



Annual Report 2021



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



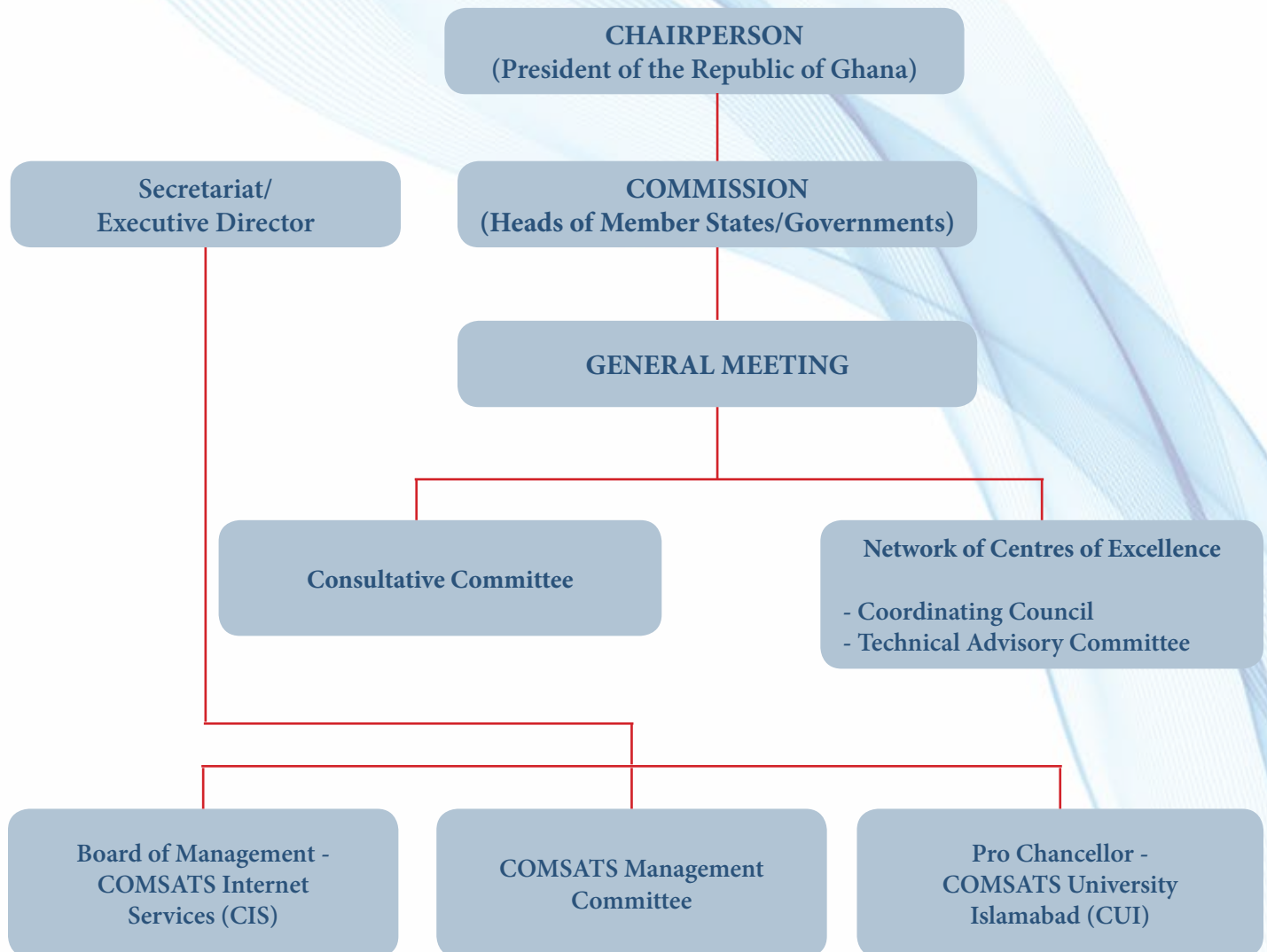
ANNUAL REPORT 2021

March 2022



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

ORGANIZATIONAL STRUCTURE





Hon. Nana Addo Dankwa Akufo-Addo

President of the Republic of Ghana
Chairperson COMSATS

Hon. Nana Addo Dankwa Akufo-Addo is the incumbent President of the Republic of Ghana. He won the country's Presidential Elections for two consecutive terms in 2016 and 2020, respectively. President Akufo-Addo assumed charge as Chairperson of COMSATS upon becoming the President of Ghana (the country holding COMSATS' Chair) for the first time on 7th January 2017. He later retained the charge upon re-election.

The Chair of COMSATS had been rotated in 2012 from Pakistan to Ghana through consensus among the members of COMSATS' Commission at its 2nd General Meeting held in Islamabad and stayed with Ghana after consensus in 3rd General Meeting.

As a lawyer, Mr. Akufo-Addo worked to champion the cause of human rights, rule of law, justice, freedom, and democracy in Ghana. He is also the Co-chair of the UN Secretary-General's SDG Advocates working with his fellow advocates to promote SDGs as part of an ambitious and transformative global development agenda.



Acknowledgement

The editorial team of COMSATS Annual Report thankfully acknowledges contributions of officials from COMSATS Secretariat, COMSATS Internet Services and COMSATS Centres of Excellence, without which this report could not have been possible. Special thanks goes out to Chairpersons of Consultative Committee and Coordinating Council for their worthy remarks and messages.

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ABOUT COMSATS

The Commission on Science and Technology for Sustainable Development in the South (COMSATS) was established in October 1994 as an international/inter-governmental organization

to act as a global forum of developing countries for their sustainable socio-economic uplift through applications of science and technology. COMSATS' current membership comprises of 27 countries located in the continents of Africa, Asia, Latin America (and Eurasia), representing a population of over one-third of the world's total.

These countries have diverse social, cultural, economic, political, educational and religious backgrounds, and also differ greatly in their scientific and technological capacities. Their common aspirations for development through cooperation in S&T brought them together on the platform of COMSATS. COMSATS' major source of scientific and technological strength stems from its network of international S&T Centres of Excellence, which comprises of 24 reputed R&D and S&T, and higher education institutes in developing countries, predominantly COMSATS Member States.

As stipulated in the organization's statutes, COMSATS Secretariat is permanently located in Islamabad, Pakistan, with its operation and expenditures supported through generous grants from the Government of Pakistan. The membership of COMSATS is open to all developing countries. The organization also aspires to broaden its horizons to all countries and institutions, including those from the North.

MISSION

The mission of COMSATS is to 'help create a world where all nations/states are at peace with one another and capable of providing a good quality of life to their populations in a sustainable way, using modern scientific and technological means'.

OBJECTIVES

Major objectives and functions of COMSATS are:

- To sensitize the countries in the South to the centrality of science and technology in the development process, to the adequate resource allocation for research and development, and to the integration of science and technology in the national and regional development plans;
- To support the functioning and activities of the Network of International Science and Technology Centres for Sustainable Development in the South, established at the foundation meeting of the Commission;
- To support other major initiatives designed to promote indigenous capacity in science and technology for science-led sustainable development, and to help mobilise long-term financial support from international donor agencies and from government/institutions in the North and the South to supplement the financing of international scientific projects in the South;
- To provide leadership and support for North-South and South-South cooperative schemes in education, training and research, such as the proposal to set up programmes of scholarships for research at centres of excellence in the South; and
- To support the relevant programmes and initiatives of major scientific organisations working for the development and promotion of science and technology in the South.

Ms. Humaira Ahmed

Federal Secretary at the Ministry of Science and Technology, Government of Pakistan

Chairperson of COMSATS Consultative Committee and Acting Executive Director COMSATS

Ms. Humaira Ahmed took charge as the Federal Secretary at the Ministry of Science and Technology, Government of Pakistan, on 18th January 2022. By virtue of her current office, Ms. Humaira is the incumbent Chairperson of COMSATS Consultative Committee and interim Executive Director at the time of publication of this Report.

A senior bureaucrat of Pakistan Administrative Service (PAS) group, Ms. Ahmed has earlier served the key institutions of Pakistan, including Federal Public Service Commission, President Office, and Establishment Division, KPK. She has vast experience of serving at senior policy implementation and policy-making positions at federal and provincial levels.

FOREWORD

Against better hopes, the Pandemic and associated challenges remained at the center-stage of global development narrative. Major setbacks have been experienced by the world with respect to a number of development indicators and Sustainable Development Goals since the onset of the Pandemic. The world, however, is gradually and inevitably acclimating to it by reprioritizing, realigning and strategizing. Not all is lost in this regard as we saw digitalization of unprecedented pace, evolved means of governance, innovative approaches to running businesses, commercial activities and day to day affairs.

Vaccine development, distribution and diplomacy globally coupled with evolving social and policy practices of health and commerce is helping to achieve new normal, if not complete normalcy, in a world where a number of other global issues await urgent responses and joint action, climate change being one of them. One of the three pillars of sustainable development and lying at the heart of key goals and targets of the UN Development Agenda 2030, environment still remains under threat of deterioration under global industrial and transportation practices among others. This, in turn, bears news of greater issues of quality of life and even survival of global populations in future. COP 26 held in Glasgow, UK, in November this year has hopefully established necessary urgency in this regard and call to action from nations across the world.

Collaborations and joint action that the values of development sector and SDGs enshrine will, therefore, remain pivotal in addressing global issues. Globalization not only brought the world closer over the decades but also necessitates cooperative approaches of global, regional and even national issues. Good foreign policies, organizations and institutions need to remain cognizant of such needs.

Pakistan became a regional leader in international S&T cooperation and Science Diplomacy, bringing countries of the South onboard with an Agenda of S&T-led development from the platform of the Commission on Science and Technology for Sustainable Development in the South (COMSATS). It took foresight, excellence of diplomacy, and an S&T vision to bring together heads of states and their representatives and build a consensus on apex forum for S&T cooperation. Putting S&T on national agenda of developing countries that became a member of such a commission was not and still is not a small feat.

This is the reason why persistence of COMSATS on pursuing this agenda with, what is now, 27 Member States, needs due recognition at regional and international level.

Pakistan's Ministry of Science and Technology (MoST) has been doing its due since the organization's statutory placement in Islamabad, Pakistan. MoST, Pakistan, has remained steadfast in its support to COMSATS by way, inter alia, of: bearing running expenses of COMSATS Secretariat to participation and support to its statutory functions, including two Commission Meetings, and seven Coordinating Council Meetings. From time to time, the Ministry has also been entrusted with responsibilities of Executive Director on interim basis.

Last of these constituted a major part of MoST-Pakistan's engagements with COMSATS during 2021. Three of my colleagues responsibly held two portfolios at the organization, i.e., the ED and ex-officio Chairpersonship of Consultative Committee (details on page 06). Working in these two roles currently, I hope the Ministry's enhanced participation in COMSATS' operations would be beneficial to the organization and its beneficiary countries and institutions.

It is encouraging to note that COMSATS is playing its due share in the progress of science and technology not only in Pakistan but also in the Southern region through Member States. Reported in this publication, such efforts can be seen from the COMSATS' activities for the year 2021 that apart from having an international participation, resulted in necessary information sharing, science diplomacy and advocacy of Sustainable Development Goals. Establishment of COMSATS Joint Centre for Industrial Biotechnology (CCIB) is one significant development of the year. COMSATS' contributions to health and Pandemic continued from the platform of COMSATS Telehealth and through R&D at COMSATS International Centres of Excellence.

A number of other undertakings in the form of webinars and trainings, international liaison with partners in the North and the South, interactions with COMSATS' member countries and diplomatic missions based in Pakistan, and international observances, furthered the organization's objectives. A remarkable development in terms of cooperation with partners included a cooperation agreement with Pakistan National Commission for UNESCO (PNCU). Detailed information on these and some other achievements are reflected in the Chapters of this Report.

I laud the hard work, and commitment of colleagues at COMSATS Secretariat and hope that the readers would find the contents of this report informative and useful.

Members of COMSATS Coordinating Council



Prof. Dr. Md. Aftab Ali Shaikh
Chairman BCSIR, Bangladesh



Dr. Cristhiane Amancio
D.G. Embrapa Agrobiologia, Brazil



Prof. Lin Zhaohui
Director ICCES, China



Prof. Dr. Yanhe Ma
Director General TIB, China



Dr. Eduardo Posada F.
Director CIF, Colombia



Prof. Mohamed Hashem
President NRC, Egypt



Prof. Herbert Robinson
Vice Chancellor UTG, Gambia



Prof. Dr. Victor Agyeman
Director-General CSIR, Ghana



Prof. Dr. Mochamad Ashari
Rector ITS, Indonesia



Dr. Alireza Ashori
President IROST, Iran



Mr. Charles N. Grant
Director General ICENS, Jamaica



HRH Princess Sumaya bint El Hassan
President RSS, Jordan



Prof. Dr. Zhanseit Tuimebayev
Rector KazNU, Kazakhstan



Prof. Promise Mebine
Director NMC, Nigeria



Prof. Dr. M. Tabassam Afzal
Rector CUI, Pakistan



Prof. Dr. M. Iqbal Choudhary
Director ICCBS, Pakistan



Prof. Dr. Imad F. S. Abukishek
President AQU, Palestine



Prof. Ahmadou Aly MBAYE
Rector/President UCAD, Senegal



Dr. Radhika Samarasekera
Director General ITI, Sri Lanka



Dr. Mohamed Suliman
Acting D.G. IRCC, Sudan



Dr. Maher Suleiman
Director HIAST, Syria



Prof. M. M.A. Mtambo
Director General TIRDO, Tanzania



Prof. Ahmed Ghrabi
Director General CERTe, Tunisia



H.E. Prof. Hasan Mandal
President TUBITAK, Turkey



Prof. Dr. Ashraf Shaalan

Chairperson of COMSATS Coordinating Council

Prof. Ashraf Shaalan was elected as the Chairperson of COMSATS Coordinating Council during its 19th Meeting held in May 2016, in Islamabad, Pakistan, when he was the President of COMSATS Centre of Excellence in Egypt, National Research Centre (NRC). Later, the Council approved his life-time membership during its 22nd Meeting. Also, he was made the Chairperson for another term through unanimous approval.

A widely published academician, Prof. Shaalan is member of the Egypt's Presidential Specialized Council for Education and Scientific Research of Egypt and has previously served as the Vice-President of the Academy of Scientific Research and Technology.

FROM THE CHAIRPERSON COORDINATING COUNCIL

It is my honour and pleasure to introduce the annual report of COMSATS for 2021 with my message as the Chairperson Coordinating Council. As we all know, the spread of Coronavirus together with its successive mutations within the last two years all over the world has led to disturbances in the short-term agenda of most of the international organizations. As everyone struggled with the COVID-19 pandemic, COMSATS Secretariat also had to come to grips with virtual meetings and webinars to accomplish its tasks in light with its mandate. These activities were enriched by the effective participation from the representatives of the member states and COMSATS Centres of Excellence. The current pandemic has highlighted the necessity of the sincere work from all of us towards development and implementation of new strategies to survive with the maximum possible accomplishment of our tasks.

With the progress in the number of vaccination in the world, I believe that COMSATS Centres of Excellence will soon be able to restore the full amplitude of hand-in-hand cooperation programmes for better and more productive science and technology in the South.

I highly appreciate the great efforts that have been made during 2021 by all the Centres of Excellence as well as the teams in the COMSATS Secretariat to adapt to the new inconvenient circumstances and achieve their missions.

I am looking forward to our next physical meeting in the near future to gather COMSATS' family under the umbrella of COMSATS Coordinating Council again to exchange ideas, strategies, and plans for the "After Pandemic Era" in the South.





CORE ACTIVITIES OF COMSATS SECRETARIAT

• COMSATS Coordinating Council	02
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CORE ACTIVITIES OF COMSATS SECRETARIAT

COMSATS Secretariat provides secretarial assistance to both the Commission and the Network of Centres of Excellence. It is responsible for regularly holding statutory body meetings as well as following up on their deliberations and decisions. The Secretariat also executes COMSATS' programmes and activities in partnership with other international agencies, national S&T institutions, R&D organizations, members of academia and scientific community across the world. Other core activities of the Secretariat relate to: pooling and management of financial resources; enhancing the membership of COMSATS and its Network; and special liaison with the host country, apart from regular engagement with all member states.



COMSATS Coordinating Council-Follow-ups, Preparations and Consultations

The 23rd Meeting of COMSATS Coordinating Council was held on 14th July 2020, which was attended by the Council members or their representatives from 19 Centres of Excellence of COMSATS, including BCSIR (Bangladesh), ICCES (China), TIB (China), CIF (Colombia), NRC (Egypt), UTG (The Gambia), CSIR (Ghana), ITS (Indonesia), IROST (Iran), ICENS (Jamaica), KazNU (Kazakhstan), NMC (Nigeria), ICCBS (Pakistan), CUI (Pakistan), AQU (Palestine), ITI (Sri Lanka), HIAST (Syria), TIRDO (Tanzania), and TUBITAK (Turkey). Decisions and recommendations of the meeting continued to be followed-up by COMSATS Secretariat during the year 2021. A look at the follow-ups is as follows.

Institution Building

In collaboration with its COMSATS Centre of Excellence in China, the Tianjin Institute of Industrial Biotechnology (TIB), COMSATS launched COMSATS Joint Centre for Industrial Biotechnology (CCIB), on 14th April 2021, in Tianjin, China. Mr. Linhao Chen, Deputy Director-General, Department of International Cooperation, Ministry of Science and Technology, China; Mr. Weidong Wang,

Deputy Mayor, Tianjin Municipal People's Government; and Prof. Dr. Yanhe Ma, Director General TIB, inaugurated the Centre.

The inauguration ceremony was physically attended by representatives from Chinese Ministry of Science and Technology (MoST), Tianjin Government, Chinese Academy of Sciences (CAS), the Alliance of International Science Organizations (ANSO), and CAS-TWAS Centre of





Excellence for Biotechnology, among others. In addition, representatives of COMSATS' Focal Ministries, Centres of Excellence, and COMSATS Secretariat virtually attended the ceremony.

At the inaugural, the establishment of CCIB was formalized through signing of an Agreement by Dr. Arshad Mahmood, Executive Director COMSATS, and Prof. Dr. Yanhe Ma, Director General TIB. Housed at TIB, the CCIB would serve as a comprehensive, integrated, open and shared platform to promote industrial biotechnology cooperation and bio-industry development among COMSATS Member States. The Joint Centre would, inter alia, facilitate collaborative R&D activities, capacity building (through training courses and academic exchange activities), S&T consultancy services, and technology transfer among COMSATS Member States and Centres of Excellence.

