries have been contributing to, and taking tangible benefits from, the organization, especially the host country, Pakistan. Soon after the establishment of COMSATS, ways and means were considered to bring the benefits of science to the common people in Pakistan.

Organizational Structure Supporting South-South Cooperation

The structure of COMSATS is unique in a way that it not only leverages the organization to facilitate capacity building of scientists from developing countries, but

Members of COMSATS Coordinating Council

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Chairman
Bangladesh Council of Scientific and
Industrial Research (BCSIR)
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Embrapa Agrobiologia
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Prof. Lin Zhaohui

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Director General
Tianjin Institute of Industrial
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Tianjin, China

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Director
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Bogotá, Colombia.

Prof. Dr. Ashraf Shaalan

President
National Research Centre (NRC)
Cairo, Egypt.

Prof. Dr. Victor Agyeman

Director General
Council for Scientific and Industrial
Research (CSIR)
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Dr. Alireza Ashori

President
Iranian Research Organization for Science
& Technology (IROST)
Tehran, Iran.

Mr. Charles N. Grant

Director General
International Centre for Environmental and
Nuclear Sciences (ICENS)
Kingston, Jamaica.

HRH Princess Sumaya bint El Hassan

President
Royal Scientific Society (RSS)
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Director
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Prof. Dr. Imad F. S. Abukishek

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Dr. Maher Suleiman

Director
Higher Institute for Applied Science and
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Prof. Mkumbukwa Madundo Angelo Mtambo

Director General
Tanzania Industrial Research and
Development Organization (TIRDO)
Dar-es-Salaam, Tanzania.

Prof. Ahmed Ghrabi

Director General
Water Research and Technologies Centre of
Borj-Cedria (CERTe)
Soliman, Tunisia.

Prof. Ibrahim Kilicaslan

President
TÜBİTAK Marmara Research Center (MAM)
Gebze Kocaeli, Turkey.

also enables clusters of high-quality R&D centres, working independently in their national capacities, to cooperate with one another as a part of COMSATS' Network of Centres of Excellence.

It was realized by COMSATS' pioneers that the decision-making process in developing countries is heavily dependent upon political patronage and the cooperation of civil bureaucracies. Thus, as an international initiative to make Science and Technology the central pillar of the development agenda in the countries of the South adopting a top-down approach was adopted to bring about significant shift in how countries perceive the role of S&T and what resources are allocated for its development.

Consequently, COMSATS is an apex body, comprising Heads of State/Government as its Members, while the highest level functionaries responsible for S&T affairs in member countries, acting as COMSATS' Focal Points, constitute its Consultative Committee. Currently, there are 26 Member States of COMSATS with the President of Ghana as its Chairperson.

The structure of COMSATS goes a step further from a single research facility catering to the training and research requirements of scientists from a vast group of countries with a wide spectrum of research interests.



Hon. Nana Addo Dankwa Akufo-Addo
President of Ghana
(Chairperson COMSATS)

It envisioned clusters of high-quality R&D centres working independently in their national capacities but cooperating with one another as a part of COMSATS' Network of Centres of Excellence. Currently, 22 such Centres/Universities spread across four continents are affiliated with COMSATS and provide it an enormously rich resource for scientific cooperation at the level of working scientists.

The Heads of these Centres of Excellence are members of the COMSATS Coordinating Council, which holds its meetings in different countries on a yearly basis. The Coordinating Council is a unique platform, which enables the leaders of R&D organizations to consult one another about the latest developments in their scientific programmes, learn from

COMSATS Centres of Excellence	International Partners
Council for Scientific and Industrial Research (CSIR)	International Water Management Institute (IWMI), Sri Lanka
	EMBRAPA, Brazil
	International Food Policy Research Institute (IFPRI), USA
	AGRA, Africa
	The West African Science Service Centre for Climate Change and Adapted Land Use (WASCAL), Ghana
Iranian Research Organization for Science and Technology (IROST)	Indian Ocean Rim Association (IORA), Mauritius
	Asian and Pacific Centre for Transfer of Technology (APCTT), India
	Commission on Science and Technology for Sustainable Development in the South (COMSATS), Pakistan
	OIC Standing Committee on Scientific and Technological Cooperation (COMSTECH), Pakistan
	The Global Innovation Family (WAITRO)
International Centre for Environmental and Nuclear Sciences (ICENS)	The University of the West Indies, Jamaica
	Commission on Science and Technology for Sustainable Development in the South (COMSATS), Pakistan
	International Atomic Energy Agency (IAEA), Australia
	Ministry of Science Energy and Technology, Jamaica
University Cheikh Anta Diop (UCAD)	African and Malagasy Council for Higher Education (CAMES)
	Association of African Universities (AAU), Ghana
	University Agency of La Francophonie (AUF), Canada
	Network for Excellence in Higher Education in West Africa (REESAO)
	Ministry of Higher Education, Universities and Regional University Centers and Scientific Research, Senegal
	National Quality Assurance Authority for Higher Education, Senegal

the best practices and successful initiatives, and, in general, exchange among each other the offers of cooperation and requests for technical assistance.

South-South Technical Cooperation

COMSATS' major source of scientific and technological strength stems from its Network of International S&T Centres of Excellence for sustainable development in the South. The Network was established during the Foundation Meeting of COMSATS with the objective of assisting the countries of the

South to build and sustain a critical mass of world-class scientists and technologists and to utilize their expertise for expediting science-led sustainable development.

COMSATS' Member States have been greatly benefiting from the Network through capacity-building activities, such as short and long trainings; seminars, workshops and symposia; postgraduate scholarships; faculty and expert-exchange; technical meetings and other joint scientific programmes linked to socio-economic development.

Members of Technical Advisory Committee

Prof. Dr. Huadong Guo

Professor and Director General
Institute of Remote Sensing and Digital Earth
Chinese Academy of Sciences,
Beijing, China.

Prof. Dr. Richard Catlow

Head of Department of Chemistry
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Technology (MISIS)
Moscow, Russia

Prof. SB Junaidu

Director, Institute of Computing & ICT
Ahmadu Bello University
Zaria, Nigeria

The network comprises firstly of a Coordinating Council with Heads of COMSATS' Centres of Excellence as its members that meet every year to make rules and regulations governing its own procedures, and approve the programmes and budget of the Network and the Secretariat.

The second organ of the network is a Technical Advisory Committee with 10 internationally renowned experts providing expert opinions and technical foresight for various programmes and activities of the Network.





COMSATS South-South Cooperation Efforts

Institution-Building in the South

With COMSATS University as the most important example in a member state that now has broad linkages in the North and the South, academic institution building

is perhaps the most effective contributions COMSATS has made for sustainable development of the South. Among these, COMSATS University is strengthening the organization's South-South and Triangular cooperation efforts.