In his inaugural remarks, H.E. Chaudhry Fawad Hussain, Federal Minister for S&T, Government of Pakistan, and Chairperson COMSATS Consultative Committee, thanked and acknowledged the financial support and patronage of the Chinese Ministry of Science and Technology (MoST), and the Tianjin Government for the establishment of CCIB under the framework of National Center of Technology Innovation for Synthetic Biology (NC SynBio). He also appreciated the role being played by COMSATS in facilitating collaborations

among the developing countries in S&T domains. He noted that scientific prowess in industrial biotechnology will go a long way in improving agriculture, healthcare, environment, and other areas of importance, and humanity will be able to fight the challenges of hunger, poverty, diseases and environmental degradation in an effective manner. Speaking on the occasion, Mr. Linhao Chen, Deputy Director-General, Chinese Ministry of Science and Technology, noted that R&D collaboration in industrial biotechnology will bring great benefits to Member States.

Dr. Mahmood, in his remarks, noted that the Joint Centre will have far-reaching benefits at both regional and global scale by potentially contributing to the solutions to some of the grand challenges of present times. Prof. Ma hoped that CCIB will help

strengthen TIB's ongoing collaboration with other S&T centres in COMSATS Member States.

During the meeting, the appointed Director of CCIB, Prof. Dr. Jibin Sun, gave a briefing on development plans, programmes and activities of the Centre. Subsequently, a meeting was held among the members of CCIB's Consultative Committee and TAC. The meeting discussed means to promoting high-level joint R&D; furthering innovative ways for capacity building; promoting technology transfer among the member countries; and building the Joint Center into a high-end think tank.

Capacity Building

COMSATS continued capacity building



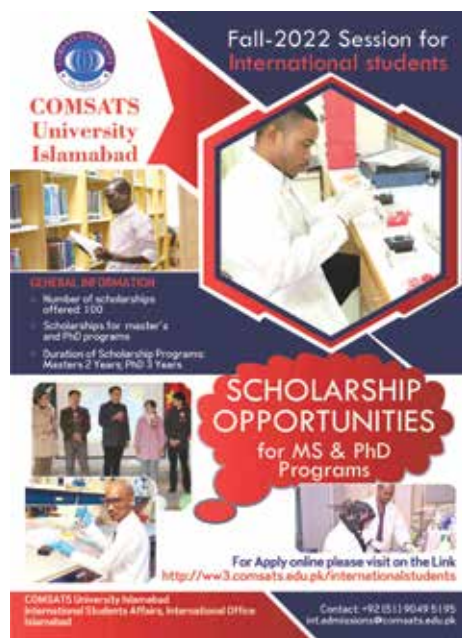
activities in different areas of science and technology with the view to strengthen scientific knowledge and workforce of the Member States and Centres of Excellence. In this regard, COMSATS organized 13 capacity building events during 2021. Due to the COVID-19 related travel restrictions, most of the events were held virtually. Also, eight lectures were delivered by various distinguished speakers belonging to member countries and international partner organizations under COMSATS' lecture series on South – South and Triangular Cooperation for socio-economic development in the South (details covered in Chapter 8). This series was also a major outcome of the meeting and resulted in engaging sessions and strengthening partnerships.

A major activity in this vein during 2021 took place in collaboration with Alliance for International Science Organizations (ANSO), China, and the Centre of Environmental Economics of the University of Chinese Academy of Sciences (CEE-UCAS), China. COMSATS jointly organized with these organizations three training courses on 'Sustainable Development and Leadership Enhancement' in 2021, during which over 200 participants from COMSATS Centres of Excellence and Member States participated.

Under newly established COMSATS Joint Centre on Industrial Biotechnology (CCIB), two capacity building events were organized by COMSATS and TIB-China. The details are covered in Section 04.

Scholarships, Fellowships and Awards

The Council advised the Centres of Excellence to benefit from the postgraduate scholarships and post-doctoral fellowships available at COMSATS' Network. Under this advice, CUI-Pakistan offers scholarships to the students vetted by COMSATS Secretariat in Masters & PhD Programmes. Open for admission in Fall 2022 semester, the



call for nominations under this offer was disseminated among the Centres of Excellence and the Focal Points. Moreover, ANSO has invited COMSATS to recommend students belonging to its member states for availing scholarships for young students for Fall 2022 semester, announcement of which has been disseminated among the Focal Points and Centres of Excellence. Pertinent actions in this respect are being taken.

COMSATS participated in the opening ceremony of the 34th Khwarizmi International Award (KIA), organized by IROST-Iran, on 7th February 2021. In this connection, certificates of the winners and Executive Director's message were shared with IROST.

New Projects and Programmes

As a meeting outcome, COMSATS Centres of Excellence were urged to initiate new projects and programmes related to SDGs to be facilitated by COMSATS Secretariat for submission of the joint proposals through donor agencies and international partner organizations for potential funding. In this connection, one project titled "Feasibility Study for Provision of Safe Drinking Water through Water Conservation (SDWC)", led by CUI-

Pakistan having participation from Egypt and Nigeria, was submitted by COMSATS under D-8 Project Support Fund which had been approved.

Moreover, ITI-Sri Lanka signed MoUs with CUI-Pakistan and ICCBS-Pakistan for collaboration in a number of fields of science and technology in presence of Prime Ministers of Pakistan and Sri Lanka, on 23rd February 2021. Furthermore, another cooperation agreement is being worked out to be signed by CUI-Pakistan and UTG-Gambia to facilitate academic exchange between the two higher education institutions of COMSATS' network.

Activities of COMSATS Centre for Climate and Sustainability

An important point of discussion of the Council Meeting, COMSATS Centre for Climate and Sustainability (CCCS) has further strengthened with the addition of TIB-China, UTG-The Gambia and HIAST-Syria, increasing the number of affiliated Centres of Excellence to 19. The Council had urged the members of CCCS to regularly hold online meetings for knowledge and resource sharing. In this regard, during 2021 CCCS organized three webinars in collaboration with various Centres of Excellence, focusing on 4 Sustainable Development Goals (SDGs): SDG6 Clean Water and Sanitation, SDG7 Affordable and Clean Energy, SDG13 Climate Action, and SDG15 Life on Land. Moreover, NRC-Egypt, KazNU-Kazakhstan, CCRD-Pakistan and AQU-Palestine submitted joint proposal through the platform of CCCS to German Ministry of Environment.



COMSATS Telehealth (CTH) for All

During the 23rd Council meeting, the



Centres of Excellence were urged to emulate COMSATS Telehealth programme in their respective countries. This advice was especially pertinent and relevant in view of the healthcare related issues and pressing needs created by the COVID-19 pandemic. As an effort in this direction, possibilities of collaboration with COMSTECH were explored to extend the benefits of CTH programme to common member states. COMSATS' team held discussions with Prof. Dr. M. Iqbal Choudhary, Director ICCBS-Pakistan/ Coordinator General COMSTECH, and discussed opportunities in this respect with a special focus on African region. The discussions led to a team from COMSTECH visiting COMSATS Telehealth facility in Islamabad for orientation on the telehealth system and its operations.

Annual Membership Contribution, Sensitization and Engagement

The Council members during the 23rd meeting agreed to play active role in sensitizing their respective governments to the importance of making due and sustained annual membership contribution towards COMSATS. In this regard, during the reporting period, AMC was received from China, Jamaica and Pakistan.

During 2021, virtual meetings were also held between officials of COMSATS Secretariat and Centres of Excellence to

enhance collaborations in various areas of S&T. Matters were discussed to take organizational matters with Network members forward as well as to discuss future plan of action. These matters included coordination with Centres of Excellence to represent COMSATS during technical meetings and forums.

As per the decision made during the meeting, Centres of Excellence actively contributed towards COMSATS' publications during the reporting period.

Engagements with Chairperson's Office in Ghana

Since the Chair of COMSATS was rotated from Pakistan to Ghana during the 2nd Commission Meeting, in April 2012, COMSATS Secretariat has been maintaining a strong liaison with Chairperson's Office to, inter alia,



coordinate the activities of various statutory bodies of COMSATS, keep the Chairperson of COMSATS fully informed about the activities of the Secretariat,

and seek his support and advice on the future activities of COMSATS. Presently, H.E. President of Republic of Ghana, Honourable Nana Addo Dankwa Akufo-Addo, is incumbent Chairperson of the Commission.

For better communication with COMSATS Secretariat, the Honorable President of Republic of Ghana, had nominated in 2019 Dr. Eugene Owusu (Advisor to President on the SDGs) as COMSATS' Focal Person at Presidency, during a meeting with COMSATS' delegation held at Flagstaff House (Jubilee House), Accra. During the reporting period, COMSATS Secretariat maintained communication to President's office on a number of matters.

Interactions after Re-election of the President

As a result of victory in Ghana's presidential election in December 2020, H.E. President of Ghana, Honourable Nana Addo Dankwa Akufo-Addo, retained both offices as President of the Republic of Ghana, and also Chairperson of COMSATS.

On re-election of the President, the felicitation message from the Executive Director COMSATS was sent to congratulate the Chairperson COMSATS. COMSATS Secretariat also published felicitation message in national newspapers. The coverage was also shared with the Chairperson office in January 2021.

Replacement of COMSATS' Focal Person in SDGs Unit

On transfer of Mr. Cletus Alengah, COMSATS' focal person at SDGs Unit, from the SDGs Advisory Unit, Mr. Dominic Asante Opoku-Manu, who assumed the Office of the President as Policy Analyst, was designated as COMSATS Focal Point at Ghana's Presidency. Mr. Cletus is playing an active role in preparations and planning of the

4th General Meeting, and COMSATS Secretariat remains actively engaged with the President's office through him.

Participation from the Chairperson's Office in the UNOSSC Retreat

On behalf of COMSATS, Mr. Dominic Asante Opoku-Manu, Policy Analyst and COMSATS' Focal Person at the Office of COMSATS' Chairperson, participated in UNOSSC Retreat to discuss 'Feasibility of Compiling Asia-Pacific Regional Report on South-South Cooperation 2021'. The event was organized on 15th December 2021, by the United Office for South-South Cooperation - Regional Office for Asia and the Pacific (UNOSSC-ROAP). The Executive Director COMSATS had nominated the Ghanaian SDGs Unit to represent COMSATS in the event.

Developments at the Executive Director's Office

In February 2021, the four-year term of the incumbent Executive Director, Dr. S.M. Junaid Zaidi, ended. While appointment of new full-time incumbent was awaited, the portfolio was passed on to the Federal Secretary of COMSATS' Focal Point in Pakistan, the Ministry of Science and Technology (MoST), on interim basis. In 2021, the portfolio passed between three Secretaries. The Federal Secretary of



MoST is also the ex-officio Chairperson of COMSATS Consultative Committee. These Secretaries thus held two portfolios during the terms mentioned in the figure below.

These Ministry officials have helped continue COMSATS' operations during 2021, as well as added vigor to the support from the Host Country, Pakistan, and COMSATS' focal ministry in the country.

Meetings and Engagements of Interim Executive Directors

Dr. Arshad Mahmood

After assuming office in March, Dr. Arshad Mahmood visited COMSATS Secretariat twice to gain more knowledge of COMSATS as an international/

intergovernmental organization and play his due role as the incumbent Executive Director COMSATS. A number of meetings were also held with senior officials of COMSATS in connection with ongoing operational needs of the Secretariat and efficient running of COMSATS' functions.

A highlight of the undertakings of his term as the Executive Director has been the launching of COMSATS Joint Centre for Industrial Biotechnology (CCIB) that was inaugurated on 14th April 2021, in Tianjin, China. The Centre has been established in collaboration with COMSATS Centre of Excellence in China, the Tianjin Institute of Industrial Biotechnology (TIB).

Thorough discussions and coordination were done in this regard with the Federal

Executive Director's Office During 2021



Dr. S.M. Junaid Zaidi

1st January to 28th February



Dr. Arshad Mahmood

1st March to 17th May



Mr. Nadeem Irshad Kayani

18th May to 27th July



Dr. Akhtar Nazir

28th July to 14th January ('22)



Secretary's office that rendered full support for the launching. The coordination also resulted in the presence of H.E. Chaudhry Fawad Hussain, Federal Minister for S&T, Government of Pakistan, in the meeting.

In his remarks on the occasion, Dr. Mahmood considered the Joint Centre a useful initiative of COMSATS and TIB.

Mr. Nadeem Irshad Kayani

Mr. Nadeem Irshad Kayani, Federal Secretary, Ministry of Science and Technology, Government of Pakistan, visited COMSATS Secretariat, on 14th June 2021. The purpose of the visit was to review the administrative and financial affairs as well as programmes of COMSATS with its senior officials. Mr. Kayani was accompanied by two of his colleagues from his Ministry – Mr. Shahzad Naim, Chief Financial and Accounts Officer (CFAO), and Mr. Zainul Abidin, Joint Scientific Advisor (JSA – International Liaison).

Briefing to senior officials of the Ministry of Science and Technology was given by Mr. Irfan Hayee, Deputy Director (Programmes), in the presence of other senior officials of COMSATS Secretariat, including Mr. Bilal Chohan, Director (Administration); and Mr. Amanullah Khattak, Director (Finance).

The presentation highlighted COMSATS' international role and on-going

programmes and activities. Mr. Hayee noted that these programmes and activities are well-coordinated among institutions in Member States, COMSATS Network and other stakeholders by COMSATS Secretariat under the patronage of COMSATS' statutory bodies that include 27 Member States and a Network of 24 Centres in 22 countries. Mr. Kayani was sensitized on the role of COMSATS Consultative Committee having representation of relevant government ministries and departments. Role of COMSATS Coordinating Council, comprising of heads of 24 Centres of Excellence, as well as the Technical Advisory Committee, a panel of renowned subject experts, was also delineated. Briefing about different activities of COMSATS covered the scientific capacity-building, scholarship/fellowship, scientific sponsorship, joint R&D initiatives as

well as outreach programmes. It was emphasized that Pakistan has been a major beneficiary of these programmes and activities.

While expressing satisfaction over the overall programmes of COMSATS, Mr. Kayani gave invaluable inputs regarding the future course of action for COMSATS. The meeting concluded with Mr. Kayani's directives to reassess financial needs of COMSATS Secretariat and establishment matters for due support from the Ministry.

Dr. Akhtar Nazir

Dr. Akhtar Nazir's engagements as the incumbent Executive Director included meetings with diplomatic officials, participation in meetings and events, as well as intermediation with the Executives of COMSATS' Focal Ministry (Ministry of Science and Technology).

Dr. Nazir met with the Ambassador of the Republic of Kazakhstan to Pakistan, H.E. Mr. Yerzhan Kistafin, and a three-member delegation led by Hon. High Commissioner of Ghana to Pakistan (Resident in Tehran), H.E. Eric Owusu-Boateng, on 25th October 2021, and 1st October 2021, respectively. The purpose was to engage the diplomats for networking, sensitization and explore possibilities of collaboration with these officials.



Dr. Nazir shared his views at COMSATS' events, joint events as well as represented COMSATS as the incumbent Executive Director at international meetings.

He chaired the event held by COMSATS Secretariat entitled "South-South Cooperation: Creating Headways for Post-Pandemic Inclusive Recovery", on 21st September 2021. The half-day event was held to celebrate United Nations Day for South-South Cooperation (12th September 2021).

On 20th December 2021, he spoke at the opening ceremony of Second International Training Course on Industrial Synthetic Biotechnology. In his recorded message during the event physically held in China, Dr. Nazir considered the event an opportunity for the participants to develop better understanding of one another's needs and skills, and build cooperative and long-term connections, as well as to share biotechnological advancements.

Dr. Akhtar participated live from MoST in a virtual workshop on 'Technical Innovation in Traditional Plant Medicine', from the platform of COMSATS Joint Centre for Industrial Biotechnology (CCIB), on 13th October 2021. Later in November, Dr. Nazir participated live from MoST, Pakistan, as a Special Guest at the inaugural of the 5th Biennial Research Symposium on "Positioning Science, Technology & Research for New Normal Industrial Challenges", organized by COMSATS' Centre of Excellence in Sri Lanka, the Industrial Technology Institute (ITI) in Sri Lanka (10th November 2021).

Held at COMSATS University Islamabad (CUI), Islamabad, on 14th October 2021, COMSATS' World Mental Health Day event had a remarkable presence from Dr. Nazir. As the Chief Guest of the event, Dr. Nazir emphasized the need for keeping debates open on mental health and other health issues through awareness events, which he deemed an important step forward for relevant remedial measures at societal and national levels.



During his term as Executive Director, he also actively corresponded with the members of COMSATS Consultative Committee and Coordinating Council regarding various programmes and activities undertaken by the Secretariat. He also oversaw the contributions made by COMSATS regarding Science Expo to be organized by Ministry of Science and Technology, Government of Pakistan, during 2022.

Interactions with Host Country, Pakistan

Prof. Dr. Ghazna Khalid, Member of Prime Minister's Task Force on COVID-19, Government of Pakistan; Mr. Yahya Akhonzada, Commissioner Dera Ismail Khan; and Dr. Zia Khattak, Director of Planning and Development, Khyber Pakhtunkhwa (KPK) (8th January 2021)

On special invitation from COMSATS, Prof. Dr. Ghazna Khalid, Member of Prime Minister's Task Force on COVID-19, Government of Pakistan; Mr. Yahya Akhonzada, Commissioner Dera Ismail Khan; and Dr. Zia Khattak, Director of Planning and Development, Khyber Pakhtunkhwa (KPK), visited COMSATS' flagship project in Pakistan, the COMSATS Internet Services (CIS), on

8th January 2021. The visit was arranged with a view to demonstrate the COMSATS Telehealth (CTH) facilities housed at CIS Islamabad for possible replication in far flung and mountainous areas of Pakistan.

Present on the occasion were Executive Director COMSATS, Dr. S.M. Junaid Zaidi; Chief Operating Officer of CIS, Mr. Nasir Jamal Khan along with senior officials of CIS. A briefing on the launching of telehealth services by COMSATS was given to the esteemed guests by Mr. Jamal who mentioned that the Programme was initiated to provide affordable, efficient and accessible healthcare to remote communities of Pakistan. He briefed the visitors about the support extended by CIS to People's Primary Healthcare Initiative (PPHI) of Balochistan for instituting a telehealth set-up. Mr. Jamal indicated that under an agreement the Government of KPK has also replicated e-ilaj facility in KP using COMSATS Telehealth model.

The visiting officials were receptive of the briefing and expressed willingness for establishing telehealth facilities in Dera Ismail Khan and Federally Administered Tribal Areas (FATA) region. Understanding was reached on having more cooperation to address dearth of medical staff and doctors in marginalized areas of Pakistan through judicious use of telehealth.