FROM A SMALL BUILDING TO BEYOND BORDERS: COMSATS UNIVERSITY ISLAMABAD (CUI)

The most successful intervention of COMSATS in higher education in what was a frontier technology in the region at the time, COMSATS University Islamabad (CUI) was established in 1998 as a project of COMSATS in IT education. CUI received the Charter of a Degree Awarding Institution (DAI) from the Government of Pakistan in the year 2000, with the name of COMSATS Institute of Information Technology (CIIT).

Apart from the UN, COMSATS is the only international organization to have a University to its name. The University that started its operations in a small building in Islamabad with less than 300 students has since grown to become a major public-sector university in Pakistan and a Centre of Excellence of COMSATS. CUI's fully functional campuses in Islamabad, Lahore, Abbottabad, Wah, Attock, Sahiwal and Vehari, are actively engaged in teaching, research and public service along with its Virtual Campus.

Currently, CUI comprises of 6 faculties and 20 departments. The University offers 97 degree programs in Computer Science, Management Sciences, Development Studies, Humanities, Engineering (Electrical, Chemical, Mechanical, Civil), Mathematics, Statistics, Biosciences, Meteorology, Physics, Pharmacy, Earth Sciences, Chemistry, Environmental Sciences, Computer Engineering, Health Informatics as well as Architecture and Design. Moreover, various centers and units work under different departments: Business Incubation Center; Student Startup Business Center; Center for Policy Studies; China Study Center; Center for Advanced Studies in Telecommunication; Interdisciplinary Research Center in Biomedical Materials; Center for Climate Research and Development; Energy Research Center; and Center of Advance Drug Research. Other Research Units functioning at different campuses

of CUI include Engineering Resource Center, Life Sciences Services Center, COMSATS Community Development Unit, Information Technology Center, CISCO Regional Academy, and Center for Micro and Nano Sciences. More than 35,000 students are currently enrolled in various programs offered by the University. The University has, so far, produced more than 53,242 graduates including 242 PhDs, and has 3,186 qualified faculty members, out of which 1,107 hold PhD qualification. Moreover, more than 500 faculty and staff members of CUI are undergoing





advanced education (MS and PhD) at leading universities around the world.

CUI has quite a vibrant and robust internationalization agenda both in order to benefit from and to extend to others the fruits of education, research and international engagement across the globe. So far CUI

has trained 800 international students from 27 different countries in various cutting-edge disciplines. Currently, 450 international students from 16 countries are studying in various campuses of CUI.

The University published 9000 research articles (from 2005 to 2017), brought-out 80 books, filed 51 patents out of which 09 are granted and two have been commercialized. More than 500 research-based workshops/conferences have been organized over the years. CUI was awarded the international certificate of quality, ISO 9001:2008 in the year 2011 which has been renewed over the years. Furthermore, its Office of Research, Innovation and Commercialization and Quality Enhancement Cell (QEC) have been repeatedly in the top category of 'W' by the Higher Education Commission (HEC) of Pakistan.

In the newly announced international rankings, CUI has yet again maintained its position as one of the leading Institutions for higher education. CUI is ranked # 301-400 in 2018 Times Higher Education (THE) Engineering & Technology subject ranking and #401-500 in Physical Sciences and Social Sciences subject ranking. While in the THE world universities rankings, CUI has been placed among 601-800 world best universities, at #125 in Asian Universities, and ranked 2nd in Pakistan. The University has also been ranked 190th in QS Asian Universities Rankings 2018. Further, Higher Education Commission (HEC) ranked CUI at number 3 in the 'General Category' and at number 6 among 'overall universities' in 2016, and top university in 'Computer Science and Information Technology' in 2012 besides being ranked 2nd in the 'research publications' category in 2015. In the recently announced research output of global higher education institutions by Nature Index CUI has once again been placed at No. 1 position in 2018 among all the universities of Pakistan, for publishing in High Impact Factor Journals.

CUI has signed over 150 Memoranda of Understanding with some of the leading universities of the world, such as the University of Illinois at Urbana-Champaign, USA; North Dakota State University, USA; University of Malaya, Kuala Lumpur, Malaysia; Jacobs University Bremen, Germany; Tampere University, Finland; and Lancaster University, UK.

In order to directly benefit OIC and COMSATS' Member States, CUI offers 100 scholarships for students from COMSATS Member States, 50 for the students from OIC member countries, 50 scholarships for ISESCO, 50 for Azerbaijan, and 80 (10 each) scholarships for the students from the Consortium of Afghan universities, Mauritius/Seychelles/Madagascar, Bhutan, Maldives, Nepal, Sri Lanka, Myanmar and Kenya.

COMSATS-COMSTECH-MTM IT Centre

COMSATS-COMSTECH-MTM-IT Centre was established in Karachi on February 27, 1999. The main objective of the institute was to promote Information Technology (IT) by providing studies in this field. It was a joint venture of COMSATS, COMSTECH, Majlis-e-Taleem-e-Milli (MTM) and Preston University. This Centre was handed over to Preston University for running its day to day operations in 2004. Initially, it was aimed that degree classes in the field of IT, like B.S & M.S and BBA/MBA would be started in affiliation with COMSATS Institute of Information Technology (CIIT). Now it is providing IT and management sciences education.

Syrian COMSATS-COMSTECH IT Centre

In 2001, COMSATS established an I.T Centre in Damascus-Syria, in collaboration with the OIC Standing Committee on Scientific and Technological Cooperation (COMSTECH) and the Ministry of Higher Education of the Arab Republic of Syria. The then Presidents of Pakistan and Syria jointly inaugurated the Centre.

The aims and objectives of the I.T Centre are to: provide high standard training in the field

of information technology; hold workshops to build the capacity of the workforce; provide e-learning tools to companies and serve as a certified training centre.

The working scope of this Centre encompasses training in software and hardware, e.g. development of networking software, Internet applications and e-commerce. The Centre offers short-term trainings in office automation, networks, databases, various programming languages, Internet applications, and graphics suites. On the other hand, long-term trainings are offered in e-Business, Network Security and Intelligent Systems.

Expanding the Frontiers of Technology in the Region through Pioneering Projects

COMSATS Internet Services (CIS)

COMSATS Internet Services (CIS) was established in 1996 as the pioneer Internet Service Provider (ISP) of Pakistan. Currently, it is providing services to major cities of the country. CIS is a diversified ISP that offers Internet as well as data and cloud computing services to corporations, government and academic institutions. CIS



also work for general welfare by providing telehealth services for rural and remote areas in Pakistan. CIS' tele-health services are operational through a network of 13 Tele-Health clinics across Pakistan. Moreover, new grounds are being broken for expanding cooperation at provincial and federal government levels.