Dr. Khalid Saeed Khan, Member of Government of Pakistan's Task Force on COVID-19 (26th January 2021)

Dr. Khalid Saeed Khan, Member of Government of Pakistan's Task Force on COVID-19, and Distinguished Investigator, University of Granada, Spain, visited COMSATS' flagship projects in Pakistan, COMSATS Telehealth Centre and COMSATS University Islamabad (CUI), on 26th January 2021. During his visit to CTH, Dr. Khan was shown around the facilities and given a briefing on telehealth model of CTH. CTH, it was informed is currently working with 06 active telehealth clinics of Baluchistan and 01 in Jhelum (Punjab). Besides provision of primary and secondary healthcare services, the Programme is also helping to build capacity of paramedical staff as well as to create awareness among general public. Dr. Nadia Rasheed, Project Manager along with her team of doctors briefed the esteemed guest regarding the operations of CTH at CIS.

Appreciative of CTH's operations, Dr. Khan emphasized the need to integrate the findings of clinical research in telehealth services. Dr. Khan was impressed with the working and dedication of doctors in providing advanced primary health care to the remote areas of Pakistan. He looked forward to having collaboration for research projects relating to maternal healthcare and the use of artificial intelligence in evidence synthesis. He also emphasized the need to include clinical research trials in CTH telehealth sites/ services.

Accompanied by Engr. Qaiser Nawab, Assistant Director (Programmes) COMSATS, Dr. Khan later visited CUI and held a meeting with the Rector, Prof. Dr. Muhammad Tabassam Afzal. During the meeting, Dr. Khan was apprised of various programmes of CUI including the newly launched artificial intelligence programme. Various developments of the International Research Center of Biomedical Materials



(IRCBM) of CUI were also shared with Dr. Khan. He appreciated the programmes of CUI and suggested developing applications for recognition and prevention of domestic violence using voice capture with content and sentiment analysis using AI.

Dr. Khan was briefed about the health informatics and computer science expertise at CUI. He suggested academic exchange programmes, including visiting faculty and joint degree/diploma programmes in health informatics, etc. Rector CUI shared with the worthy guest achievements of the International Research Center of Biomedical Materials (IRCBM) at CUI Lahore campus and encouraged him to visit various academic and research facilities at CUI's other campuses in Pakistan.

Mr. Syed Shamoon Hashmi, Additional Secretary Special Initiatives, National Assembly of Pakistan (17th February 2021)

On 17th February 2021, Mr. Syed Shamoon Hashmi, Additional Secretary (Special Initiatives), National Assembly of Pakistan, visited COMSATS Secretariat along with Mr. Akhonzada Hussain Yousafzai, Focal Person on Speaker's Special Initiatives, to receive a briefing on COMSATS and explore areas for possible collaboration.

During the meeting, Dr. S. M. Junaid Zaidi, Executive Director COMSATS, briefed the distinguished guests about COMSATS' operations and programmes. Mr. Hashmi was receptive of Dr. Zaidi's presentation and appreciated the role COMSATS has been playing for the development of its Member States. To further explore areas of cooperation, Mr. Shamoon informed that National Assembly of Pakistan operates through various Standing Committees that provide oversight for governmental functions.

In this connection, he proposed that COMSATS could act as a think tank on S&T and related matters to support various Standing Committees. In particular, he sought support for National Assembly Standing Committees for Climate Change, Information Technology and Communication, Energy, and S&T. It was also discussed and agreed that COMSATS having expertise in the field of data warehousing will support National Assembly in establishing a secure data centre.

Dr. Sahibzada Ali Mahmud, Managing Director of Khyber Pakhtunkhwa Information Technology Board (KPITB) (20th February 2021)

On 20th February 2021, Dr. Sahibzada Ali Mahmud, Managing Director of Khyber

Pakhtunkhwa Information Technology Board (KPITB) visited COMSATS Secretariat and held a brief meeting with Executive Director, Dr. S. M. Junaid Zaidi. Also present during the meeting were Mr. Nasir Jamal Khan, Chief Operating Officer (COO) of COMSATS Internet Services (CIS), and Engr. Qaiser Nawab, Assistant Director (Programmes) at COMSATS Secretariat.

During the meeting, Dr. Mahmud was apprised of COMSATS Telehealth Programme and CIS as well as CIS' ongoing collaboration with KPITB. Appreciating COMSATS' programmes, Dr. Mahmud informed that KP is undergoing a digital transformation with rapidly expanding mobile and internet connections. This has the potential to significantly drive economic growth, improve employment opportunities, and enhance service delivery.

H.E. Shibli Faraz, Federal Minister for S&T, Government of Pakistan (11th August 2021)

H.E. Mr. Shibli Faraz, the Federal Minister for Science and Technology (MoST), Government of Pakistan, visited COMSATS Secretariat on 11th August 2021. Mr. Faraz assumed his office at COMSATS' Focal Ministry in Pakistan in April 2021. He was accompanied by Dr. Akhtar Nazir, Federal Secretary MoST, who is also the incumbent Executive Director COMSATS, as well as Maj. Qaiser Majeed Malik, Additional Secretary (MoST). The Minister and his colleagues were received by senior officials of COMSATS Secretariat that included Mr. Bilal Chohan, Director (Administration); Mr. Amanullah Khattak, Director (Finance); and Mr. Irfan Hayee, Deputy



Director (Programmes).

During the meeting, a comprehensive briefing was given to the honorable guests highlighting COMSATS' role as an intergovernmental S&T organization of the countries of the South. Besides, an overview of COMSATS' financial standing was given by Mr. Khattak who also made key recommendations to help improve the existing financial standing of COMSATS.

The case of COMSATS Internet Services (CIS) – COMSATS' flagship project established in 1996 – also came under consideration and Mr. Faraz recommended taking progressive measures to ameliorate the state of affairs in this pioneer internet service provider (ISP) of Pakistan.

Further during the meeting, discussions were held on ways to making COMSATS' programmes and operations more efficient and impactful, in particular, matters related to establishment, administration and finances. It was also noted that Pakistan as a member state and COMSATS' host country has been

the main beneficiary of COMSATS' programmes and activities. Moreover, it was hoped that scientific organizations under the Ministry of Science and Technology will extend their support for COMSATS and at the same time benefit from its international linkages. H.E. Mr. Faraz was appreciative of COMSATS' role as a key regional player in international cooperation in S&T. He hoped to see COMSATS' activities more aligned with national development agenda of Pakistan through applied R&D, commercialization and monetization of the research outputs, in addition to finding innovative solutions to national challenges. He also advised re-thinking strategies to help achieve COMSATS' international mandate.

Dr. Nazir noted that international S&T organizations, including those based in Pakistan have a long way to go in adapting to the needs of 21st century that it has presented in the last two decades. He hoped COMSATS remains cognizant of these needs and will make leaps in this direction in the coming years.

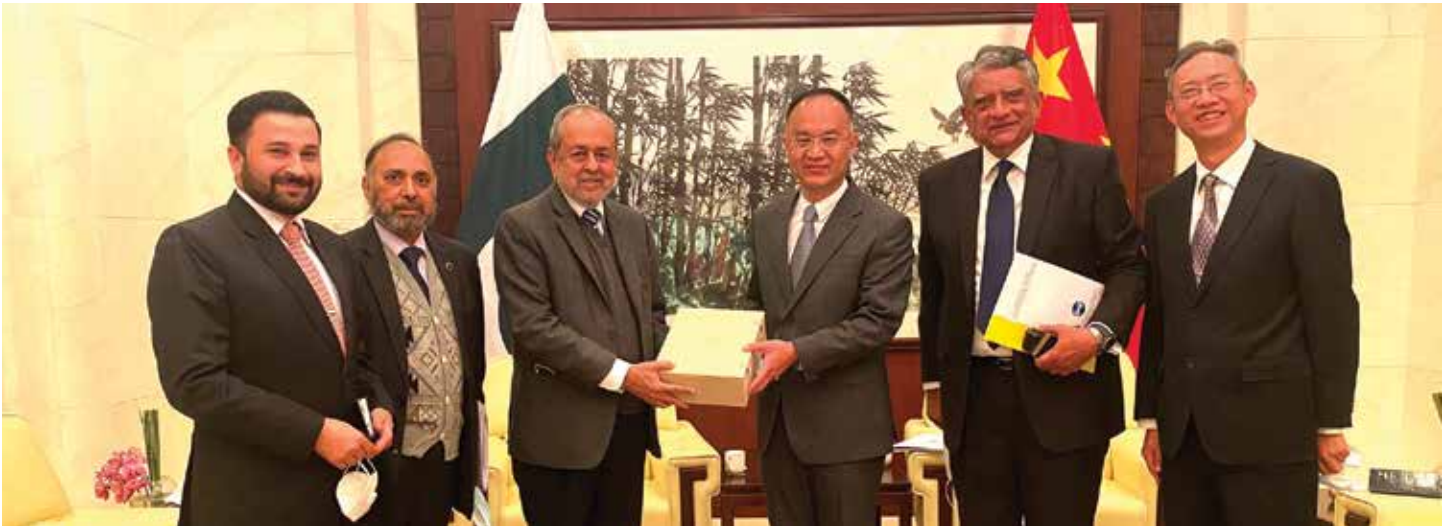


STRENGTHENING SOUTH-SOUTH AND TRIANGULAR COOPERATION

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- Meetings with Diplomats of Potential Member States 13

STRENGTHENING SOUTH-SOUTH AND TRIANGULAR COOPERATION

One of the functions of COMSATS is to support major initiatives designed to promote indigenous S&T capacity through synergies among relevant Governments in the North and the South. Dignitaries, officials and delegations from a number of countries are engaged on regular basis to establish and promote linkages to help strengthen triangular cooperation in a number of fields, including education, training and research, climate change, SDGs and more.



During 2021, COMSATS' officials held meetings with diplomatic missions of member and non-member states based in Islamabad with a view to sensitize them on COMSATS' undertakings as well as to seek the support of their good offices for the advancement of COMSATS' mission in the region to help realize common goals relating to sustainable development. Also, patronage for respective country's participation in COMSATS' international activities aiding the organization's growth in strategic and programmatic directions was sought during these meetings.

Common feature of these meetings was the briefing on COMSATS, its mission, objectives and international outreach. The dignitaries were also familiarized with the scientific cooperation programmes of COMSATS at national, regional and international levels.



H.E. Mr. Mohammed Motahar Alashabi, Ambassador of Yemen to Pakistan (January 08, 2021)

Possibilities of collaboration between Yemen and other Member States of COMSATS were explored during the meeting, and the Ambassador assured his full support to facilitate the induction of a

suitable R&D Centre or higher education institution of Yemen in COMSATS' Network of Centres of Excellence. Induction of such an institute, it was noted, would facilitate various collaborative undertakings, including joint research and development projects, capacity-building activities, expert-exchange, and technology transfer arrangements.



The Honourable Ambassador handed over a letter from H.E. Prof. Dr. Hussein Basalamah, Minister of Higher Education and Scientific Research of Yemen, seeking COMSATS' support to establish a university of science and technology in Yemen.

H.E. Mr. Nong Rong, Ambassador of China to Pakistan (February 03, 2021)

This introductory meeting between Executive Director COMSATS, Dr. S.M. Junaid Zaidi, and Ambassador of China to Pakistan, H.E. Mr. Nong Rong, was held at the Embassy of China in Islamabad in the presence of senior officials from both sides.

Felicitating H.E. Mr. Nong Rong on assuming charge of Ambassador of China to Pakistan, Dr. Zaidi apprised him of COMSATS – China collaboration. COMSATS has good working relations with the Chinese Ministry of Science and Technology (MoST) and its umbrella institutions as well as the Chinese Alliance of International Science Organizations (ANSO) which has resulted in activities and programmes framed for the scientific uplift of the developing countries.

While discussing prospects of launching multilateral projects under the umbrella of Belt and Road Initiative, it was mentioned that COMSATS and Chinese MoST have also signed an agreement on 'Cooperation

Initiative on Silk Road of Innovation' for ST&I cooperation for sustainable development.

It was also hoped that Chinese government could play a catalytic role in institution building in COMSATS Member States, such as research centres, academic institutions, and S&T parks.

Mr. Rong appreciated COMSATS' undertakings towards the promotion of Science and Technology in the global South and pledged full support of his office for the realization of common goals.

Mr. Suleiman Khalid, Deputy Head of Mission of the State of Iraq (September 08, 2021)

The Deputy Head of Mission was accompanied by his colleague from the

Embassy, Mr. Asseel Al-Jomaily. During the meeting, Mr. Khalid expressed his Government's desire for reconciliation on scientific and academic grounds. In this connection, he also shared details of cooperative measures being initiated with Pakistani government and academic institutions, such as Ministry of Foreign Affairs (MoFA), Government of Pakistan; and COMSATS University Islamabad (CUI) – a Centre of Excellence of COMSATS.

Referring to a recent visit of the Iraqi Foreign Minister to Pakistan, Mr. Khalid informed that the Government of Iraq is working towards strengthening its international relations. Support of Ambassador's good office was also sought for Iraq's membership to COMSATS for which it was decided that the latter will initiate the process by reaching out to relevant government body of the Government of Iraq, i.e., Ministry of Higher Education and Scientific Research.

Discussions during the meeting also led to the understanding that COMSATS Secretariat will support formalization of agreement between COMSATS University Islamabad and the University of Baghdad, with a view to create twinning arrangements between the two leading academic institutions to support faculty and academic exchange besides other initiatives.





H.E. Eric Owusu-Boateng, High Commissioner of Ghana to Pakistan (October 01, 2021)

The High Commissioner of Ghana to Pakistan (Resident in Tehran) was accompanied by Mr. Omar Shahid Butt, Vice Consul General of Ghana in Pakistan, and Mr. Tahir Javed, Public Relations Officer at Ghanaian Consulate in Pakistan.

Mr. Owusu-Boateng commended COMSATS' role in the advocacy and promotion of science in the global South, particularly in the African region. He considered COMSATS a unique platform for the promotion of South-South scientific cooperation. He took keen interest in COMSATS' Scholarship and Fellowship Programme and offered facilitation to ensure that Ghanaian students would benefit from these opportunities.

Mr. Omar Shahid Butt shared some of the planned activities of the Ghanaian Consulate in Pakistan, and discussed possible participation of COMSATS in the same. Other matters discussed during the meeting included:

- Ghana's annual membership contribution to COMSATS;
- Possibility of Ghana offering scholarships/fellowships to other member countries; and
- Expansion of COMSATS' membership in African region.

The High Commissioner pledged to support and facilitate communication between COMSATS and Ghanaian authorities/institutions for future collaborative undertakings.

H.E. Mr. Yerzhan Kistafin, Ambassador of Kazakhstan to Pakistan (October 25, 2021)

During the discussion, interim Executive Director COMSATS, Dr. Akhtar Nazir, and H.E. Mr. Kistafin exchanged views on expanding COMSATS-Kazakhstan cooperation, particularly in academia. He sought Ambassador's support for the expansion of COMSATS' membership in the Central Asian region; improving interaction with COMSATS' focal point in Kazakhstan – the Ministry for Education and Science; and furthering work on COMSATS' scholarship programme and

COMSATS' project proposal on Telehealth collaboration with Kazakhstan.

H.E. Mr. Kistafin expressed satisfaction on the active role being played by COMSATS in supporting Kazakhstan's cooperation with other member countries of the organization. His Excellency informed COMSATS' officials of the strong political liaison between Kazakhstan and Pakistan for purposeful international collaboration. In this regard, he urged COMSATS to help sustain high-level interactions with Kazakhstan. The Ambassador suggested:

- Exploring collaboration with the Turkic Academy – an international organization founded in 2012 by Azerbaijan, Kazakhstan, Kyrgyzstan, and Turkey under the auspices of the Cooperation Council of Turkic Speaking States (Turkic Council) with the goal of coordinating scientific research on Turkic language, literature, culture, and history.
- Holding a seminar for diplomats of Central Asian countries, including Azerbaijan to discuss possibilities of collaboration and COMSATS' offer of membership.

COLLABORATIONS WITH NATIONAL AND INTERNATIONAL ORGANIZATIONS

- United Nations Office for South-South Cooperation (UNOSSC), USA 16
- Committee on Scientific and Technological Cooperation of the OIC (COMSTECH), Pakistan 17
- Pakistan National Commission for UNESCO (PNCU), Pakistan 18
- Ministry of Science and Technology (MoST), China 19
- Alliance of International Science Organizations (ANSO), China / University of Chinese Academy of Sciences (UCAS), China 19

COLLABORATIONS WITH NATIONAL AND INTERNATIONAL ORGANIZATIONS

Over the years, COMSATS has expanded its cohort of national and international partners to foster broader and more effective collaborations in Science and Technology and launch new programmes and activities with its Centres of Excellence for sustainable socio-economic development of the Member States. Still growing, these partnerships aim to complement the programmes of COMSATS focusing on capacity-building of Se&T community in developing countries.



United Nations Office for South-South Cooperation (UNOSSC), USA

On November 30, 2018, a Memorandum of Understanding was signed between COMSATS and United Nations Office for South-South Cooperation (UNOSSC) in New York, on the sidelines of 10th Global South-South Development Expo held at the United Nations. The two organizations have been since collaborating for executing joint activities in different fields of Science and Technology. The agreement signed has opened possibilities to engage with the United Nations and its agencies and to engage with other countries on South-South cooperation programmes.

COMSATS-UNOSSC collaboration proved to be mutually beneficial for the two organizations in terms of promoting South-South Cooperation. Under the framework of the MoU signed for COMSATS and UNOSSC collaborated for



and undertook the following collaborative activities during the report:

- Webinar to observe United Nations Day for South-South Cooperation

(September 21, 2021);

- Capacity Building Webinar on Digital Government and Transformation: Exploring South-South and triangular cooperation innovations (November



02-05, 2021);

- COMSATS' participation UNOSSC Retreat "Feasibility of compiling Asia-Pacific Regional Report on South-South Cooperation 2021" (December 15, 2021).

Committee on Scientific and Technological Cooperation of the OIC (COMSTECH), Pakistan

During 2021, COMSATS and COMSTECH agreed to work together to initiate a regional Telehealth programme to benefit their member states, especially in the wake of the ongoing pandemic. COMSATS' team held discussions in this regard with the Coordinator General COMSTECH, Dr. M. Iqbal Choudhary, in his office. COMSATS was represented by Dr. Azeema Fareed, Principal Medical Officer and Coordinator of COMSATS Telehealth Programme; Mr. Nisar Ahmed, Deputy Director Systems; and Mr. Irfan Hayee, Deputy Director Programmes. Senior officials of COMSTECH attending the meeting were Mr. Abdul Haseeb, Director (Coordination); Mr. Haris Akram, Programme Manager; and Ms. Khazima Muazim, Programme Manager.