COMSATS Telehealth (CTH)

The Telehealth activities of COMSATS (CTH) are another example of the significant achievements made by COMSATS over the years, whereby the socio-economic benefits are being passed on to the marginalized communities of the remote and inaccessible areas of Pakistan. Since the pilot phase of its eHealth Programme in Gujar Khan (2001), COMSATS has been actively playing its role in the development of Tele-health in Pakistan. Full scale Tele-health services are now being provided in Skardu for the Northern Areas of Pakistan and in Zhob for the less developed areas of Balochistan. Thousands of patients have benefitted from the tele-consultations given by medical specialists under this programme. In order to further the support of COMSATS' eHealth activities, a comprehensive web-portal to maintain and transfer patient data has been developed by COMSATS' eHealth team. This is the first

of its kind web-based software in Pakistan, which has been specifically developed for Tele-health purposes.

Main objectives of COMSATS eHealth Programme are to:

- Promote the use of latest ICTs to improve access to better healthcare for the marginalized communities;
- Utilize COMSATS' experience in tele-health and replicate its services in other parts of Pakistan and other Member States; and
- Build the capacity of healthcare professionals serving marginalized communities in remote areas.
- Some of COMSATS CoE's aspire to launch tele-health program in their countries, these are:
 - Higher Institute for Applied Science and Technology (HIAST), Syria
 - Royal Scientific Society (RSS), Jordan
 - Al-Quds University, Palestine

Others already engaged in the field include:

- Al-Farabi Kazakh National University (KazNU), Kazakhstan-running a tele-health project in collaboration with Korean company





- Industrial Research and Consultancy Centre (IRCC), Sudan-Running a project and an MoU between Federal Ministry of Health, Sudan and IT Department of IRCC
- TUBITAK Marmara Research Centre (MAM), Turkey-working on a tele-health project with a national mobile operator.

Capacity-Building in the Countries of the South

Since its establishment, COMSATS has organized/co-organized over 250 national and international events on various subjects ranging from scientific capacity-building, renewable energy, water resource management, mathematical modelling, weather prediction, biotechnology, nanotechnology, repair and maintenance of scientific equipment, national innovation systems, science journalism and telecommunication & Internet Security to South-South and North-South collaboration in research and development. These events have provided a useful platform to the members of the scientific community, development-experts, donor and development agencies, and the decision-

makers to share their views and experiences on contemporary issues of vital concern.

COMSATS keeps a close watch on scientific breakthroughs and emerging technologies to keep Member States abreast on potential benefits and risks.

The range of the themes and beneficiary countries over the years can be seen from table on the next page, showing these events' relevance to South-South Cooperation.

China-Pakistan collaboration in the field of Numerical Weather Prediction leading to develop short-term and long-term weather prediction in some countries of the South

During 1997-99, COMSATS collaborated with China and Pakistan for organizing three workshops on Numerical Weather Prediction (NWP). The purpose of the workshops was to spread the skills among COMSATS' Member States involved in using Numerical Weather Prediction Model. The model can be used to make more accurate and timely weather prediction. More than 300 scientists from COMSATS Member States benefitted from these events.

Event Theme	Countries
Renewable Energy Technologies	Pakistan, Malaysia, Bangladesh, Indonesia, Maldives, Sudan, Sri Lanka, Turkey, Egypt, Iran, Jordan, Kazakhstan, Germany, USA
South South and North South Cooperation	Pakistan, Egypt
Research and Industrial Applications	Pakistan
Scientific and Engineering Equipment Repair	Pakistan, Sudan, Egypt, Senegal, Tunisia, Sudan, Ghana, Iran, Oman, Ghana, Nigeria, Kazakhstan
Physics	Pakistan, Bangladesh, China, Egypt, Germany, Iran, Ireland, Italy, Japan, Pakistan, Sudan, Turkey, UK, USA
Environment	Pakistan, Jordan, China, Colombo, Iran, Norway, USA, Sweden, Finland, Japan, Netherlands, France, Nigeria, Brazil, Germany, United Kingdom, Spain, Ghana, Thailand, India, Sri Lanka, Egypt, Belgium, and Switzerland
Nanoscience and Nanotechnology	Pakistan, Syria, Canada, Australia, Japan, Germany, Malaysia, Philippines, Sri Lanka, Thailand, USA, Iran, Malaysia, Jordan, Egypt, United Arab Emirates, India, Bangladesh, Bulgaria, Cambodia, Sudan, Tunisia, Kenya, Mauritius, Morocco, Nepal, Myanmar, Indonesia, Vietnam, Uganda, Iraq, Malawi, France, China, Italy, Saudi Arabia, South Korea, Syria, Turkey
Telehealth	Pakistan
Emerging technologies	Pakistan
Technology Parks	Pakistan
Human stem cells	Egypt, Pakistan
Bridging Digital Divide	Lebanon, Syria, Egypt, Iran, Jordan, Pakistan, Sudan
Socio-economic development	Pakistan, Bangladesh, China, Nigeria, Sri Lanka, USA
Applications of Information and Communication Technologies	Sudan, Pakistan, Uganda, Iran, Malaysia, Brunei, Mauritania, Yemen, Egypt, Tunisia, Bahrain, Bangladesh, Morocco, the Gambia, Ghana, Jordan, Palestine, Senegal, Uganda, Tanzania, Nigeria, Sri Lanka
Internet Security	Syria, Malaysia, Indonesia, Bangladesh, United Arab Emirates, Nigeria, Egypt, Sudan, Jordan, Brunei Darussalam, Iran, Tunisia, Tanzania, Turkey, The Gambia, Colombia, Guinea, Morocco, Chad, Palestine, Uzbekistan, Ivory Coast, Kazakhstan, Mauritania, Pakistan
Climate Change	China, Ghana, Sri Lanka, Thailand, Pakistan, Malaysia, Nepal, Mongolia, Uganda, Iran, Egypt, Bangladesh, Vietnam, Jordan, Sudan, Germany, India, Nigeria
Medicinal Plants	Turkey
Intellectual Property	Pakistan, Bangladesh, China, Iran, Kazakhstan, Malaysia, Nepal, South Korea, Sri Lanka, United States, Switzerland, Morocco, Benin, Brunei Faso, Cote d'Ivoire, Gabon, Ghana, Guinea, Niger, Senegal, Tanzania, Togo, Uganda, Tunisia
Natural Products	Iran
Science Education	Pakistan
Structural Chemistry	Pakistan, Bangladesh, Cameroon, China, Egypt, France, Germany, India, Iran, Jordan, Malaysia, Nepal, Nigeria, Saudi Arabia, Sri Lanka, Sudan, Sweden, Turkey, UK, USA, Yemen

continue...

Agriculture, Food Security and Biotechnology	Bangladesh, Pakistan, Senegal, Sudan, Sri Lanka, Nigeria, Egypt
Mathematical Modelling	Bangladesh, Jordan, Pakistan, Senegal, Nigeria
Biosafety and Biosecurity	Kazakhstan, Jordan, Bahrain, Iran, USA, Pakistan, Nigeria
Viruses and Vaccines	The Gambia, Bangladesh, Sri Lanka, Ghana, Nigeria, Pakistan, Sudan

As a follow-up of these events, one scientist each from Sri Lanka, Syria and Pakistan received short-term training at the International Centre for Climate and Environment Sciences (ICCES), China, on Numerical Weather Prediction Model with financial support of COMSATS. Moreover, a scientist from Pakistan Meteorological Department (PMD) completed his PhD from ICCES in 2005 with financial support of COMSATS, who upon his return greatly contributed towards the upgradation and activities of PMD.

COMSATS-ISESCO South-South Cooperation for Capacity Building in Developing Countries

A major constant in cooperation for capacity building events over the years took place with ISESCO. Realizing that COMSATS and OIC have 17 common member countries, COMSATS has been collaborating with ISESCO, under a Memorandum of Understanding, which was signed in March 2004. In this regard, the two organizations have jointly organized 52 capacity building events in various fields of science and technology, including cyber security, nanotechnology, ICTs, repair and maintenance of scientific instruments, agriculture and biotechnology, mathematical modeling, renewable energy, etc., during which thousands of engineers, scientists and technicians belonging to the common member countries have been trained. Moreover, COMSATS has been hosting ISESCO's Islamic World Science Net (IWSN) Web-portal from 2006 till 2016, comprising

information and data related to S&T sectors of Islamic countries.

Furthermore, the two organizations are supporting a joint research project entitled 'Mathematical Modeling and Simulation of Air and Water Pollution: Effects and Remedies'.

COMSATS has been collaborating with ISESCO and the Inter Islamic Network on Information Technology (INIT) for jointly organizing the series of international workshops on 'Internet Security: Enhancing Information Exchange Safeguards'. The workshops aim to provide a forum to the young scientists/professionals from the developing countries to learn about the latest advancements in the field of Internet security; promote the use of state-of-the-art technologies for protection of network and network-accessible resources from different types of malicious attacks; and identify effective Internet/information security solutions for general public, governmental organizations and commercial ventures through rigorous risk-analyses and security management approaches.

So far, seven workshops have been held in Syria (2011), Jordan (2012), Tunisia (2013), Tanzania (2014), Turkey (2015), Morocco (2016), and Kazakhstan (2017). The workshops were hosted by the relevant government organizations of the aforementioned countries. During these events, capacity of more than 350 scientists, engineers and technicians was built.

COLLABORATIONS FOR BENEFIT TO THE GRASSROOT SCIENTISTS: ISESCO-COMSATS' WORKSHOP SERIES ON REPAIR AND MAINTENANCE (2004-2017)

A series of National Training Workshops on Repair and Maintenance of Scientific Engineering Equipment in Universities, Research Institutions, and Small Scale Industries (2004-2017) was started by COMSATS in 2004 COMSATS in collaboration with Islamic Educational, Scientific and Cultural Organization (ISESCO). The purpose was to enable the Islamic countries to achieve technological self-reliance and reduce the technological dependence on the foreign experts for the repair and maintenance of scientific equipment. During the workshops hands-on training is provided to the scientists, researchers, engineers and technicians in order to upgrade their skills and enhance their capacities in repairing, maintaining and troubleshooting important scientific engineering equipment in their organizations.

	Year	Country	Participants Trained	Financial Worth of Equipment Repaired during the workshops (US \$)
1 st	2004	Sudan	30	15,000
2 nd	2005	Syria	27	20,000
3 rd	2005	Sudan	30	30,000
4 th	2010	Senegal	25	30,000
5 th	2011	Egypt	28	100,000
6 th	2012	Tunisia	30	80,000
7 th	2013	Sudan	36	45,000
8 th	2013	Ghana	30	20,000
9 th	2014	Iran	69	26,700
10 th	2015	Oman	30	25,000
11 th	2015	Ghana	30	334,000
12 th	2016	Nigeria	40	90,000
13 th	2017	Kazakhstan	60	400,000
Total			405	US\$ 1,115,700



COMSATS-CERN-NCP Cooperation for Data-Grid Applications and Physics Data Analysis

COMSATS has collaborated with the European Organization for Nuclear Research (CERN) and the National Centre for Physics (NCP), Pakistan, to initiate a project for Data-Grid Applications and Physics Data Analysis. In this regard, several trainings and workshops on Data Grid Computation were organized.

Facilitating Academic and Scientific Excellence in the South

Scientific Activities Sponsorship

COMSATS has been sponsoring workshops/seminars/training programmes in its Member States, as well as providing research/study and travel grants to scientists/professionals from these countries for participation in international conferences. So far, more than 250 conferences and workshops have been partially supported by COMSATS in its member countries, training more than 6,000 scientists and researchers from developing countries.

Expert Exchange Programme

COMSATS facilitates exchange of experts among its Network of Centres of Excellence and other institutions in Member States to promote knowledge-sharing and South-South Cooperation. Developing world scientists, particularly from Member States, are offered fellowships and short-term trainings in COMSATS Centres of Excellence for academic/research activity in various scientific fields.

COMSATS facilitated and sponsored a group of researchers from developing countries i.e., Jordan, Egypt, Sudan, and Pakistan to conduct joint research titled 'Phytochemical and Pharmacological Studies on Medicinal Plants and Standardization of Herbal Plants of Indus and Nile Valleys', as well as share their expertise and lab resources. The research project is being undertaken by COMSATS Centre of Excellence in Karachi, International Centre for Chemical and Biological Sciences (ICCBS). The experts are being provided sponsorship to cover international accommodation and other related expenses.



Postgraduate Scholarships

To promote academic excellence, COMSATS offers scholarships to the students from Member States at its International S&T Centres of Excellence. A large number of scholarships have been granted to students from COMSATS' Member States (including Bangladesh, China, Ghana, Iran, Gambia, Jordan, Nigeria, Palestine, and Syria), particularly at its Centres of Excellence in Pakistan, COMSATS University to enable them to pursue their higher studies in different disciplines. Currently, more than 20 students from COMSATS Member States are enrolled at the university under different programmes.

Through this programme, COMSATS also sponsored 5 Ph.D. students at International Center for Chemical and Biological Sciences (ICCBS), Karachi, Pakistan, as well as one Ph.D. at International Centre for Climate and Environment Sciences (ICCES), Beijing, China. Also, three scientists from Kazakhstan, Sri Lanka and Sudan have received short-term trainings at ICCBS with sponsorship of COMSATS.