During the meeting, Dr. Iqbal expressed the willingness to collaborate with

COMSATS in order to pass on the benefits of telehealth to common member states of the two organizations with a special focus on African countries. He noted that COMSTECH's parent body, the OIC, is willing to support collaboration in the field of telehealth.

COMSATS' delegation briefed Dr. Choudhary and his team about COMSATS Telehealth (CTH) programme, which highlighted programmatic and technical aspects of telehealth. The ensuing discussions revolved around scale and scope of programme activities under telehealth; infrastructure and technical gadgetry required; as well as operational and service delivery mechanism

models. As a result of these discussions, COMSTECH officials expressed interest in physically visiting COMSATS Telehealth Centre to learn and understand how COMSATS Telehealth is being run.

In view of the discussions and potential for collaboration, the Coordinator General COMSTECH invited a concept note on telehealth from COMSATS in order to seek patronage of OIC. The OIC has long-standing relations with governments of common member states of COMSTECH and COMSATS in Africa.

It was agreed by officials of the two organizations that the potential collaboration in the field of telehealth





will focus on: creating more awareness on telehealth and its benefits, central trainings and regional workshops, exchange of experts, in addition to establishing telehealth nodes with suitable technical facilities.

Subsequent to this, a four-member delegation of COMSTECH visited COMSATS Telehealth Resource Centre housed at COMSATS Internet Services, Islamabad, on June 23, 2021. The visit was a follow-up on earlier discussions and deliberations made during a meeting between senior officials of COMSTECH and COMSATS with an aim to develop collaboration between the two organizations in the field of Telehealth.

The COMSTECH delegation comprised of Mr. Aftab Zaidi, Senior Director (Admin & HR); Mr. Abdul Haseeb, Director Coordination; and Ms. Khazima Muazim and Mr. Haseeb Ahmed, Programme Managers. At the COMSATS Telehealth Resource Centre, the visiting delegation was given an orientation on functions and operations of COMSATS Telehealth (CTH) Programme. Dr. Azeema Fareed, Coordinator for CTH and Principal Medical Officer at COMSATS Secretariat, introduced the visitors to the management and medical team providing telehealth consultations. She apprised the delegation about the requirements for setting-up a telehealth facility at a basic health unit.

Moreover, she shed light on ways to elevate the quality of telehealth services and to scale-up a telehealth project.

During the orientation, Mr. Irfan Hayee, Deputy Director Programmes at COMSATS Secretariat, also recalled the best practices learnt and adopted by COMSATS in early years of the project to customize its telehealth programme keeping in view cultural and societal norms and practices. He noted that the telehealth initiative was gradually up-scaled and brought under broad programme umbrella.

Dr. Nadia Rasheed, Project Manager CTH at CIS and a family physician by profession, elaborated how COMSATS Telehealth Resource Centre is linked-up with various basic health units in remote and far-flung areas of the country.

At the time, seven health facilities from Balochistan were connected with doctors at COMSATS Telehealth Resource Centre. She noted that communities in these areas are greatly benefiting from tele-consultations given by general physicians and when needed by specialist medical doctors on case-to-case basis.

Dr. Nadia also briefed about the technological infrastructure and the softwares, digital medical gadgetry being used for transmitting patients' data/

information. She opined that Telehealth is a very useful platform to gather feedback from the rural communities.

COMSTECH officials were appreciative of the telehealth set-up and services run by COMSATS for distant and marginalized communities. The delegation expressed its willingness to initiate collaboration with COMSATS in the field of Telehealth, for which the two organizations agreed to jointly prepare a concept note.

Pakistan National Commission for UNESCO (PNCU), Pakistan

On November 8, 2021, an MoU was signed between COMSATS and the Pakistan National Commission for UNESCO (PNCU) for execution of COMSATS-UNESCO joint project titled 'COMSATS-UNESCO South-South Regional (Asia-Pacific) Technical Cooperation Programme (Biennium 2020-21)' under the UNESCO participation programme. The project was approved by UNESCO in May 2021 for grant of US \$ 35,000 under the regional category of UNESCO participation programme for 2020-21.

The proposed programme's main goal is to strengthen the scientific and technical capacities of COMSATS and UNESCO common member countries in the Asia-Pacific region by leveraging knowledge from COMSATS' Network of S&T Centres of Excellence, as well as other partnering institutions. The proposal calls for holding three to four international workshops/conferences in common fields of interest to COMSATS and UNESCO member countries. In this regard, four Centres of Excellence of COMSATS: CUI-Pakistan, ICCBS-Pakistan, TIB-China, and ITI-Sri Lanka, have formally consented upon hosting the following joint events.

- International Training Course on Synthetic Biology and Industrial Biotechnology at Tianjin Institute of Industrial Biotechnology (TIB), China (held from December 20 to 30



- December 2021, details in Chapter 4);
- 15th International Symposium-cum-Training on Natural Product Chemistry (ISNPC) at International Centre for Chemical and Biological Sciences (ICCBS), Pakistan;
- International Conference on Industry 4.0 in the Developing World: Challenges, Gaps and Opportunities at Industrial Technology Institute (ITI), Sri Lanka;
- International Conference on Sustainable Technologies in Modern Energy: A roadmap towards Green Economy at COMSATS University Islamabad (CUI), Pakistan.

Ministry of Science and Technology (MoST), China

COMSATS' interactions with the Chinese Ministry of Science and Technology (COMSATS' Focal Point) dates back to 1994 when China became a Member State. Since signing of a Memorandum of Understanding between Chinese Ministry of Science and Technology (COMSATS' Focal Point) and COMSATS in 2020, efforts are being made to strengthen STI collaboration and exchanges; boost STI people-to-people exchange; establish joint laboratories for high-level scientific study and collaborative research and development; and science park cooperation and technology transfer. As a result of this partnership agreement, MoST has provided patronage and financial support to the Tianjin Institute of

Industrial Biotechnology (TIB) of Chinese Academy of Sciences – one of the twenty-four COMSATS Centres of Excellence – for establishing 'COMSATS Joint Centre for Industrial Biotechnology' launched during 2021 (details in Chapter 1).

Moreover, MoST-China's support remains available through support to COMSATS' Centres of Excellence in China, TIB, Tianjin, and ICCES, Beijing.

Alliance of International Science Organizations (ANSO), China / University of Chinese Academy of Sciences (UCAS), China

COMSATS became a member of ANSO in 2019. Later during 2020, COMSATS signed an MoU with the Centre of Environmental Economics of the University of Chinese Academy of Sciences (CEE-UCAS), China (also a member of ANSO), for cooperation in various areas of mutual interest.

COMSATS' collaboration with ANSO and UCAS continued during 2021 through:

- Inauguration of the Belt & Road International Innovation Development Institute Network (ANSO-BIDI Institute Network), in China, during July 2021 (details in Chapter 6);
- ANSO Training on 'Sustainable Development and Leadership

Enhancement' (October 28, 2020 – February 03, 2021) (details in Chapter 4);

- First Term of ANSO-BIDI School (May 12 – August 04, 2021) (details in Chapter 4);
- Second Term of ANSO-BIDI School (November 17, 2021 – January 19, 2022) (details in Chapter 4).

Others

Also during 2021, COMSATS remained engaged with other partner organizations for sharing of knowledge and experience during the former's events. These organizations included:

- United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), Thailand;
- South Centre, Geneva;
- United Nations Educational, Scientific and Cultural Organization (UNESCO), Pakistan;
- InterAcademy Partnership (IAP), Trieste;
- Network of African Science Academies (NASAC), Nairobi;
- Islamic World Educational, Scientific and Cultural Organization (ICESCO), Morocco.

Invaluable contributions from experts and senior officials from these organizations helped build a sound narrative for COMSATS' events and undertakings, as well as South-South Cooperation.

CAPACITY-BUILDING EVENTS AND INTERNATIONAL OBSERVANCES

• Webinar on ‘Modeling and Simulation on Climate Change and Environmental Pollution: Strengthening Resilience in the Global South’ (January 12, 2021)	22
• Webinar on ‘Sustainable Management of Forests and Challenge of Deforestation in the Global South’ (February 18, 2021)	24
• Belt and Road Online Training Course (October 28, 2020 – February 03, 2021)	25
• First Term of ANSO-BIDI School (May 12 – August 04, 2021)	26
• Second Term of ANSO-BIDI School (November 17, 2021 – January 19, 2022)	27
• Workshop on ‘Technical Innovation in Traditional Plant Medicine’ (October 13, 2021)	27
• Training Course on ‘Industrial Synthetic Biotechnology’ (December 20 – 30, 2021)	29
• World Cancer Day (February 02, 2021)	32
• International Year of Peace and Trust (February 19, 2021)	32
• International Women’s Day (March 08, 2021)	33
• World Environment Day 2021 (June 07, 2021)	34
• World Hepatitis Day 2021 (July 28, 2021)	35
• United Nations Day for South-South Cooperation (September 21, 2021)	36
• World Mental Health Day (October 14, 2021)	38

CAPACITY-BUILDING EVENTS & INTERNATIONAL EVENTS

Capacity-building constitutes an important aspect of COMSATS' programmes aimed at strengthening South-South Cooperation. Events in important scientific areas and those related to SDGs are regularly held to strengthen scientific linkages; build indigenous capacities; and promote S&T as a tool for development. These events provide a useful platform to the members of the scientific community, development experts, donor/development agencies, and the decision-makers in particular from Member States, to share their views and experiences on contemporary issues of importance for S&T-led socio-economic development as well as achieving SDGs. Advocacy of other international agenda and issues is also done, inter alia, through observance of International Days bearing various themes.



Since beginning of the COVID-19 pandemic, digital means remained the main channel of communication for holding of scientific events and activities during 2021 as well. This also helped increase the participation of diverse ethnic groups owing to several countries continuing travel restrictions and strict safety protocols.

Apart from training courses and webinars that were held entirely virtually, international days were also marked during the year through holding of physical, hybrid, as well as virtual events. A total of 14 such activities were held that apart from knowledge-sharing, capacity-building, and networking also served to advance the efforts of COMSATS towards science diplomacy and advocacy of Sustainable Development Goals (SDGs) – the latter aspect is systematically reviewed

in Chapter 5. Table 4.1 summarizes this year's capacity-building activities, whereas Figure 4.1 gives a glimpse of thematic areas under which these activities fall.

Webinars and Trainings

Webinar on 'Modeling and Simulation on Climate Change and Environmental Pollution: Strengthening Resilience in the Global South' (January 12, 2021)

The objective of the webinar was to exchange information, share knowledge and good practices to strengthen climate actions in the Global South, as well as highlight the role of modelling and simulations for evidence-based knowledge to help formulate policies and legislation for climate action. Organized through the

platform of COMSATS Centre for Climate and Sustainability (CCCS), the webinar had the organizing support of COMSATS Centre of Excellence in Nigeria – National Mathematical Centre (NMC).

Opening Session

In his remarks at the opening, Ambassador Shahid Kamal, Advisor (Climate Change) at COMSATS, commented that the past decade was the hottest with record increase in the global temperatures and level of carbon emissions. Developing countries, he opined, have to bear the brunt of such global events surrounding climate change in the wake of resources constraints and dearth of sound technologies. Considering climate change as one of the biggest challenges of all time, he considered mathematical modeling and simulation as an important area of research and

Table 4.1: International Participation & Partners of Capacity-Building Activities (2021)

Sr. No.	Activity Name	Partners	Participating Countries
1.	Webinar on 'Modeling and Simulation on Climate Change and Environmental Pollution: Strengthening Resilience in the Global South'	National Mathematical Centre (NMC), Nigeria	Ghana, Iran, Nigeria, Pakistan, and Turkey
2.	Webinar on 'Sustainable Management of Forests and Challenge of Deforestation in the Global South'	The Council for Scientific and Industrial Research (CSIR), Ghana; Forestry Research Institute (FORIG), Ghana; and Forestry Research Network of Sub-Saharan Africa (FORNESSA), Ghana	Cameroon, Colombia, Ghana, Jordan, Malawi, Nepal, Nigeria, and Pakistan
3.	ANSO Training on Sustainable Development and Leadership Enhancement	Alliance of International Science Organizations (ANSO), China; and University of Chinese Academy of Sciences (UCAS), China	Canada, China, Colombia, The Gambia, Indonesia, Iran, Jamaica, Jordan, Kazakhstan, Palestine, Pakistan, Syria, Tanzania, Tunisia, and Turkey
4.	First term of ANSO-BIDI School on 'Innovation, Sustainable Development and Leadership Enhancement'	Alliance of International Science Organizations (ANSO), China; and Centre of Environmental Economics of the University of Chinese Academy of Sciences (CEE-UCAS), China	China, Egypt, The Gambia, Ghana, Indonesia, Iran, Italy, Jordan, Kazakhstan, Montenegro, Nepal, Nigeria, Pakistan, Palestine, Syria, Sri Lanka, Sudan, Thailand, and Tunisia
5.	Second term of ANSO-BIDI School on 'Innovation, Sustainable Development and Leadership Enhancement'	Belt & Road International Innovation Development Institute Network (ANSO-BIDI Institute Network), China; Alliance of International Science Organizations (ANSO), China; and Centre of Environmental Economics of the University of Chinese Academy of Sciences (CEE-UCAS), China	Armenia, Belgium, Canada, China, Egypt, Iran, Kazakhstan, Nigeria, Pakistan, Sri Lanka, Syria, Thailand, and Turkey
6.	Workshop on 'Technical Innovation in Traditional Plant Medicine'	Tianjin Institute of Industrial Biotechnology (TIB), China	Bangladesh, China, Egypt, Ghana, Iran, Jamaica, Kazakhstan, Nigeria, Pakistan, Sri Lanka, Sudan, Tanzania, and Turkey
7.	Training Course on 'Industrial Synthetic Biotechnology'	Alliance of International Science Organizations (ANSO), China; Chinese Ministry of Science and Technology; CAS-TWAS Center of Excellence for Biotechnology, China; Innovation Cooperation Center, Bangkok; and United Nations Educational, Scientific and Cultural Organization (UNESCO)	Bangladesh, Cambodia, China, Egypt, Ghana, Pakistan, Iran, India, Jordan, Kazakhstan, Morocco, Nepal, Nigeria, Sri Lanka, Rwanda, Tanzania, and Zimbabwe



Dr. Stephen Onah, Director of NMC, Nigeria, shared his Centre's work on mathematical modeling and simulation for climate and environmental sciences. He was of the view that mathematical modeling is an effective and reliable means to predict and mitigate adverse impacts of climate change.

Technical Session

Mr. Bilal Anwar, General Manager, Commonwealth Climate Finance Hub, moderated the technical proceedings of the webinar. Speakers from Ghana, Iran,

Nigeria, Pakistan, and Turkey elaborated the various aspects of the subject at hand through presentations and talks indicated below:

Dr. Daniel Tutu Benefoh, Deputy Director of the Climate Change Unit at Environmental Protection Agency, Ghana, discussed KUMASI emission and LEAP IBC models used for the prediction of climate change impacts, and interaction of air quality and climate change, respectively. He stated that black carbon which is the major contributor of air pollution leads to alteration in meteorological patterns. Further, he mentioned that Ghana is quite

collaboration to guide policies concerning climate mitigation and adaptation within the framework of Paris Climate Agreement and 2030 Development Agenda.



vulnerable to effects of climate change due to its geographic location, though the country's share towards global carbon emissions is low. In view of this, he added, the country is investing more in research relating to air quality monitoring, climate change, and health.

The speaker from Iran, Prof. Dr. Ghasem Azizi from the Department of Physical Geography of the University of Tehran, discussed water crises in the context of global warming. He opined that change in atmospheric composition leads to global warming which further alters weather patterns, changes land cover, and causes imbalance in energy. He also shared the cases of Parishman Lake, Hamoon Lake, and Urmia Lake of Iran and discussed precipitation patterns of 65 years, from 1948 to 2013.

Prof. B. O. Oyelami, Head of Mathematical Modeling and Simulation Research Group, National Mathematical Centre (NMC), Nigeria, talked about the importance of modeling and simulation for climate

change, atmospheric pollution, ground water management, oil spillage, flooding, glacial melts, and other climate change related phenomenon. He was of the view that meteorological patterns, emissions, pollutant interactions can be best predicted by mathematical simulations which can play a significant role for adaptation and mitigation of climate change.

Representing Pakistan, Dr. Zia Ur Rehman Hashmi, Head of Water Research Section, Global Change Impact Studies Centre, Ministry of Climate Change, discussed Pakistan Climate Change Policy that is centered upon adaptations, mitigations, transboundary water management, glaciers as protected areas, and enhancing R&D activities. He also shared Pakistan Safety Agenda that focuses on the safety and well-being of people, sustainable economic growth, and fulfilling international commitments. Further, he discussed the case of Kabul and Indus river basins which are being severely impacted by climate change.

The last speaker of the webinar, Prof. Hüseyin Toros, Professor of Climate Change, Air Quality and Modeling, Istanbul Technical University (ITÜ), Turkey, discussed climate change situation of Turkey. He opined that atmospheric pollutants alter the atmospheric patterns, therefore, air pollution is one of the primary drivers of climate change.

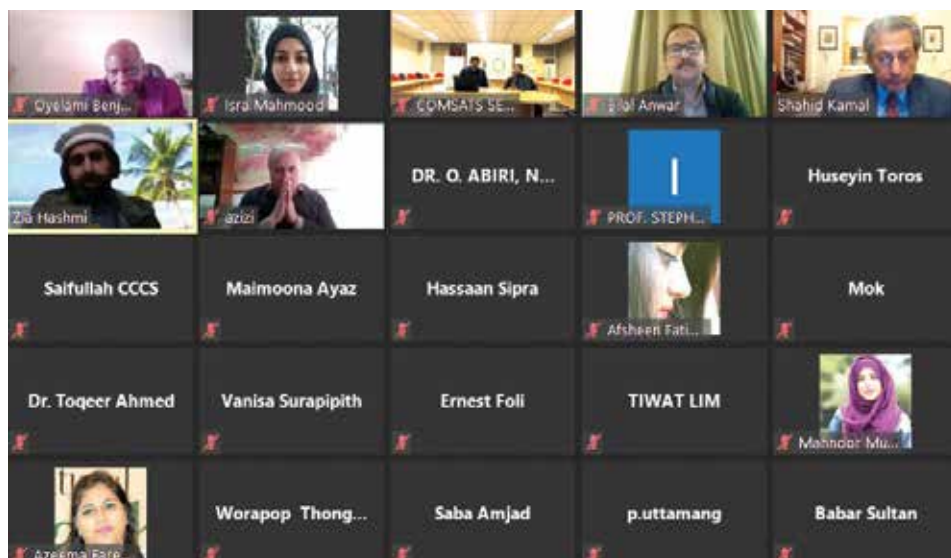
Closing Session

The webinar concluded with closing remarks of Dr. M. Sharif, Advisor Science and Technology Sector, Islamic World Educational, Scientific and Cultural Organization (ICESCO), Morocco, who underscored the importance of integrating mathematical modeling and simulations in research for effective policy making.

Webinar on 'Sustainable Management of Forests and Challenge of Deforestation in the Global South' (February 18, 2021)

Partnering with the Ghanaian Council for Scientific and Industrial Research (CSIR), Forestry Research Institute (FORIG) and Forestry Research Network of Sub-Saharan Africa (FORNESSA), COMSATS Centre for Climate and Sustainability (CCCS) organized this webinar with the aim to sharing knowledge and insights on the theme as well as proposing policy interventions to accelerate and scale up efforts to mitigate deforestation.

With umbrella theme of SDG15, the webinar explored the environmental, economic and social aspects of forest ecosystem and its importance in mitigating the negative impacts of climate change. The webinar opened by Founder Head of CCCS, Ambassador Shahid Kamal, was





moderated by Dr. Ernest Gordon Foli, Principal Research Scientist at FORIG/ CSIR, and member of UN Secretary General's Advisory Group on the Global Sustainable Development Report (2019).

Speakers

Prof. Daniel Ofori, Director of FORIG/ CSIR, Ghana, delivered the keynote address, whereas the following experts and scientists delivered presentations and talks sharing views on the theme of the event: Dr. Tonjock Rosemary Kinge, Associate Professor of Mycology, Department of Biological Sciences, University of Bamenda, Cameroon; Mr. Mauricio Andrés Valencia Camelo, Environmental Engineer, International Centre for Physics (CIF), Colombia; Mr. Jacob Amoako, Measurement, Reporting and GIS officer at Climate Change Directorate of the Forestry Commission of Ghana; Prof. Dr. Maher J. Tadros, Department of Natural Resources and Environment, Jordan University of Science & Technology, Jordan; Dr. Steve Makungwa, Forest Measurements, Modeling and Climate Change Expert at University of Agriculture and Natural Resources, Malawi; Mr. Shiva Pariya, Forest Officer, Ministry of Industry, Tourism, Forests and Environment, Nepal; Dr. Samuel Olalekan Olajuyigbe, Senior Lecturer, Department of Forest Production and Products, University of Ibadan, Nigeria; and Mr. Ashiq Ahmad Khan, Scientific Representative of EvK2CNR Association, Pakistan.

Discussions

Key points discussed during the webinar included: significance of forests from cultural, economic, social and environmental perspectives was highlighted. Deforestation was considered a key contributor towards water scarcity and creating imbalances in ecosystems. Irrational urban development was considered a key challenge and a threat to forests and related ecosystems due to loss of biodiversity and overuse of wood for timber and fuel. Loss of natural habitats causes major environmental setbacks in terms of climate change and biodiversity. Commercially, forests were considered important for providing ecotourism opportunities for livelihood of people, which is why reduction in forest cover could increase unemployment.

Key Recommendations

Recommendations of the event included:

- Alternate and clean fuel is best approach to reducing demand of fuel wood coming from forests;
- Mainstreaming of new technologies and environment-friendly approaches is necessary to reduce dependence on fuel wood;
- Formulation and implementation of suitable government level policies is necessary for forest preservation and regeneration; and
- Urban forestry could be a good approach for ensuring clean

environment and fresh air, while agro forestry could be a useful adaptive approach to addressing food insecurity.

Belt and Road Online Training Course (October 28, 2020 – February 03, 2021)

Under a Memorandum of Understanding signed by COMSATS with the Centre of Environmental Economics of the University of Chinese Academy of Sciences (CEE-UCAS), China, in July 2020, COMSATS joined hands with the Organization for the holding of an online training course on 'Sustainable Development and Leadership Enhancement' that continued from October 2020 to February 2021.

The training beneficiaries included 48 individuals from COMSATS Centres of Excellence in Colombia, The Gambia, Indonesia, Iran, Jamaica, Jordan, Kazakhstan, Palestine, Pakistan, Syria, Tanzania, Tunisia, and Turkey.

The three-month long training course consisted of 14 modules that covered, inter alia, the following topics:

- Lessons and insights from international collaborations;
- Leadership role in promoting international science programmes;
- Decision making under uncertainty for the management of new technologies and sustainable development;
- Disruption of priorities in large-scale systems;
- Economic policies against climate change;
- CAS and its strategy in education: fusing research and training;
- Benefits from new technology - the case of autonomous vehicles;
- Green finance;
- Conservation and sustainable development through internationally-designated areas (IDAS);

- Science for policy – advice and diplomacy; and
- Supporting companies in fighting against COVID-19 through digitalization and digital payments.

The training concluded with a certificate distribution ceremony.

First Term of ANSO-BIDI School (May 12 – August 04, 2021)

COMSATS joined hands with the Alliance of International Science Organizations (ANSO) and the Centre of Environmental Economics of the University of Chinese Academy of Sciences (CEE-UCAS) to conduct the first term of ANSO-BIDI School on 'Innovation, Sustainable Development and Leadership Enhancement'. Earlier started as ANSO Training on Sustainable Development and Leadership Enhancement, the training was renamed subsequent to launching of Belt & Road International Innovation Development Institute Network of ANSO (ANSO-BIDI Institute Network) in July 2021 (details in Chapter 6). The two-and-a-half-month long training covered a wide range of topics falling within the mandate and objectives of the collaborating organizations. The training provided a platform to learn and hone skills, exchange information, ideas and experiences as well as promote international cooperation in research and training.

This virtual training was attended by over 150 participants from the Asian and African region, including 80 from COMSATS Centres of Excellence in the Member Countries of Egypt, The Gambia, Ghana, Indonesia, Iran, Jordan, Kazakhstan, Nigeria, Palestine, Pakistan, Syria, Sri Lanka, Sudan, and Tanzania.

Opening Session

The event was opened by Prof. Desheng Wu, Dean of the Belt and Road College of UCAS, Director of the Research Centre for Environmental Economics of UCAS, China. The opening session



included remarks of heads/representatives of participating and collaborating organizations.

Representing COMSATS on the occasion, Prof. Dr. Ashraf Shaalan, Chairperson COMSATS Coordinating Council, remarked that global South is facing growth impediments in the form of challenges of poverty, illiteracy, food insecurity, inadequate healthcare infrastructure, and environmental degradation with the added burden of COVID-19 Pandemic. He was of the view that conscious efforts in education, STI, as well as research & development sector at global, regional and national levels can help address such challenges. He communicated that COMSATS has been collaborating with the like-minded institutions with a view to enhance capacity of developing countries in various fields of science and technology that can aid institutional level efforts towards national and Global Goals.

Training Modules

The online training was divided into 11 modules included lectures on related aspects of management, technological innovation and sustainable development. Professors from renowned academic institutions delivered presentations, inter alia, on the following themes: sustainability and leadership: the technology perspective; economic policies against climate change; integrating natural

science and economics for biodiversity conservation and ecosystem service preservation; valuing the real options in supply-chain responsiveness: implications for innovation, sustainability, and profit; brand value upgrading and sustainable development growth in digital economy era; disruptions of priorities in engineering systems; science diplomacy for sustainable development: the role of international scientific organizations; will printed maps soon prove to be only cultural heritage? the changing role of cartography; the concepts of sustainability and sustainable business in practice; on the benefits from new technology - the case of autonomous vehicles; and the Polish Academy of Sciences' advisory role to the government and to the society during time of COVID-19 pandemic.

Closing Session

The training concluded on August 4th in a ceremony that included remarks of heads/representatives of organizing and collaborating institutions. Speaking on the occasion, Prof. Ashraf Shaalan thanked the eminent resource persons/trainers for sharing their knowledge and expertise. He acknowledged the efforts of ANSO and UCAS towards the organization of this online training and expressed willingness to hold more of such events in collaboration with the partner organizations.

The ceremony concluded with the

presentation of certificates to 13 outstanding trainees belonging to various institutions/organizations.

Second Term of ANSO-BIDI School (November 17, 2021 – January 19, 2022)

After the successful completion of the first in August, the second term of ANSO-BIDI School kicked off in November 2021 that was attended by over 200 trainees from across the globe. The training also attracted 85 researchers and leaders from COMSATS Centres of Excellence in Egypt, Iran, Kazakhstan, Nigeria, Pakistan, Sri Lanka, and Syria. This COMSATS-ANSO-UCAS training course was aimed to enhance connectivity of science and technology innovation as well as to promote the concept of sustainable development and leadership capacity building in the Belt and Road region.

Opening Session

The event was opened in a virtual ceremony by Prof. Desheng Wu, Dean of the Belt and Road College of UCAS, Director of the Research Centre for Environmental Economics of UCAS, China. Leaders and representatives of collaborating and participating organizations joined in the ceremony online, including: Prof. Jinghua Cao,

Executive Director of the Alliance of International Science Organizations (ANSO), China; Prof. Junshe Dong, Vice President and Executive Deputy Secretary of the Party Committee of the University of Chinese Academy of Science, China; Prof. Dr. Ashraf Shaalan, Chairperson of COMSATS Coordinating Council; Prof. Dr. Hasan MANDAL, President of the Scientific and Technological Research Council of Turkey (TUBITAK), Turkey; Prof. Dr. Attaullah Shah, Vice Chancellor of Karakoram International University (KIU), Pakistan; Dr. Lily Eurwilaichitr, Vice President of the National Science and Technology Development Agency (NSTDA), Thailand; Prof. Gevorg Vardanyan, National Academy of Sciences, Republic of Armenia (NASRA), Armenia; Dr. Atichat Preittigun, Advisor at Thailand Science Research and Innovation (TSRI), Thailand; Prof. Luis Seco, Professor, Director of RiskLab and President/CEO Sigma Analysis and Management, Canada; and Prof. Dr. Philippe De Maeyer, Senior Professor, Department of Geography, Ghent University, Belgium.

Speaking on behalf of COMSATS, Prof. Shaalan stated that concerted efforts by all stakeholders, including governments, business sector, scientific community, policymakers, society, and individual citizens are needed to address the ongoing socio-economic challenges being faced by

the South, particularly the battle against COVID-19 pandemic and achievement of Sustainable Development Goals. He laid emphasis on education, science, technology, indigenous R&D, and innovation at all levels for addressing these challenges. Prof. Shaalan stated that COMSATS has been promoting South-South and Triangular cooperation in the fields of science and technology through various initiatives related to capacity-building; collaborative research and development; and exchange of knowledge, experiences, good practices and technological resources, etc.

Recalling the ongoing mutually beneficial cooperation between COMSATS, ANSO and UCAS, he assured the ceremony of COMSATS' support for the activities of ANSO-BIDI Institute Network to achieve common objectives. Prof. Shaalan thanked the organizing committee, trainees and subject experts for their participation in this important event, as well as the leaders of the partner organizations for their collaboration.

Training Modules

During the training modules, distinguished professors from well-known universities and leaders of prestigious international organizations based in Belgium, Canada, China, Sweden, Switzerland, and USA delivered lectures on several topics, including organizational management, risk management, resource integration and deployment, climate change economic policies, and disruptive technologies.

Workshop on 'Technical Innovation in Traditional Plant Medicine' (October 13, 2021)

Collaborating with one of its Centres in China, the Tianjin Institute of Industrial Biotechnology (TIB), COMSATS organized a virtual workshop on 'Technical Innovation in Traditional Plant Medicine' with a view to provide



a platform for interaction, knowledge sharing, and expertise exchange in the field of biomedicine and synthetic biology.

Organized from the platform of COMSATS Joint Centre for Industrial Biotechnology (CCIB) under one of its Joint R&D Groups on Biomedicine, the training was held to contribute towards 'Good Health and Well-Being' Sustainable Development Goal 3 of the UN Global Agenda 2030. With physical and virtual participation (at CCIB/TIB and COMSATS Secretariat) of around 60 scientists/officials belonging to 13 Member States of COMSATS, the webinar covered talks by experts from China, Kazakhstan, and Pakistan.

Inauguration

Prof. Dr. Jibin Sun, Director of CCIB and Deputy Director-General of TIB, gave welcome remarks at the inauguration. Addressing the august gathering, he acknowledged the support of COMSATS Secretariat for organizing this workshop. Highlighting the significance of the workshop's theme, Prof. Sun stated that medicinal plants are one of the oldest means for cure, prevention and mitigation of diseases. Many natural products from plants, he added, provide great pharmacological benefits and are major sources for discovery of new drugs and has played a significant role in the treatment of COVID-19.

In his opening remarks, Executive Director COMSATS, Dr. Akhtar Nazir (also the Federal Secretary, Ministry of Science and Technology, Government of Pakistan), remarked that around 80% of the world population uses herbal medicine for primary healthcare needs due to their health benefits with minimum adverse effects. He commented that COVID-19 pandemic has resulted in unprecedented global health and economic challenges, and it is a matter of great urgency to reflect upon the situation and enhance global cooperation and support for combating COVID-19 and such outbreaks in the



future. He stated that COMSATS is keen to collaborate with the institutions having similar mandates to achieve these common objectives.

Technical Proceedings

Prof. M. Iqbal Choudhary, Director International Center for Chemical and Biological Sciences (ICCBS), delivered keynote address titled "Traditional Chinese and Unani Medicine – Nexus for Human Beings". He called to attention widening discrepancies in the healthcare systems of developed and developing countries, including health disparities, emergence of new diseases, innovation decline, health inequities, and system complexities. He shed light on the current status and significance of Unani system of medicine and traditional Chinese Uyghur medicine, which are being used in many countries. Some major challenges in herbal medicine as highlighted by Prof. Iqbal included: know-how gap; inconsistency; lack of understanding of the biomarkers; chemical vs bioactivity standardization issues; and lack of credible clinical evidence.

He recommended following measures for reinforcement of traditional medicine sector:

- i. Documentation and compilation of Pharmacopodia to serve as an important resource for government agencies, scientists, industry, practitioners, and patients;

- ii. Development and networking of human resource related to traditional medicine; and
- iii. Registration and marketing of traditional medicines.

Further during the technical session, following presentations were made by field experts from China, Kazakhstan and Pakistan.

Phytochemical investigation of medicinal plants from Kazakhstan: Sharing a background of research towards investigation of medicinal plants in Kazakhstan, Prof. Janar Jenis, Director of the Research Center for Medicinal Plants of Al-Farabi Kazakh National University (KazNU), noted that classic work in this field in Kazakhstan dates back to last quarter of 15th century. Major contours of which, she added, relate to anatomy, physiology and pathology of human body; diagnosis and treatment; immunity prevention, care, food; and pharmacology. She also shared the research work of her Centre in this domain and informed about the medicinal plant resources of Kazakhstan.

Discovery of Bioactive Triterpenoids Biosynthetic Pathway in Mushroom: In this presentation, Prof. Meng Wang from TIB China, highlighted the importance of the discovery of bioactive tri-terpenoids biosynthetic pathway of mushrooms. He informed that *Ganoderma lucidum* is one of the famous traditional mushrooms



in East Asia and has a large market in healthcare industry. He shed light on biosynthesis pathways of Genoderic Acids as well as highlighted efforts being made for its improvement.

Genome Sequencing and Natural Product Biosynthesis: Prof. Huifeng Jiang from TIB discussed the functions of plant natural products and informed that over 85% patients of the COVID-19 were cured by traditional Chinese medicinal plants. Other topics covered by Prof. Jiang during his presentation included: biosynthesis of natural products; genome sequencing in plants; decoding taxol biosynthesis; coexpresional analysis of taxol biosynthesis genes; diosgenin and its synthetic pathways; and biological activity assay of polydatin.

Towards the Customized Production of Flavonoids in Microorganisms: In his presentation, Prof. Jingwen Zhou from Jiangnan University, China, discussed gene and pathway mining targeting the cellular optimization of microorganisms to produce flavonoids and its biotransformation into high value products through sequential enzymatic activities.

The ensuing discussions laid emphasis on creating linkages and synergies to benefit from the technical offers made at the workshop. Dr. Muhammad Ali from COMSATS University Islamabad (CUI), Pakistan, suggested seeking funding for

joint projects from international donors on narrowed down research topics. He stressed the need for exchange of samples, incorporation of more advance techniques, and organization of seminars on regular bases.

On the occasion, Prof. Maliheh Safavi from the Iranian Research Organization for Science and Technology (IROST), Iran, offered collaboration in areas of new biotech compounds from natural resources. Prof. Farzana Shaheen from ICCBS, Pakistan, also suggested documenting the traditional medicine, organization of more of such events for exchange of information, and defining effective funding mechanisms.

Closing Session

During the brief closing session, Mr. Farhan Ansari, Sr. Assistant Director (Programmes), COMSATS, acknowledged Director of CCIB and coordinators of its Joint R&D Group on Biomedicine for organizing this important event, which he hoped, would result in the initiation of mutually beneficial R&D cooperation and technology-transfer arrangements.

In his closing remarks, Prof. Sun thanked all the speakers and considered the workshop a good start for mutual learning and understanding, as well as a solid foundation for future collaboration. He invited relevant scientists belonging to COMSATS Member States to join the Joint

R&D Groups of CCIB, and also invited collaborative proposals that could be supported by CCIB.

Training Course on 'Industrial Synthetic Biotechnology' (December 20 – 30, 2021)

Under COMSATS-UNESCO project framework on 'South-South Regional Technical Cooperation Programme 2021', a ten-day long training course on Industrial Synthetic Biotechnology was held in December 2021. Beside United Nations Educational, Scientific and Cultural Organization (UNESCO), the training was conducted with the support and patronage of following organizations: Alliance of International Science Organizations (ANSO), China; the Department of International Cooperation of the Chinese Ministry of Science and Technology (MoST); Tianjin Institute of Industrial Biotechnology (TIB), China; and Chinese Academy of Sciences (CAS). Organized from the platform of COMSATS Joint Center of Industrial Biotechnology (CCIB) inaugurated in April 2021 (details in Chapter 1), the course also had the organizing support of CAS-TWAS Center of Excellence for Biotechnology of China, and Innovation Cooperation Center of Thailand.

The broad objective of the training was to provide theoretical and practical laboratory training on fundamentals underlying the industrial synthetic biotechnology and introduce the participants on the progress in frontier technologies in different areas, including biomedicine, bio-agriculture, future food, bio-chemicals, bio-based materials, and bioenergy. The training had notable international participation mainly from member states of COMSATS' and that of the Road and Belt Initiative (BRI). In the wake of COVID-19 pandemic and related travel restrictions, the medium for training was kept online, and only 40% participants from the host country, China, were allowed to attend the training in person.