Mobility Fund/Travel Grants

In order to facilitate individual scientists to avail opportunities of scientific exchanges offered in international moots, more than 550 travel grants of up to US\$ 600,000 have been provided by COMSATS to young scientists from 40 developing countries. COMSATS has been providing opportunities for scientists from one developing country to carry out research at institutions in another developing country through its expert exchange programme. The transfer of knowledge and technology has also been brought about through a series of intensive in-country workshops, donations of laboratory supplies and small grants for research projects.

Incentivizing Research and Development

COMSATS has been sponsoring Khwarzmi International Award (12th to 31st KIA) since 1998. COMSATS supports two awards (first prize of US \$ 1,000/- and second prize of US \$ 500) for "Major/Significant Technological Innovations". More than 40 Awards (US \$ 30,000 in total) have been given to scientists from Developing Countries.



Policy and Advocacy

Policy Dialogues

COMSATS Secretariat has been engaged in promoting South-South cooperation through organizing policy dialogues, workshops and consultations that focused specifically on South-South cooperation. COMSATS has been commemorating UN Day for South-South Cooperation on 12th September for last 6 years. These events promoted discussion and knowledge exchange among stakeholders regarding challenges and opportunities in implementation of 2030 Agenda.

Science Diplomacy Programme

As an organization advocating the centrality of science and technology for prosperity, human development and social progress for over 20 years among its Member States, COMSATS has long practiced the principles of Science Diplomacy in its conventional dimensions. This has helped raise awareness, facilitated scientific exchanges and allowed international collaborative projects and research under its umbrella. The recent launch of the COMSATS' Science Diplomacy Programme is a new approach towards addressing needs of scientists, diplomats,

journalists and policy-makers to build peace among nations using scientific knowledge and principles for allowing informed decision making.

The programme entails a COMSATS' Science Ambassador Scheme, a series of lectures on Science contributing to International Diplomacy, Discussion forums on Contemporary Issues affected by science and other capacity building activities in the planes of Science popularization, advocacy and diplomacy.

Distinguished Professorship Scheme

The R&D organizations and universities of Member States can benefit from COMSATS' Distinguished Professorship Scheme, whereby they can benefit from the invited lectures delivered by a group of renowned scientists and professors. The international travel expenses of the Distinguished Professors are borne by COMSATS, whereas local hospitality is offered to them by the host country institution.

COMSATS' Panel of Experts on Science, Technology and Innovation Policy

COMSATS' Member States can seek free consultancy from COMSATS' Panel



of Experts on Science, Technology and Innovation Policy on formulating/reviewing their national policies related to science, technology and innovation. The panel includes renowned experts from Sri Lanka, France, Colombia, Sudan, and Pakistan.

South-South and Triangular Cooperation

In order to achieve its objectives, COMSATS has been using a variety of conventional and innovative mechanisms. First and foremost in this connection is the policy of organizing international capacity-building programmes in partnership with other international organizations, such as Pakistan Commission for UNESCO, ISESCO, NAM S&T Centre, and Academy of Sciences for the Developing World, in order to gain maximum benefits with limited monetary input. Significant in-kind contribution of member countries is received in the form of hospitality to visiting scientists, local organizational expenditures of international events and travel for participation in COMSATS related meetings.

COMSATS also provides an institutional platform for South-South and North-South technical cooperation in areas of mutual interest, such as Education, Information Technology, Environment, Energy, and Health.

The organization actively facilitates exchange of expertise and technology among its Member States. In that direction, it is currently implementing various programmes and projects in collaboration with its Member States as well as some international organizations/agencies. For implementing its South-South and North-South Cooperation programmes, COMSATS has developed working relations with the following international organizations:

For the benefit of its Member States, COMSATS maintains close links with world renowned S&T institutions and international organizations working in various areas relevant to socio-economic development and institution building. The size and scope of COMSATS' international cooperation varies from national to regional to international levels. The usual mode of such cooperation

Some Partner Organizations in the North and the South

- Abdus Salam International Centre for Theoretical Physics (AS-ICTP);
- American Institute of Pakistan Studies (AIPS);
- Centre for Science and Technology of the Non-Aligned and Other Developing Countries (NAM S&T Centre);
- Chinese Academy of Sciences (CAS);
- European Commission (EC);
- International Centre for Genetic Engineering and Biotechnology (ICGEB);
- International Development Research Centre (IDRC);
- Islamic Educational, Scientific and Cultural Organization (ISESCO);
- OIC Standing Committee on Scientific and Technological Cooperation (COMSTECH);
- Oman National Computer Emergency Readiness Team (OCERT);
- Pacific Islands Development Forum (PIDF);
- The World Academy of Sciences (TWAS);
- United Nations Development Programme (UNDP);
- United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP);
- United Nations Educational, Scientific and Cultural Organization (UNESCO);
- United Nations Industrial Development Organization (UNIDO).

is the sponsorship of projects, on-job trainings, workshops, postgraduate education scholarships, expert visits, as well as technical consultancies. The international cooperation is facilitated through bilateral and multilateral Memoranda of Understanding (MoU), Agreements and Letters of Intent. Presently, there are over 58 MoU signed with a number of national/international collaborators. Horizons of these collaborations are being expanded to the North and avenues of cooperation are being explored with the European Union and institutions in the UK, such as Association of Commonwealth and British Council.

Participation in Some Recent International Fora

74th session of UNESCAP

Under its renew vision for future, COMSATS has stepped up its contacts with regional and international organizations. As a part of this exercise in 2017, COMSATS established its institutional arrangement with a regional development arm of the United Nations, UN Economic Social Commission for Asia and the Pacific (UNESCAP). The MoU signed with UNESCAP pertain to cooperation, inter alia, on joint research, events, capacity building, and STI Network of Centres of Excellence. The two Commissions are working to support member countries' efforts to exploit the potential of STI for sustainable development. Based on the decision that the two commissions would invite one another to attend their fora/ meetings as observers, COMSATS attended 74th session of UNESCAP in May 2018.



Inauguration of UN-OHRLLS's Technology Bank for Least Developed Countries

A three-member delegation led by the Executive Director COMSATS, Dr. S.M. Junaid Zaidi, visited Turkey, in June 2018. The visit was undertaken to attend the inaugural session of the UN Technology Bank for Least Developed Countries.

The members attended the inaugural session of the UN Technology Bank hosted by the Government of Turkey on the 4th of June 2018. The ceremony marked the achievement of the first target of the 2030 Agenda for Sustainable Development, SDG target 17.8

As a result of new collaborations sought, COMSATS has been invited to attend the Inauguration of UN-OHRLLS's Technology Bank for Least Developed Countries on June 4, 2018. With 4 member countries common with Commonwealth Association and LDCs, and in all seven LDCs as its members, COMSATS is well placed to disseminate the benefits of the Bank. LDCs that are the Member States of COMSATS are: Bangladesh; Gambia; Senegal; Somalia; Sudan; Tanzania; and Uganda.