Inauguration

The inaugural ceremony of the course was held on 20th of December and was attended by members of CCIB's Consultative Committee and Technical Advisory Committee, as well as distinguished members of TIB and Organizing Committee of the training course. Virtual participation of the ceremony included that of policy makers and members of scientific community from COMSATS Member States.

As host of the event, Prof. Sun Jibin, Deputy Director-General of TIB and Director of CCIB, opened the event and mentioned that the event is focused on the theory, practice and application of the Industrial Synthetic Biotechnology mainly in the form of technical presentations and demonstration experiments. In his opening speech, Director-General of TIB, Prof. Yanhe Ma, extended a warm welcome to all the participants on behalf of CCIB and TIB. He thanked and appreciated the support of ANSO, COMSATS, UNESCO, and other partners. He recalled that the first edition of the training course was organized by TIB in 2019, and expressed satisfaction over the fact that the second edition is being held with even greater international participation.

Mr. Syed Junaid Akhlaq, Secretary General of the Pakistan National Commission

for UNESCO (PNCU), acknowledged the efforts of partner organizations towards holding the subject training. Mr. Akhlaq commented that the theme of the training is quite pertinent to achieving socio-economic development targets. He commended COMSATS for its past and ongoing collaboration with UNESCO, and assured UNESCO and PNCU's full support to strengthen this mutually beneficial collaboration.

Speaking on the occasion, Dr. Akhtar Nazir, Executive Director COMSATS, expressed his gratitude to TIB for collaborating with COMSATS and for readily sharing its technological resources and expertise with other member countries of COMSATS in an important emerging field. Dr. Nazir stressed that a positive externality of the pandemic's long stay is acceleration of innovations and technologies in the digital, physical and biological realm that has increased the world's pace in widespread use of devices and applications, such as Artificial Intelligence-aided genetic and metabolic engineering, Cloud Computing for biological, genomics, and drug design, Block chain-based pandemic surveillance, and big data analytics to accelerate the development of vaccinations.

In her remarks, Ms. Xuemei Yang, Division Director, Department of International Cooperation, China's Ministry of Science

and Technology, recalled the cooperation that exists between COMSATS and the Chinese Ministry of Science and Technology, formalized under a Memorandum of Understanding on Silk Road Innovation that supports pragmatic cooperation through key actions, such as collaborative laboratories, science parks, technology transfer, and people-to-people exchange. In his address, Prof. Jinghua Cao, Executive Director of ANSO Secretariat, noted that ANSO-led collaborative research lays emphasis on problems-driven and needs-oriented development in order to address common challenges, strengthen people-to-people ties, and create a community with a shared future for humanity.

Concluding the ceremony, Prof. Sun Jibin made a keynote presentation, in which he gave an overview of Synthetic Industrial Biotechnology, methodologies and enabling technologies, major breakthroughs in the field, and potential implications of the next genomic revolution.

The opening session was followed by a virtual tour of TIB to showcase its state-of-the-art laboratory facilities and diverse array of cutting-edge instruments.

Technical Proceedings

The training programme was divided into six technical sessions comprising of keynote lectures and talks by subject experts, and six experimental sessions, and group discussions focused at fostering interaction and future collaboration among participating researchers from developing member countries. The trainers belonged to various academic and research institutions of China, including Biotechnology Research Institute, Chinese Academy of Agricultural Sciences, Nanjing Tech University, Jiangnan University, Xi'an Jiaotong University, Guangdong Technion Isreal Institute of Technology, Institute of Microbiology of Chinese Academy of Sciences, Chongqing University, as well as Washington State University of USA.



Emphasis during the training remained on highlighting advancements in synthetic biotechnology and how innovations in synthetic biology could benefit humanity in providing solutions to medical, environmental, and agricultural challenges. The training course also addressed other areas where synthetic biotechnology can be applied and challenges and opportunities regarding production strategies and applications of microbial cell with emphasis on food and energy applications were also highlighted.

Some of the main topics covered under the six themes were:

- *Frontier Technology on Biomedicine:* biosynthesis of Plant derived natural products, green bio-manufacturing of fine chemicals including pharmaceuticals;
- *Frontier Technology on Bio-agriculture:* biomass degradation and bio-based chemical production, synthetic microbiome and its application in agriculture, intelligent design of artificial biological nitrogen fixation system and its application in agriculture;
- *Frontier Technology on Future Food:* progress in production technology and industrialization of microbial polyunsaturated fatty acids, technology development of carbohydrate engineering, bio-manufacturing of artificial meat;
- *Frontier Technology on Bio-chemicals:* biochemical industry using bio-catalysis, challenges and opportunities for bioconversion of low-cost biomass into biofuels, bio-manufacturing and intelligent control systems;

- *Frontier Technology on Bio-based Materials:* bio-based production of materials monomers; synthesis of biodegradable plastic polylactic acid in the era of SynBiotech, key technologies for strengthening the synthesis process of bio-based materials;
- *Frontier Technology on Bioenergy:* progress of anaerobic digestion technology for biogas production, construction of bio-electrochemical system for bioelectricity conversion, synthetic microbial consortia for biofuel and natural products production.

During the experimental sessions, instructional videos especially developed for this training programme, provided step-by-step guidance on how to operate equipment, software or follow a technical process for high throughput and automated genetic engineering,

technology of systems biology in metabolic engineering, X-ray Protein crystal structure determination, DNA synthesis, intelligent fermentation technology, and designing of metabolic pathways based on genome-scale metabolic network.

During group discussions, the trainees held discussions on some of the major research endeavors over the last decade devoted to industrial synthetic biotechnology with a view to establishing prospective partnerships and form new synergies.

At the end of graduation ceremony, the participants shared the information regarding their different skillsets, research experience and diverse academic backgrounds and agreed to collaborate for interdisciplinary research projects of CCIB's R&D Groups on bio-medicine, bio-agriculture, future food, bio-energy, bio-chemical, and bio-based materials.

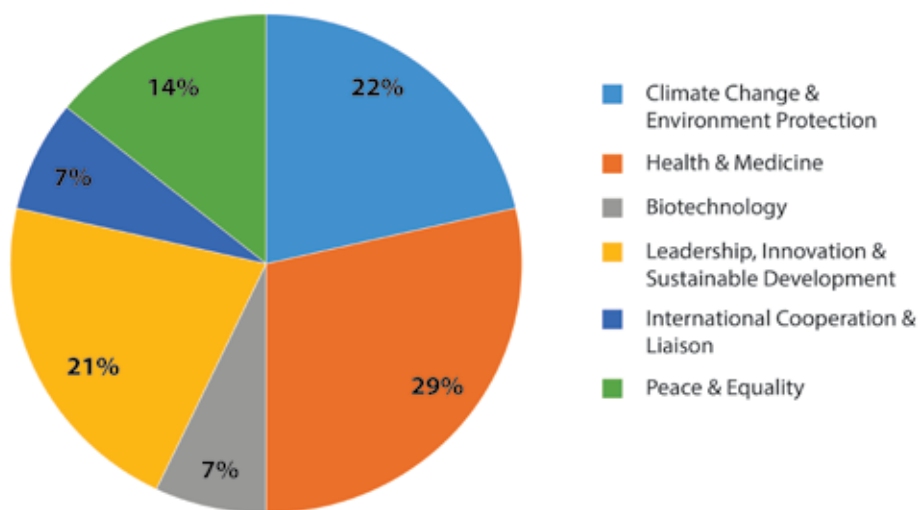


Figure 4.1: Thematic Categorization of Events & Activities (2021)

Closing Session

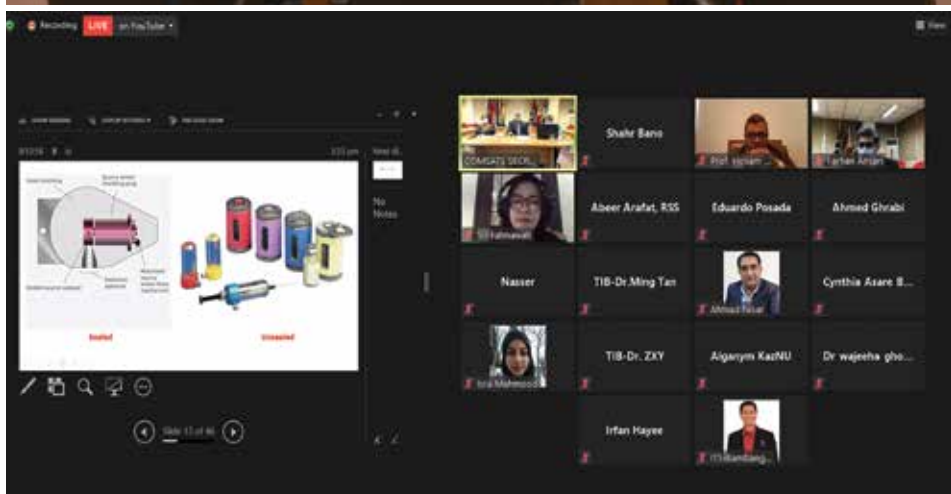
During the concluding session, Prof. Jibin Sun, delivered a brief presentation on COMSATS Joint Centre for Industrial Biotechnology (CCIB). He mentioned that six R&D collaborative groups have been formulated under this Centre that aim to leverage collective expertise, resources and knowledge to support, enhance, enable and efficiently coordinating the human resource development, research, and industry.

In his closing remarks, Prof. Sun noted that the training course on synthetic industrial biotechnology proved to be a great platform for not just reviewing what has been accomplished in the subject thus far, but also for setting out ideas and working out a roadmap for how research in this area could be expanded in the future.

International Observances

World Cancer Day (February 02, 2021)

To observe World Cancer Day 2021, COMSATS organized a lecture on 'Applications of Radiations in Cancer Management' delivered by a nuclear medical specialist, Dr. Muhammad Sohaib. Currently serving as the Director of Nuclear Medicine & Oncology at Pakistan Atomic Energy Commission (PAEC), Dr. Sohaib discussed the use of radiations for diagnosis, staging and treatment of cancer. He detailed on various techniques and types of radiations employed in cancer therapy while also sharing a brief history of nuclear medicine. Dr. Sohaib also shared the efforts of hospitals working



under PAEC's umbrella to help realize the goal of "No one fights alone". It was mentioned that training programmes and courses in the field of nuclear medicine are being offered for Pakistani and international students.

The lecture was followed by Q&A session during which Dr. Shoaib responded to queries relating to the use of molybdenum for nuclear medicine purposes; resolution of PET scanning; as well as COVID-19 impact on cancer patients' care.

International Year of Peace and Trust (February 19, 2021)

In view of the year 2021 being declared as the 'International Year of Peace and Trust (IYPT)' by United Nations and COMSATS' mission of creating a peaceful world

through science and technology, a talk was arranged by COMSATS in collaboration with the Embassy of Turkmenistan in Islamabad. Titled '2021: The International Year of Peace and Trust', the talk was delivered by H.E. Mr. Atadjan Movlamov, Ambassador of Turkmenistan to Pakistan and Dean of Diplomatic Corps in Pakistan.





The talk highlighted Turkmenistan's efforts for bringing peace and stability in the region; one of which is the presentation of a resolution at UN General Assembly in 2019 urging it to declare 2021 as the year of peace and trust. After unanimous adoption of the resolution by UN General Assembly, the country declared year 2021 as 'Turkmenistan is the Motherland of Peace and Trust'. The year aims to mobilize international efforts to promote peace and trust among nations on the basis of political dialogue, mutual understanding and cooperation in order to build sustainable peace, solidarity and harmony.

Mr. Movlamov mentioned that UN General Assembly adopted the Resolution of Permanent Neutrality of Turkmenistan twice in 1995 and 2015. Such a policy has helped Turkmenistan and other Central Asian Republics to achieve progress and prosperity for their nations after independence from the USSR. It is also helping Turkmenistan establish a constructive relationship with its neighboring countries as well as in building a lasting peace through economic and humanitarian assistance.

While sharing views on Turkmenistan's relations with its neighboring countries, the Ambassador informed that Turkmenistan attaches great importance to enhancing cooperation with Pakistan, in particular, in energy sector. In the same

vein, Turkmenistan supports international initiatives to rebuild Afghanistan, inter alia, through programmes under the Regional Economic Cooperation Conference on Afghanistan and the construction of infrastructure projects like Turkmen-Afghan-Pak-India (TAPI) gas pipeline.

Speaking on the occasion, Executive Director COMSATS, Dr. S.M. Junaid Zaidi, considered peace and cooperation in S&T indispensable for achieving progress towards sustainability. He also invited Turkmenistan to join COMSATS as a member state. Amb. (R) Fauzia Nasreen, Advisor (SDGs) at COMSATS; Journalist Tazeen Akhtar; and Dr. Afshan Malik, Chairperson Sindhu Welfare, also spoke on the occasion and shared useful insights on the theme of the event.

International Women's Day (March 08, 2021)

Celebrated with the theme 'Women in Leadership: Achieving an Equal Future in a COVID-19 world,' this year's International



Women's Day aimed to acknowledge the tremendous efforts by women and girls around the world in shaping a better future and recovery from the COVID-19 pandemic and highlight the gaps that remain.

With the foregoing in view, COMSATS Secretariat organized a webinar on 'International Women Day: Building Inclusive Science Environment in the South'. The event aimed to celebrate women's achievements and success in Science, Technology and Engineering and to highlight challenges limiting women's due participation in science-led socio economic development. Eminent women speakers from the global South delivered their talks reflecting on their journey in Science & Technology careers.

Amb. (R) Fauzia Nasreen, Advisor for SDGs at COMSATS chaired the session. In her opening remarks, she emphasized on the equal participation of all genders in scientific research to help drive innovation and strengthen economy. She observed that given the challenges confronting the world and global South in particular, gender disparity is detrimental to S&T-led development. She deemed creating inclusive environment for promotion of STEM education and careers imperative to inculcate leadership qualities in women scientists.

Dr. Assemgul Kalikumarovna Sadvakassova, Deputy Dean at the Al-Farabi Kazakh National University of Kazakhstan, showed with her own example that how women can maintain work-life balance and pursue a scientific career despite running a household. She hoped that her successful efforts could serve as an example for girls and women aspiring to make contributions in their respective fields.

Eng. Abeer Arafat, Assistant to the President for Special Projects, Royal Scientific Society (RSS), Jordan, in her presentation introduced another area of scientific knowledge and research that



pertains to applying scientific knowledge to museums. She was of the view that women are playing equally important role in preserving and conserving historical artifacts and intellectual wealth in their country. She also acknowledged the leadership and guidance of Princess Sumaya bint El Hassan of Jordan in her success as a member of RSS team. Ms. Abeer highlighted how she pushed herself to achieve excellence during her involvement in various projects and as an in-charge at international organization. In RSS she is playing vital role in building networks and other relationships.

In her inspiring talk on the occasion, Prof. Mariangela Hungria, Researcher at Embrapa Soja, discussed how way of living in older days in Brazil affected her as she strived to pursue her career as a scientist. From early age, another inspiring woman – her grandmother – supported her to avail all the opportunities that came her way during the journey. She strived to maintain work-life balance throughout her life while focusing both on her career and personal life. She considered dreams very important for growth of any kind.



Sharing her experience of facing sensitive issues related to gender equality, Prof. Samia Charfi, Director General of Scientific Research in the Ministry of Higher Education and Scientific of Tunisia, talked about her journey of perseverance that helped shaped her career. She also highlighted some statistics of women's contribution in science and technology in her country – 55% and 70% researchers and post-docs, respectively. Prof. Charfi hoped that with the passage of time, young women researchers will be seen at more top-level positions.

A consultant orthopedic surgeon based in UK, Dr. Sohail Chughtai, also joined the session to share perspective on event's theme from the lens of opposite gender working in the field of science. He was of the view that the perceptions are changing in modern era and the role of women in Science and Technology is now being increasingly realized and heeded. He remarked that keeping women away from the jobs and core scientific fields is still a dominant societal behavior especially in the underprivileged areas compared to progressive societies where women are now excelling in every field.



World Environment Day 2021 (June 07, 2021)

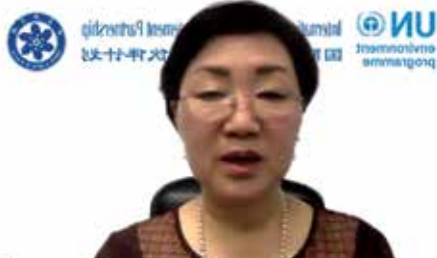
To observe World Environment Day, COMSATS Centre for Climate and Sustainability (CCCS) organized a virtual conference in collaboration with the United Nations Environment Programme – International Ecosystem Management Partnership (UNEP-IEMP). Bearing the theme of the Day – Ecosystem Restoration – the Conference gathered speakers from China, Colombia, Ghana, Jamaica, Jordan, Kazakhstan, Pakistan, and Sri Lanka. Opening the conference, Ambassador Shahid Kamal, Founder Head of CCCS, thanked all the panelists and participants.



Speaking on the occasion, Ms. Kerstin Stendahl, Head of Ecosystems Integration Branch, UNEP, shared UNEP's schema for UN Decade of Ecosystem Restoration while also highlighting the significance of the Day.

In his keynote address, Mr. Malik Amin Aslam Khan, Special Advisor to Prime Minister (SAPM) on Climate Change, Government of Pakistan, shared key interventions made by Pakistan to mitigate the effects of climate change. He informed that Pakistan has opened 15 national parks and initiated "Recharge Pakistan" project





to help reserve flood water as a nature-based solution.

During the first session, speaker from China, Ms. Guoqin Wang, Program Manager at UNEP-IEMP, informed about institutions and key approaches that helped China restore its ecosystems.

Dr. Ernest Foli, Principal Research Scientist at the Council for Scientific and Industrial Research (CSIR), Ghana, and Dr. Linxiu Zhang, Director, UNEP-IEMP, moderated the second session where panelists discussed issues and scientific solutions to tackle ecosystem degradation.

Dr. Yu Liu, Deputy Director at the Synthesis Center of Chinese Ecosystem Research Network (CERN) of the Chinese Academy of Sciences, China, shared a case study of Karst region in China and developments made since 1996 for the conservation of environment. Mr. Mauricio Andrés Valencia Camelo, Environmental Engineer at the International Centre for Physics (CIF), Colombia, shared key issues of environmental degradation in Colombia. He was of the view that anthropogenic activities along with unsustainable agricultural practices have played a major role in the degradation of environment.

Dr. Lucy Amissah, Senior Research Scientist at CSIR-Forestry Research Institute of Ghana (FORIG), Ghana, shared some forest restoration projects of Ghana and deemed role of local communities highly significant for restoration of forests.

Discussing mangroves degradation in Jamaica, Prof. Terrence Forrester,



Director, UWI Solutions for Developing Countries (UWI SODECO) University of the West Indies, Jamaica, considered charcoal production one of the key factors contributing towards this damage. In his talk, Dr. Maher J. Tadros, Professor in Vegetation Ecology and Management Department of Natural Resources and Environment, Jordan University of Science and Technology, Jordan, detailed a case study of invasive species being replaced by native species to abate ecosystem degradation in Jordan.

Dr. Dinara Abiyeva, Managing Director of GIS-Centre, JSC Institute of Geography and Water Security, Kazakhstan, discussed the role of Geographic Information System (GIS) to combat climate change challenges, whereas, Dr. Rangika Bandara, Senior Lecturer at the Department of Zoology and Environmental Management, University of Kelaniya, Sri Lanka, shared key plans and strategies of Sri Lanka to combat climate change. Closing the conference, Dr. Linxiu Zhang shared the economic, social and environmental benefits of ecosystems

and stated that degradation of ecosystem increases the rate of natural disasters. She considered research and science-based solutions imperative to address this challenge.

World Hepatitis Day 2021 (July 28, 2021)

On World Hepatitis Day 2021, COMSATS reached out to Dr. Huma Qureshi, a prominent name in the prevention of hepatitis in Pakistan, for an informative discussion on viral hepatitis, its public health implications, and efforts for its preventions and control within and outside Pakistan. An honorary fellow of the Royal College of Physicians, Ireland, Dr. Qureshi has played a pivotal role in the development of National Hepatitis Strategic Framework (2017-2021) and National Hepatitis C testing and treatment guidelines. Currently practicing Gastroenterology, Dr. Qureshi has previously held notable positions in government sector.

Hosted by Dr. Azeema Fareed, Principal Medical Officer and Focal Person, COMSATS Telehealth Programme, the session highlighted various aspects of hepatitis, including its types, prevention, treatment as well as its public health implications in Pakistan and globally. Giving salient features of the disease, Dr. Qureshi stated that some types of hepatitis result in chronic liver disease and liver





cancer. Various transmission modes of the virus along with information about the available vaccines was also shared by Dr. Qureshi. The need for inclusion of Hepatitis B vaccine in routine Expanded Programme on Immunization (EPI) for newborns in Pakistan was also asserted.

Sharing her views on the theme of the day, Dr. Qureshi expressed concern over the diverted attention from diseases such as hepatitis in the wake of COVID-19 pandemic. She was of the view that waiting for full recovery from the pandemic would only add more burden to the already soaring cases of hepatitis; therefore, countries should remain cognizant of the needs of this endemic-associated threats and take measures accordingly to combat it. In this connection, she deemed knowledge among the general public about the rapid “finger-prick” test along with the treatment regimen imperative to deal with dire consequences of the disease. Being the National Focal Person for Hepatitis in Pakistan, she shared key challenges towards the elimination of hepatitis in the country. Over-population combined with dearth of funds for testing and treatment were highlighted as major obstacles in this connection.

Concluding the session, Dr. Qureshi highlighted the role of international organizations important for relevant advocacy and raising awareness. She stated that social media platforms can be effectively employed for raising awareness regarding the prevention, screening and treatment of hepatitis and advocating its



massive, affordable, approachable and liable testing.

United Nations Day for South-South Cooperation (September 21, 2021)



An advocate of South-South cooperation and championing the efforts of regional players towards the greater good, COMSATS commemorated United Nations Day for South-South Cooperation (September 12) by organizing a webinar: 'South-South Cooperation: Creating Headways for Post-Pandemic Inclusive Recovery'.



Having a virtual gathering of around 90 from 28 countries of Asia, Africa, Americas, and Europe, the webinar featured talks by notable speakers from United Nations Office for South-South Cooperation (UNOSSC), New York; South Centre, Geneva; Alliance of International Science Organizations (ANSO), Beijing; InterAcademy Partnership (IAP), Trieste; Network of African Science Academies (NASAC), Nairobi; United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), Bangkok; and the Islamic World Educational, Scientific and Cultural Organization (ICESCO), Rabat.

Opening Session

Opening the session, Executive Director COMSATS, Dr. Akhtar Nazir welcomed the participants and extended gratitude to distinguished speakers for joining the event bearing an important theme relating to global development. He considered digital technologies indispensable for inclusive recovery from the pandemic and, in this connection, communicated COMSATS' resolve to work with like-minded institutions.

In his video recorded message for the occasion, Dr. Adel Abdellatif, Director, UNOSSC, commended COMSATS' role in championing the cause of South-South Cooperation. He strongly urged the participants to make full use of the 'South-South Galaxy', a platform developed by UNOSSC as a digital global knowledge



sharing and partnership brokering forum, providing best practices for South-South cooperation; as well as connecting solution-providers with solutions-seekers and facilitating cross-country and cross-regional partnerships and collaborations.

Technical Proceedings

In his talk on the 'Role of South-South Cooperation in the Current Pandemic: Lessons for an Inclusive Recovery', Dr. Carlos Maria Correa, Executive Director, South Centre, highlighted the importance of S&T in addressing various human needs and socio-economic challenges. He considered insufficient technology-sharing a failure of multilateral system amidst COVID-19 crisis. Dr. Correa stressed upon the need of having a policy framework to help translate S&T-led progress at global level.

In her presentation, Assistant Executive Director of ANSO, Prof. Ai Likun, shared the role of ANSO in promoting cooperation in science in the global South. Various activities of ANSO, she mentioned, are tailored to achieve shared-development and United Nations Sustainable Development Goals (SDGs) through Science, Technology, Innovation and Capacity Building (STIC). Prof. Likun further shared ANSO's efforts in combating COVID-19 crisis that resulted in initiation of various research-based and scientific projects in collaboration with regional and international partners. She was also of the view that achieving SDGs by 2030 relies greatly on recovery and progress in the global South for which South-South Cooperation is essential. Speaker from IAP, Dr. Peter McGrath, discussed the role of Academies of Science in leveraging South-South Cooperation

for global development. He noted some strategic priorities of IAP and also mentioned programmes being run by IAP in collaboration with global partners to promote the importance of science in research and education, as well as empower regional networks of academies to provide independent, evidence-based, authoritative advice on global, regional and national issues.

President of NASAC, Prof. Mahouton N. Houkonnou, shared views on promoting South-South cooperation through networking of Science Academies. He stated that scientific research can be harnessed for greater global good through collaboration and advocating South-South cooperation. He was of the view that through effective partnerships, like-minded organizations can bring a dynamic change on the science and



technology landscape. He further noted STEM education as one of the core missions of NASAC and he deemed it vital for the achievement of SDGs in Africa. Prof. Hounkonnou sought COMSATS' support in promoting the voice of science to be heard by decision-makers and policymakers in the African continent and beyond.

Dr. M. Sharif, Advisor Science and Technology, ICESCO, shared ICESCO's experience in implementing various Science and Technology programmes during COVID-19. Some projects and programmes launched during the Pandemic as mentioned by Dr. Sharif, inter alia, included:

- construction of water reservoirs;
- setting-up of small units to produce sanitation and hygiene products;
- organization of online lectures in disaster management and water security; and
- capacity-building of young scientists.

Director of Strategy and Programme Management Division at UNESCAP, Mr. Adnan H. Aliani, regarded South-South and Triangular cooperation as ESCAP's prescribed modus operandi. He considered effective regional and sub-regional multilateral mechanisms important for post-COVID-19 recovery. To this effect, he shared the targets of UNESCAP that include, greater investment in social protection systems; re-alignment of financial and economic priorities in line with 2030 Agenda for Sustainable Development; building resilient supply chains; increasing cross-border connectivity; and restoring ecosystem balance.

Discussions

During the Q&A session, interesting discussions took place between learned speakers and participants that touched upon: role of South-South cooperation for inclusive peace; means and mechanisms to strengthen science advisory; role of digital

platforms in enhancing South-South cooperation; effectiveness of South-South cooperation as compared to Triangular cooperation; and budgeting for disaster risk reduction and crisis management.

Some key points transpiring from the discussions are summarized below:

- Poverty alleviation needs to remain a top priority amid the arising global challenges, ensuring food and water security, and disaster preparedness and management, which would help build resilience of developing countries and ensure their better recovery from the pandemic.
- Better integration of new technologies, big data, and AI could help the global South's recovery from COVID-19 pandemic.
- Gap between scientists and policy makers needs to be bridged through better communication on important development subjects, such as SDGs. Academies of sciences have an important role to play in this respect and their networking and collaboration with relevant stakeholders could help greatly in this regard.
- Open science and transferring scientific knowledge is key to making learning crucial to deal with global challenge; cloud technologies could benefit the developing countries greatly in moving forward.
- A hybrid approach with digital and physical component is inevitable for South-South cooperation in the 'new normal' that the pandemic has brought to the world.
- Disaster preparedness, planning and management related to climate change and health emergencies was highlighted as key area of concern in present and future owing to their growing intensity and frequency, calling for due investment in the South.

Closing Session

Closing the session, Dr. Nazir extended gratitude to all the speakers for their informative talks and presentations highlighting best practices, solutions and lessons learnt from the pandemic. He remarked that collaborative and integrated approach will be needed in the post-COVID-19 world.

The webinar concluded on the note that South-South and Triangular cooperation mechanisms need to be strategically built to address current and future socio-economic challenges and to make inclusive recovery from the crises triggered by COVID-19 pandemic.

World Mental Health Day (October 14, 2021)

In the backdrop of spiraling mental health issues since the onset of COVID-19 pandemic, the need to build capacities and increase awareness in this domain has become greater. With the foregoing in view and to mark World Mental Health Day (October 10), COMSATS Telehealth Desk organized a workshop on 'Engaging University Faculty for Mental Health Wellbeing of Youth', in collaboration with COMSATS Centre of Excellence, COMSATS University Islamabad (CUI), Islamabad. Held at CUI, Islamabad, the Workshop had physical and virtual





participation of 30 faculty members belonging to various fields of arts and science.

The subject event with its overarching theme of mental health and wellbeing of youth also touched on Sustainable Development Goals 3 (Good Health and Wellbeing) and 4 (Quality Education).

Opening Session

Opening the event, Dr. Azeema Fareed, Pr. Medical Officer and Focal Person COMSATS Telehealth Project, underscored the significance of the subject and need for creating awareness about it among people of all age groups. She also highlighted COMSATS' efforts and contribution towards the realization of 2030 Global Agenda.

In his welcome address on the occasion, Registrar CUI, Dr. Sajjad A. Madani, highlighted a number of challenges for youth arising from the digital age. He especially mentioned the mental wellbeing challenges surfacing from the overuse of social media having deep social and psychological impact.

Technical Session

The first speaker for the technical session, Dr. Aisha Kashif, Counselor, Psychologist United Nations (UN), Islamabad, acquainted the participants with spectrum of the term 'mental health' and briefly shared factors affecting mental health and peace. She shed light on the myths and stigmas associated with mentally sick person and mental illnesses. Discussing stress-related issues in university students, she stated that university environment presents a distinct set of challenges to students and could be a factor determining mental health of students.

Dr. Noreen Akhter, Deputy Director Sr. Psychologist National University of Sciences & Technology (NUST), Islamabad, focused on the warning signs and identification of at-risk cases. She apprised the participants of the stigmas related to mental illnesses which may trigger self-harming behavior and suicidal thoughts. Few factors affecting mental health and leading to increased cases of drug abuse, depression and anxiety in youth as identified by Dr. Akhter included: lack of connection between parents/teachers and youth and unhealthy use of

social media and digital tools.

The last speaker, Dr. Saima Kalsoom, Psychologist, National Defence University (NDU), Islamabad, highlighted teachers' role in contributing to students' mental health and peace. In connection with this, she considered teachers' psycho-education vital and urged university policy makers to provide favorable environment to faculty for them to effectively manage their relationship with young minds. She recommended practicing meditation and yoga for keeping mind and body healthy and urged faculty members to maintain a good healthy bond with their students.

During the Q&A session, topics such as parents' mental health education, consequences of social media, and awareness on sexual harassment and other sensitive issues were deliberated upon. Discussing these issues, guest speakers added that lack of awareness regarding child mental health issues and absence of parent-child connection are root causes of increasing trend in mental illnesses in young generation. Moreover, moderate and effective use of social media and digital gadgets is vital to help deal with such challenges.

Closing Session

The Chief Guest for the closing ceremony, Dr. Akhtar Nazir, incumbent Executive Director COMSATS, appreciated the subject event organized by COMSATS Secretariat Telehealth Desk and COMSATS University Islamabad. In the light of key global stats on mental health of youth, Dr. Nazir considered it important to give this field of medical science



due importance for ensuring healthier societies. He further emphasized the need for keeping debates open on this and other health issues through awareness events, which he deemed an important step forward for relevant remedial measures at societal and national levels.

Delivering his vote of thanks at the closing ceremony, Prof. Dr. Tabassum Afzal, Rector COMSATS University Islamabad (CUI), considered cultural and societal norms an important factor in dealing with mental illnesses. He cited examples of stress management from the Islamic history and urged the faculty to take

initiatives for the wellbeing of youth's mental health. He also acknowledged the long-standing COMSATS – CUI relationship and extended gratitude to organizers, participants, and other distinguished guests.





EFFORTS TOWARDS SUSTAINABLE DEVELOPMENT GOALS

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EFFORTS TOWARDS SUSTAINABLE DEVELOPMENT GOALS

Sustainable development has been at the core of COMSATS' raison d'être, mandate and subsequently developed programmes and activities. The organization's own mandate gains further thrust and impetus from relevant global agenda, such as the UN Global Agenda 2030. COMSATS' activities covered in different chapters of this report align with different Sustainable Development Goals. This Chapter provides a bird's-eye view of the same.



Introduction

The transformative 2030 Agenda for Sustainable Development was adopted in a historic Sustainable Development Summit hosted by United Nations at its headquarters in September 2015. Successor of Millennium Development Goals (MDGs), this Global Agenda was set up with vehement aspirations of building a world free from hunger, poverty and illiteracy and standing on the principles of equality, peace and justice, while also ensuring the health and prosperity of the planet.

This inclusive plan has provided a blueprint to the signatory nations to monitor and record their progress on various development indicators. However, a concerted effort involving public-private sector, international organizations, civil society, as well as scientific community is required for their realization.

The year 2021 witnessed fallouts of the Pandemic-driven setbacks on economic and social fabric delaying transition towards an inclusive and sustainable future. Nonetheless, within this crisis, exist tremendous opportunities of creating a better future where the role of international organizations is vital. COMSATS with its mission and mandate parallels with the essence of Global Goals that is to say “Sustainability” – has over the years focused its attention on Sustainable Development Goals (SDGs) through their integration within its activities, programmes and plans (Table 5.1).

COMSATS conducted several activities and events during the reporting year with a view to create awareness, enhance networking and knowledge sharing, as well as find necessary solutions and generate recommendations for meeting the targets outlined in 2030 Agenda. These undertakings have been categorized into seven groups each addressing a certain

aspect of the development Agenda; the details of which are as follows. Figure 5.1 shows percentages of undertakings based on thematic clustering of SDGs.

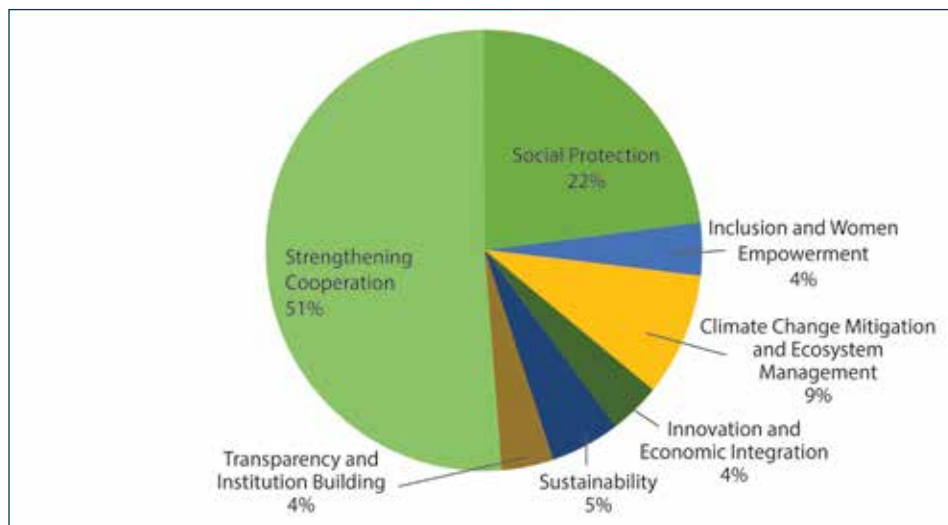
Social Protection (SDG 1, 2, 3, 4, and 6)



No Poverty, Zero Hunger, Good Health and Well-being, Quality Education, and Clean Water and Sanitation

COMSATS, through some of its activities during the year, contributed to SDGs with the larger aim of providing social protection and safety nets to communities and regions falling within the circumference of COMSATS' membership. In this direction, educational and skills development activities were undertaken targeting different tiers of the society, both learners and implementers. Apart from imparting knowledge, sharing good practices and providing necessary skills-sets to the people equipping them

Figure - 5.1: Percentages of COMSATS' undertakings (2021) based on thematic clustering of SDGs



to manage social and economic issues, these activities also helped generate policy recommendations for the decision makers to ensure that adequate means – development cooperation, infrastructure, technical resources, financing, opportunities – exist to achieve objectives of poverty reduction, good health, quality education, as well as food and water security. Furthermore, connectivity remained at the helm of these undertakings to garner support of relevant stakeholders for furtherance and development of COMSATS' relevant programmes. Below is a list of activities and collaborations reached to meet various targets of SDGs 1, 2, 3, 4, and 6.

- Lecture series under COMSATS' Science Diplomacy Programme
 - Lecture on 'Food Security during the Pandemic: Importance of South-South Regional Cooperation';
 - Lecture on 'Pandemic-associated Advances in Research and Development: Science and Technology at work in OIC Region';
 - Lecture on 'Science Diplomacy and Scientific Migration'; and
 - Lecture on 'Science, Technology and Innovation to address

COVID-19 in Palestine'

- COMSATS Telehealth (CTH) Programme
 - Visit of Prime Minister's Task Force on COVID-19, Government of Pakistan to CTH resource centre;
 - Lecture on 'Applications of Radiations in Cancer Management';
 - Workshop on 'Engaging University Faculty for Mental Health Wellbeing of Youth'; and
 - Information session on 'World Hepatitis Day'.
- COMSATS Centre for Climate and Sustainability (CCCS)
 - Webinar on 'Sustainable Management of Forests and Challenge of Deforestation in the Global South'; and
 - Virtual Conference on 'Ecosystem Restoration in the Global South'.
- Workshop on Technical Innovation in Traditional Plant Medicine;
- Webinar on 'South-South Cooperation: Creating Headways for Post-Pandemic Inclusive Recovery'.