The honorary life-time member of COMSATS Coordinating Council, Prof. Mohamed H.A. Hassan, is the Chair of the



Governing Council of Technology Bank. Modelled after UN University, the Bank is headquartered in Turkey, one of the latest member countries of COMSATS.

Programmes for Triangular Cooperation

Establishment of TWAS and TWNSO office at COMSATS' Headquarters, Islamabad – for Pakistan and other COMSATS Member Countries

A Regional Coordinating Office of Academy of Sciences for the Developing World (TWAS) and Third World Network of Scientific Organizations (TWNSO) was established at COMSATS Headquarters, Islamabad, on July 24, 2000. The Coordinating Office ensures quick disposal of the cases pertaining to the region and coordinates speedy exchange of information on research and other scientific projects designed by TWAS / TWNSO. A part of the Coordinating Office has been dedicated to Prof. Dr. Abdus Salam (Nobel Laureate), the founder of both TWAS and COMSATS, in recognition of his valuable services for development of science and technology.

Establishment of ICTP-Pak Chapter at COMSATS Headquarters, Islamabad (2002)

Pakistan Chapter of AS-ICTP was setup at COMSATS Headquarter on 31st May 2001. A website for AS-ICTP was developed and data of Alumni was updated. A series of Lectures were held from the academic work of Nobel laureates. The ICTP-PC maintains and disseminates latest news and programs of AS-ICTP

Promoting Joint Research for Common Solutions to the Problems of the South

International Thematic Research Groups

This concept is based on extending the most common way modern research is conducted. Generally, there is always a senior professor as Group Leader with several students/post-doctorate or other co-workers as Group Members; all engaged in work on a well-defined theme of research. COMSATS' ITRGs are different only in the sense that the Group Leader is an outstanding international scientist in one

How ITRGs Aid South-South Cooperation in Joint Research

- A platform to the scientists/researchers of the collaborating institutions to discuss and initiate joint research projects in the area relevant to the theme of the group
- Opportunities to the less technologically advanced Member Institutions working in the areas relevant to the group's theme to benefit from the expertise/experiences of the superior Lead Centre and Member Institutions of the group
- Opportunities of sharing the laboratory resources/facilities needed to perform research among the group members. Those institutions with weaker technological base will be able to benefit from their advanced counterparts in the group
- Opportunities of short-term trainings/workshops to the researchers of the Member Institutions in order to build their capacity in the subject area and enable them to perform their research assignments indigenously and efficiently
- Opportunities of expert exchange to the Member Institutions

of the member countries, while the Group Members are a combination of local and other scientific workers distributed in different countries interested in the project. The theme of the group activity and the size of the group are left to the discretion of the Group Leader. Collaborations under ITRGs have brought together a number of relevant institutions from Bangladesh, Brazil, China, Egypt, Iran, Iran, Jamaica, Jordan, Nepal, Nigeria, Pakistan, Sri Lanka, Sudan, Tanzania, Turkey, and Zimbabwe.

Currently, six ITRGs are active, their names and corresponding research projects decided in their foundation meetings are enlisted next page.

Some salient activities that transpired as

a result of the cooperation under ITRGs among the countries of the South are as follows:

Collaboration of China with other Member States

The ITRG on Climate Change and Environmental Protection is being led by the International Centre for Climate and Environment Sciences (ICCES), China. The group is executing joint research project entitled: 'Characteristics and Mechanism of the Extreme Climate Events under the Climate Change Background'. Researchers and scientists belonging to China, Iran, Zimbabwe, Sudan, Pakistan, Sri Lanka, Bangladesh, Uganda, Nigeria, Malaysia and Nepal are participating in the project.



Groups, Lead Centres and Title of Research Project/Group Leader
Information and Communication Technologies (ICTs) e-Solutions for Community Using Low-cost Wi-Fi COMSATS University Islamabad (CUI), Pakistan
Natural Products Sciences Drug Discovery from Nature for Neglected Diseases International Center for Chemical and Biological Sciences (ICCBS), Pakistan
Climate Change and Environmental Protection Characteristics and Mechanism of the Extreme Climate Events under the Climate Change Background International Center for Climate and Environment Sciences (ICCES), China
Mathematical Modeling Mathematical Modeling and Simulation of Air and Water Pollution: Effects and Remedies National Mathematical Centre (NMC), Nigeria
Agriculture, Food Security and Biotechnology Improvement of Wheat Quality and Productivity Using both Traditional and Modern Techniques University of Khartoum, Sudan
Renewable Energy i) Measurements and Characterization of New Silicon Crystalline Solar Cells ii) Development of Microbial Fuel Cells for Bioelectric Generation and Wastewater Treatment Iranian Research Organization for Science and Technology (IROST), Iran.

Collaboration of Nigeria with other Member States

The ITRG on ‘Mathematical Modeling’ is being led by the National Mathematical Centre (NMC), Nigeria. The group is executing joint research project entitled: ‘Mathematical Modeling and Simulation of Air and Water Pollution: Effects and Remedies’. Researchers and scientists belonging to Nigeria, Tanzania, Pakistan, Bangladesh, Jordan and Senegal are participating in the project.

Collaboration of Pakistan with other Member States

The ITRG on ‘Natural Products Sciences’ is being led by the International Center for Chemical and Biological Sciences (ICCBS), Pakistan. The group is executing joint research project entitled: ‘Drug Discovery from Nature for Neglected Diseases’. Researchers and scientists belonging to Pakistan, Egypt,

Iran, Sudan, Bangladesh, Nigeria, Sri Lanka, Turkey, Kazakhstan, Libya, Algeria and Indonesia are participating in the project.

Apart from joint research projects, COMSATS’ ITRG programme provides a platform for expert-exchange and sharing of laboratory resources among the member institutions. Moreover, opportunities of short-term trainings are provided to the group members in order to build their capacity in the target area and enable them to perform their research assignments more effectively.

Bilateral Research Activities between Centres of Excellence

Each year, during the Coordinating Council Meetings, the Centres of Excellence identify areas in which they wish to collaborate and initiate joint research activities. In response to Sustainable Development Goal 17, a number of Centres of Excellence of

COMSATS began knowledge and research based partnerships.

More than 10 memoranda of understanding have been signed between COMSATS' Centres of Excellence to promote South-South cooperation in the areas of agriculture, food and water, Environment and climate change, health, information and communication technologies (ICTs), new and emerging technologies, and renewable energy technologies.

Information Dissemination and Management

Web-portals

Cognizant of the need for having easily accessible digital resource of the ongoing research activities for S&T cooperation, COMSATS embarked upon the programme of developing information gateways in collaboration with its partner organizations. The programme aims to facilitate and foster

scientific and institutional networking and to bring about socio-economic development.

In 2006, COMSATS in collaboration with IESCO developed the web-portal 'TWSN' — the Islamic World Science Net (www.icpsr.org.ma). In 2001, COMSATS provided its technical expertise to UNIDO for the development of 'Industrial Information Network (IIN)', a web-portal that aimed to provide one-window operation to small and medium enterprises (SMEs) for business-to-business transactions. The expertise and experience thus gained by COMSATS can be extended to other member countries on request.

Publications

In addition to the information management and dissemination through web portals, COMSATS publications over the years have been providing the countries of the South, members and non-members alike important information of various natures. From periodicals informing them about



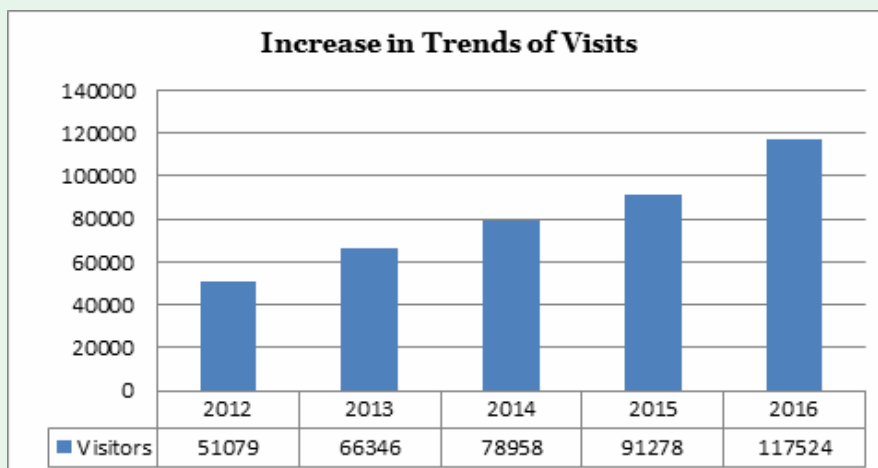
VIRTUALLY BRINGING THE WORLD TOGETHER: ISLAMIC WORLD SCIENCE NET

Islamic-World Science Net (IWSN) web portal was launched in 2007 jointly by ISESCO and COMSATS with an aim to facilitate and foster scientific and institutional networking and to bring about socio-economic development in Islamic Countries. To bring the scientists /researchers from French origin in the network, the French version of IWSN, was also developed and launched by COMSATS. Uptil 2016, COMSATS' dedicated team maintained the web-portal on behalf on ISESCO.

IWSN provided a virtual forum for scientific researchers, particularly from the Muslim Countries in 13 scientific thematic areas/disciplines to exchange information, share knowledge, address common concerns and develop and supervise realistic programmes for achieving excellence in scientific research. More than 6,200 scientists /researchers got themselves registered on the IWSN virtual scientific thematic groups. The portal also provide a large volume of informative data comprising profiles of 699 R&D institutions, 772 universities and 25 academies of sciences, as well as scientific profiles of 57 member states of the Organization of Islamic Cooperation (OIC).

The main IWSN virtual scientific thematic groups on the web portal included; New and Renewable Energy Group, Science and Research Policy Group, Bio-sciences / Biotechnology and Genetic Engineering Group, Bioethics group, Environment Group, Mathematics Group, Water Management Group, Nano-technology Group, Science & Technology Park Management and ICTs in Science and Technology Group.

The data collected through analytical tools showed the popularity of the web portal among scientists and students not only from Islamic World but from the developed countries as well. The Analytical Report for 2012-2017 shows visitors from over 197 countries/territories. Majority of the visitors of the portal were from the developed countries, and United States, Russia, United Kingdom & India are among top ten (10) countries.



opportunities and developments available with COMSATS and its organs, intellectual contributions of various scientific events, compendia and directories to scientific journal papers, these publications have been important in raising awareness and stimulating discourses on important issues pertaining to S&T-led development of the countries of the South.

COMSATS' journal, Science Vision, in its 21 volumes has received inputs from a number of countries including: Bangladesh, Egypt, Indonesia, Italy, Jamaica, Kazakhstan, Malaysia, Netherlands, Pakistan, Portugal, Spain, Sri Lanka, Sudan, Sweden, Syria, Taiwan, Turkey, UK, and USA.

While COMSATS' Newsletter has remained a regular means for engaging with the stakeholders and has had a constant patronage from its 22 Centres of Excellence in developing countries.

Another important set of publications brought out from time to time by COMSATS Secretariat is the "COMSATS' Series of Publications on Science and Technology". COMSATS' national and international events focus on promoting science and technology, highlight policy, and emphasize

efficacious practices. These are included in the afore-mentioned series.

COMSATS also brings out joint publications with its partner organizations, such as COMSATS-TWAS 'Excellence in Science' covering profiles of scientific institutions from Nepal, Colombia and Pakistan, and COMSATS-NAM S&T Centre Nanotechnology in the Edge of Convergence covering proceedings of an important event held in Malaysia. Partners for other publications include ISESCO.

Some other Publications

- AS-ICTP: 50 Years of Science for the Future – Views from Islamabad
- One Hundred Reasons to be a Scientist: (Urdu Version)
- Profiles of Institutions for Scientific Exchange and Training in the South (Fourth Edition)
- Directory of International Donor and Development Organizations
- Biotechnology Book
- Scientific and Technological Research for Development
- Education, Science and Technology in Developing Countries: Some Thoughts and Recollections



COMSA

Islamabad Pakistan



What's Ahead for South-South and Triangular Cooperation

Collaborations among Centres of Excellence

With its renewed focus on South-South and Triangular cooperation, COMSATS shall continue to facilitate collaboration among its Centres of Excellence in order to enable them collectively address their common challenges. Key collaborative undertakings between the Centres of Excellence expected to materialise soon are given below:

Kazakhstan-Pakistan Collaboration for Establishment of Joint Laboratory in Chemistry at ICCBS, Pakistan

Under an agreement signed earlier, two Centres of Excellence of COMSATS, namely the Al-Farabi Kazakh National University (KazNU), Kazakhstan, and the International Center for Chemical and Biological Sciences (ICCBS), Pakistan, are jointly establishing a Kazakhstan-Pakistan Joint Laboratory in Chemistry at ICCBS, Karachi, Pakistan. The joint laboratory is expected to be opened during 2018.

China-Sri Lanka Collaboration to Establish the Center for Extreme Climatic Events & Environmental Research (CECEER) in Colombo

During 2015, two Centres of Excellence of COMSATS, namely the International Centre for Climate and Environment Sciences (ICCES), China, and the Industrial Technology Institute (ITI), Sri Lanka, signed an MoU for the establishment of the Center for Extreme Climatic Events & Environmental Research (CECEER) at ITI, Colombo, Sri Lanka. The two Centres have also been collaborating with each other in the field of climate sciences under COMSATS' International Thematic Research Group on 'Climate Change and Environmental Protection' since 2010. In accordance with the MoU, the afore-mentioned Centre is being jointly established at ITI.

Sudan-Pakistan Collaboration in Industrial Research

A Programme of Cooperation has been agreed between IRCC-Sudan and Pakistan Council for Scientific and Industrial Research (PCSIR), Pakistan, to initiate and undertake R&D projects, industry oriented projects and any other activities. The objective of this Programme of Cooperation is to develop a joint mechanism to promote and fund innovation-driven research and technology development as well as to encourage partnerships and business-led R&D&I projects between the government-owned science and industrialization research organizations of both countries.

China-Sri Lanka Collaboration for Research in Water Sector

ICCES-China is collaborating with ITI-Sri Lanka for a research project on hydrological changing characteristics in Mahaweli watershed, whereby meteorological data has been collected in this area for characteristics research of extreme climate events. The goal is to build up a large-scale land surface hydrological coupling model for Mahaweli watershed, and to start simulation study of hydrology and water resources process and evolution. The project is part of China-Sri Lanka Science & Education Cooperation project Under the Belt and Road Initiative.

China-Pakistan Collaboration in Climate Sciences

As a follow-up of a visit of officials of CUI-Pakistan to ICCES-China in 2016, the two organizations are planning a joint research project on identifying features and impacts of climate change alongwith the China-Pakistan Economic Corridor for the past 20 years by using and comparing meteorological data collected from both sides.

Colombia-China Collaboration

As a follow-up of the visit of an official of CIF-Colombia to ICCES-China in December 2017, the two centres are planning to execute a joint research project focusing on climate change and disaster modelling in order to better cope with the climatic and environmental hazards in Colombia. A preliminary dialogue on the joint international conference or training workshop is also being conducted.

China-Pakistan Collaboration in the Field of Industrial Biotechnology

TIB-China and COMSATS are exploring the possibility of establishing a research centre on industrial biotechnology in Pakistan.

Pakistan-Kazakhstan Academic Collaboration

An MoU has been signed between KazNU-Kazakhstan and CUI-Pakistan during April 2018 in order to provide the basis for the exchange of staff, scholars, students, academic information and materials in the belief that academic and research processes at both educational institutions would be enhanced and that mutual understanding between their respective faculty, scholars, staff and students would be increased by establishing different exchange programs.

Nigeria-Pakistan Collaboration

NMC-Nigeria and CUI-Pakistan are planning to collaborate in the fields of Mathematics, e-Learning, Biotechnology, Environmental Sciences, Physics and Computer Science. The plans also include enhancing cooperation in the following areas: fellowship/scholarship opportunities, Accessibility of CUI Virtual Campus to NMC, joint online conferences, e-library, research-based visits, and joint research projects.

Tanzania-Sudan Collaboration in Leather and Textile Research

IRCC-Sudan and TIRDO-Tanzania are considering joint research projects in leather and textile research, expert and students exchange program, and technology transfer program.

Turkey-Tanzania Collaboration

TIRDO-Tanzania and TÜBİTAK MAM-Turkey are making consultations to collaborate in the areas of energy, engineering, food science and technology, biotechnology, materials technology, environment, and chemistry. Moreover, Expert & Students Exchange program and Technology Transfer program are also being considered.

Tunisia-Turkey Collaboration

TÜBİTAK MAM-Turkey and the Government of Tunisia are cooperating in the following fields: Environment and Cleaner Production, Energy, Genetic Engineering and Biotechnology, Food, Chemical Technology, Materials and Earth, Marine Sciences etc. The cooperation would be possible by means of student programs, EU programs and H2020 through bilateral and multilateral agreements.

Collaboration between COMSATS and International Organizations

COMSATS is closely interacting with ICGEB-Italy, TWAS-Italy, ICTP-Italy, British Council-UK, ACU-UK, Universities UK, European Union, DFID, etc. in order to explore opportunities of triangular cooperation for the benefit of developing countries.

The United Nations Educational, Scientific, and Cultural Organization (UNESCO) and

COMSATS have been cooperating with each other since last several years based on the recognition that important elements of complementarity exist between the two organizations. Within the framework of implementation of the MoU signed between the two organizations in 2015, COMSATS has proposed a bi-annual joint Cooperation Programme to UNESCO. The main purpose of the proposal is to cooperate in the human resources development, especially the capacity-building of human resources in developing countries from African region. Proposal include faculty training programme, regional consultative meetings on Science diplomacy; learning and transfer Innovation Policy in Africa, curriculum development, workshops to learn Advanced Technology Commercialization, and the dispatch of specialists.

Moreover, collaboration under 2017 MoU with UNESCAP is expected to be expanded and strengthened.

Future Aspirations and Lines for South-South Cooperation

COMSATS is looking to have a more effective need assessment of its Member

States. Institution-building and upgradation is an important consideration. Some important considerations, therefore, in future engagements of COMSATS would be:

- i. S&T Mapping Exercise for the developing countries in order to identify their strong areas as well as areas in which they need support from others.
- ii. Country level Need Assessment for the developing countries in order to effectively address their challenges.
- iii. Facilitation in formulating/reviewing their national ST&I Policies and also advocating increase in annual national expenditures for S&T and R&D.
- iv. Commercialization of research through Technoparks.
- v. Upgrading of existing centres and their laboratories and establishment of new research centres in cutting edge fields of science and technology in developing countries with help from International Donor and Development Agencies, including World Bank, Islamic Development Bank, Asian Development Bank, African Development Bank, etc.
- vi. Establishment of New state-of-the-art universities with a quality that places them among top 500 universities of the world.

5

FUTURE PLANS (2018-2019)



Centres of Excellence



BCSIR-Bangladesh



Embrapa Agrobiologia-Brazil



ICCES-China



TIB-China



CIF-Colombia



NRC-Egypt



CSIR-Ghana



IROST-Iran



ICENS-Jamaica



RSS-Jordan



KazNU-Kazakhstan



NMC-Nigeria



ICCBS-Pakistan



CUI-Pakistan



AQU-Palestine



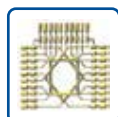
UCAD-Senegal



ITI-Sri Lanka



IRCC-Sudan



HIAST-Syria



TIRDO-Tanzania



CERTE-Tunisia



TÜBİTAK MAM-Turkey

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