Inclusion and Women Empowerment (SDG 5 and 10)

Gender Equality and Reduced Inequalities

COMSATS' constitutional ideology is drawn greatly from awareness of inequalities and disparities between the North and the South accentuating the need for equitable sharing of resources among nations. A mechanism devised in this connection central to COMSATS' objectives is pooling and sharing of resources among developing countries and relevant collaborative arrangements with the developed world. Parities that are needed in this context also include dimensions of gender, S&T, knowledge, and education. With the foregoing in view, COMSATS organized following activities that contributed to relevant targets of SDGs 5 and 10.

- Commemoration of International Women's Day celebrating achievements and success of women in STEM fields; and
- Webinar on 'South-South Cooperation: Creating Headways for Post-Pandemic Inclusive Recovery'.

Climate Change Mitigation and Ecosystem Management (SDG 13, 14, and 15)

Climate Action, Life Below Water, and Life On Land

Coordinated efforts of COMSATS towards climate change management and cooperation resulted in an international network – COMSATS Center for Climate and Sustainability (instituted in 2018). Concerted efforts are being made to meet various targets associated with the goal of climate change mitigation. Such efforts and activities continued with the same vigor and foresight during 2021.

Broad themes of activities conducted by COMSATS from the platform of CCCS

Table 5.1: 2021 Programmes / Activities Meeting Relevant Targets of SDGs

Sr. No.	Activity Name	Sustainable Development Goal (SDG)
1	Webinar on 'Modeling and Simulation on Climate Change and Environmental Pollution: Strengthening Resilience in the Global South'	SDG 13: Climate Action
2	Webinar on 'Sustainable Management of Forests and Challenge of Deforestation in the Global South'	SDG 6: Clean Water and Sanitation SDG 13: Climate Action SDG 15: Life On Land
3	Webinar on 'South-South Cooperation: Creating headways for Post-Pandemic Inclusive Recovery' (Observance of United Nations Day for South-South Cooperation)	SDG 1: No Poverty SDG 2: Zero Hunger SDG 3: Good Health and Well-being SDG 4: Quality Education SDG 6: Clean Water and Sanitation SDG 7: Affordable and Clean Energy SDG 9: Industry, Innovation and Infrastructure SDG 10: Reduced Inequalities SDG 11: Sustainable Cities and Communities SDG 12: Responsible Consumption and Production SDG 15: Life On Land SDG 17: Partnerships for the Goals
4.	ANSO-BIDI School on 'Innovation, Sustainable Development and Leadership Enhancement'	SDG 8: Decent Work and Economic Growth SDG 16: Peace, Justice, and Strong Institutions SDG 17: Partnerships for the Goals
5.	Workshop on 'Technical Innovation in Traditional Plant Medicine'	SDG 3: Good Health and Well-being SDG 12: Responsible Consumption and Production
6.	Training Course on 'Industrial Synthetic Biotechnology'	SDG 17: Partnerships for the Goals
7.	Lecture on 'Applications of Radiations in Cancer Management' (Observance of World Cancer Day)	SDG 3: Good Health and Well-being SDG 17: Partnerships for the Goals
8.	Talk on '2021: The International Year of Peace and Trust' (Observance of International Year of Peace and Trust)	SDG 16: Peace, Justice, and Strong Institutions SDG 17: Partnerships for the Goals
9	Webinar on 'International Women's Day: Building Inclusive Science Environment in the South' (Observance of International Women's Day)	SDG 5: Gender Equality SDG 10: Reduced Inequalities SDG 17: Partnerships for the Goals
10.	Virtual Conference on 'Ecosystem Restoration in the Global South' (Observance of World Environment Day)	SDG 6: Clean Water and Sanitation SDG 13: Climate Action SDG 14: Life Below Water SDG 15: Life On Land SDG 17: Partnerships for the Goals
11.	Information Session on Hepatitis by Dr. Huma Qureshi (Observance of World Hepatitis Day)	SDG 3: Good Health and Well-being SDG 17: Partnerships for the Goals
12.	Workshop on 'Engaging University Faculty for Mental Health Wellbeing of Youth' (Observance of World Mental Health Day)	SDG 3: Good Health and Well-being SDG 4: Quality Education SDG 17: Partnerships for the Goals



and otherwise included: ecosystems restoration; building climate-resilient communities; and sustainable forest management. The outlined targets were contributed to through holding of virtual thematic events to facilitate exchange of scientific knowledge on the subject, develop research capacity, as well as building of connections for achieving targets falling under SDG 13, 14, and 15. A list of these is given below:

- Webinar on 'Modeling and Simulation on Climate Change and Environmental Pollution: Strengthening Resilience in the Global South';
- Virtual Conference on 'Ecosystem Restoration in the Global South';
- Webinar on 'Sustainable Management of Forests and Challenge of Deforestation in the Global South'; and
- Webinar on 'South-South Cooperation: Creating headways for Post-Pandemic Inclusive Recovery'.

Innovation and Economic Integration (SDG 8 and 9)

Decent Work and Economic Growth, and Industry, Innovation and Infrastructure

Scientific capacity-building, technological upgradation, training and education, scientific infrastructure development,

industrial growth, entrepreneurship, youth empowerment, and innovation are the areas of great interest to COMSATS owing to their significance to its member states' developmental needs. Accordingly, the organization realizes the magnitude of the need for investment in these domains for greater good of societies and for achieving all aspects of sustainability in an effective manner. The events of 2021 bearing the themes relating to the targets of SDGs 8 and 9 were:

- ANSO-BIDI School on 'Innovation, Sustainable Development and Leadership Enhancement';
- Webinar on 'South-South Cooperation: Creating headways for Post-Pandemic Inclusive Recovery'; and
- Lecture on 'Science Diplomacy and Scientific Migration'.

Sustainability (SDG 7, 11, and 12)

Affordable and Clean Energy, Sustainable Cities and Communities, and Responsible Consumption and Production

Kept at the heart of the organization's founding mandate, "Sustainability" is seen in all undertakings of COMSATS with the understanding that socio-economic growth is viable only with prudent and efficient use and sharing of existing means

and resources with due environmental considerations. Abiding by these principles, COMSATS is facilitating policy dialogues and debates to help integrate clean and green solutions in growth patterns, building capacities to guide research and development towards this cause as well as enhancing cooperation with regional players to meet the targets of SDG 7, 11, and 12. This year's activities aligning with the targets relating to Goal 7, 11 and 12 are as follow:

- Webinar on 'South-South Cooperation: Creating headways for Post-Pandemic Inclusive Recovery'; and
- Workshop on 'Technical Innovation in Traditional Plant Medicine'.

Transparency and Institution Building (SDG16)

Peace, Justice, and Strong Institutions

The narrative of creating a peaceful world through judicious use of S&T is well-embedded in COMSATS' mission and has long steered the organization's course of action. This mission is being pursued through different means, one of which is institution building. One such landmark was achieved in 2021 that mainly served target 6 of Goal 16 and peripherally other targets of Goal 3, 4, and 17. This year's undertakings aligning with the targets of Goal 16 are as follows:

- Launching of COMSATS Joint Centre for Industrial Biotechnology (CCIB); and
- Observance of International Year of Peace and Trust – 2021.

Strengthening Cooperation (SDG 17)

Partnerships for the Goals

Partnerships and collaborations are central to COMSATS' Statutes inspired by the idea that concerted efforts can



help galvanize achievement of shared goals through sharing of resources, best practices and solutions. The founding fathers of COMSATS established the need for bridging North-South multi-sectoral divide for a sustainable future of the world and the very same idea has been seen operative in full glory globally in the wake of the Pandemic.

Like earlier years, multi-sectoral partnerships remained COMSATS' forté during 2021. Revitalizing its long-standing collaborations with key global players, COMSATS built new connections during the year in contemporary fields, such as digital health and industrial biotechnology, as well as held important meetings with representatives of the host country, Pakistan, and diplomatic missions

of COMSATS Member States. Besides, thematic events held during the year served an additional purpose of building connectivity in cross-cutting areas. COMSATS' activities during 2021 majorly aimed to serve the following objectives relating to SDG17. Table 5.2 outlines different undertakings against the relevant targets.

- Strengthening of South-South and Triangular cooperation in S&T;
- Enhancing and facilitating exchange of knowledge, expertise, technical and financial resources;
- Extending support for need-based capacity-building in developing countries;
- Helping mobilize financial resources for developing countries; and
- Providing assistance for realization of national action plans and ultimately Sustainable Development Goals.

Table 5.2: Activities Meeting Targets of SDG-17

Sr. No.	Activity	Relevant Target of SDG17
1	Engagement with Chairperson's Office in Ghana	17.14. Enhance policy coherence for sustainable development
2	Institution building: Launching of COMSATS Joint Centre for Industrial Biotechnology (CCIB)	17.6. Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge-sharing on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism
3	Collaboration with national, regional and international organizations	17.6. Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge-sharing on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism 17.16. Enhance the Global Partnership for Sustainable Development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the Sustainable Development Goals in all countries, in particular developing countries
4	Lecture Series on 'South-South and Triangular Cooperation for Sustainable Development in the South'	17.14. Enhance policy coherence for sustainable development
5	Publications, advocacy and communication	17.16. Enhance the Global Partnership for Sustainable Development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the Sustainable Development Goals in all countries, in particular developing countries

PARTICIPATION IN IMPORTANT FORA AND MEETINGS

- Inauguration of ANSO-BIDI Institute Network (July 07, 2021) 48
- UNOSSC's Webinar on 'Digital Government and Transformation: Exploring South-South and Triangular Cooperation Innovations' (November 02 – 05, 2021) 49
- International Research Symposium on 'Positioning Science, Technology & Research for New Normal Industrial Challenges' (November 10, 2021) 50
- WHO/EMRO & UNESCO's Webinar on 'Fair, Equitable and Timely Allocation of Covid-19 Vaccines in the Arab States/Eastern Mediterranean Region' (December 06, 2021) 52
- UNOSSC Retreat 'Feasibility of Compiling Asia-Pacific Regional Report on South-South Cooperation 2021' (December 15, 2021) 53

PARTICIPATION IN IMPORTANT FORA AND MEETINGS

Events and organizational meetings of partner and potential partner organizations are utilized as means to aiding efforts for joint work on regional and international development. Based on commonalities of mandates with partner organizations, reciprocal representation in statutory meetings and capacity-building events are encouraged as good networking opportunity. These help garner mutual support, explore avenues of cooperation, and start and foster joint initiatives.



Inauguration of ANSO-BIDI Institute Network (July 07, 2021)

Since 2019, COMSATS is an active member of the Alliance of International Science Organizations (ANSO) of China – a body of scientific organizations along the Belt and Road Region committed to promoting sustainable development through catalyzing cooperation initiatives in Science, Technology, Innovation

and Capacity Building (STIC) at the international level. As a member organization of ANSO and being an advocate of science diplomacy and sustainable development, COMSATS participated in the inauguration of Belt & Road International Innovation Development Institute Network (ANSO-BIDI Institute Network).

Held on 7th July at the University of

Chinese Academy of Sciences (UCAS), the ceremony had physical and virtual participation of heads/representatives from Chinese state institutions, research centres, scientific organizations, as well as academic institutions around the globe.

Prof. Desheng Wu, Dean of the Belt and Road College of UCAS & Director of the Research Centre for Environmental Economics of UCAS, opened the event. Leaders from various member organizations of ANSO-BIDI Institute Network made opening speeches, including Prof. Dr. Jinghua Cao, Executive Director of ANSO; Dr. Junshe Dong, Vice President and Executive Deputy Secretary of the Party Committee of UCAS; Dr. Yongguan Zhu, Research Fellow and Doctoral Supervisor, Institute of Urban Environment and Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences (CAS); Prof. Philippe De Maeyer, Professor at Ghent University (UGent), Belgium; Dr. Veselin Vukoti, Rector of University of Donja Gorica in





Montenegro (UDG), Montenegro; Prof. Sunil Babu Shrestha, Vice Chancellor of Nepal Academy of Science and Technology (NAST), Nepal; Mr. Sakawat Hossain, on behalf of Dr. Farzana Islam, VC Jahangirnagar University, Bangladesh; Prof. Lucio Lamberti, Professor, Politecnico di Milano (MIP), Italy; Dr. Attaullah Shah, Vice Chancellor, Karakoram International University (KIU), Pakistan, as well as Prof. Dr. Ashraf Shaalan, Chairperson of COMSATS Coordinating Council.

Representing COMSATS Secretariat, Prof. Shaalan in his remarks deemed establishment of the Network a step forward in building stronger South-South cooperation in the field of science and technology for sustainable development. He communicated COMSATS' resolve to support such initiatives to enhance capacity of developing countries in line with emerging trends, and global needs and challenges.

A non-profit, non-governmental international organization established by the College of Belt & Road of UCAS, ANSO-BIDI Institute Network is mandated to facilitate sustainable development in the South particularly along the Belt & Road region through a long-term training and exchange mechanism. Apart from ANSO and COMSATS, various scientific and academic organizations from Asia, Europe, and North America, joined the Network. These include: MIP

Politecnico di Milano – Italy, University of Toronto – Canada, National Science and Technology Development Agency (NSTDA) – Thailand, University of Donja Gorica (UDG) – Montenegro, National Academy of Sciences, Republic of Armenia (NASRA) – Armenia, and Jahangirnagar University – Bangladesh.

UNOSSC's Webinar on 'Digital Government and Transformation: Exploring South-South and Triangular Cooperation Innovations' (November 02 – 05, 2021)

As a key facilitator of capacity development programmes on South-South and Triangular cooperation, COMSATS was invited to participate in UNOSSC's capacity building webinar on 'Digital Government and Transformation: Exploring South-South and Triangular Cooperation Innovations', held from 2nd to 5th November 2021.

Managers and mid-level professionals from central and local governments, as well as government agencies in charge of digital project creation and implementation, were invited to participate in the webinar which was organized in partnership with the Asian and Pacific Training Centre for ICT for Development and Amazon Web Services Institute.

In view of COMSATS' technical strength

in the form of its Network of International S&T Centres of Excellence, UNOSSC also requested COMSATS to nominate relevant subject expert as guest speaker to conduct a technical session on 'Emerging Technologies', on 4th November 2021. In consultation with one of its Centres of Excellence – the Scientific and Technological Research Council of Turkey (TÜBİTAK) – COMSATS nominated Dr. Nuriye Ünlü, the Deputy Director of TÜBİTAK BİLGEM Software Technologies Research Institute (YTE), to speak on key emerging digital government trends, potential of Artificial Intelligence (AI) in digital government and ethical concerns associated with it, as well as to discuss the need for and significance of robust data governance and digital identity systems.

Introducing the National Artificial Intelligence Strategy (2021- 2025) developed by the Turkish Presidency's Digital Transformation Office and the Ministry of Industry and Technology, Ms. Ünlü intimated that the strategy aims to: consolidate Turkey's artificial intelligence objectives and provide the groundwork for a more aggressive investment plan. Plans and efforts are afoot to strengthen Turkey's public institutions for integrating next generation technology and to have effective data-driven decision-making processes.

During the presentation, she also informed that Turkey has launched several production and incentive opportunities

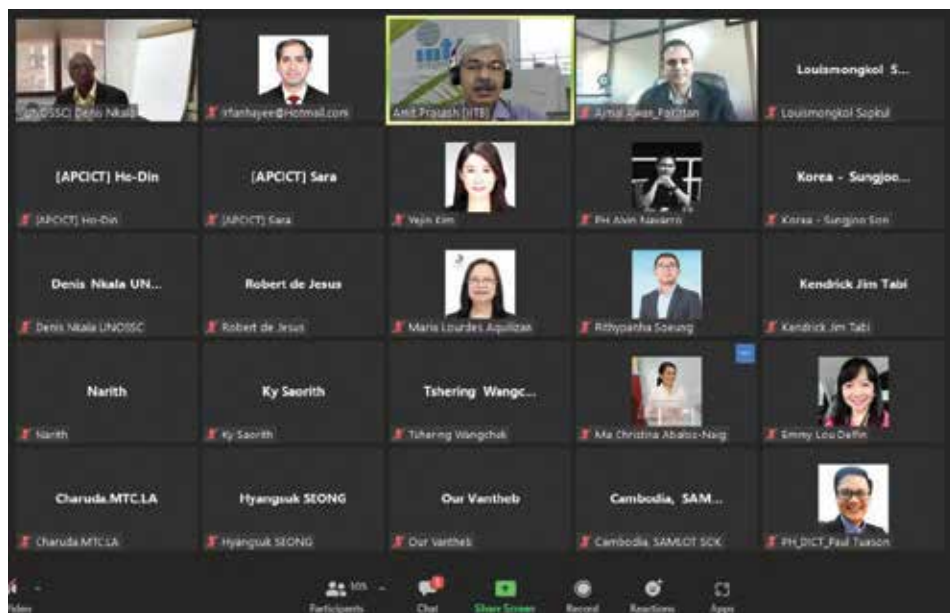


to support R&D activities in high-impact emerging technology fields, including information security, energy storage, advanced functional and energy materials, biotechnological medicine, broadband technologies, electro mechanic systems, artificial intelligence and machine learning technologies, micro-nano optic electronic systems, robotics, mechatronics & automation, motor technologies, big data and data analytics, and Internet of Things (IoT).

Under one of the agenda items of the webinar, national digital government strategies and programmes of selected countries in Asia and the Pacific were discussed. Availing on this opportunity, COMSATS liaised with the Ministry of Information Technology and Telecommunication (MoITT) of Government of Pakistan to make their participation possible for the event through presentation of the country's national strategy. This resulted in Mr. Ajmal A. Awan, Member International Coordination at MoITT, representing Pakistan in the session.

Establishing the significance of digital transformation for long-term prosperity in the post-pandemic age, Mr. Awan stated that Pakistan was already committed to bringing about a major digital transformation even before the COVID-19 pandemic – a goal expedited further by the Pandemic. He spotlighted Government of Pakistan's programmes and projects tailored to increase the competence and capacity of individuals, institutions and companies in the field of emerging technologies, including big data and artificial intelligence.

He remarked that Pakistani latest digital initiatives – particularly the Digital Pakistan Policy 2021, three-year rolling Spectrum Strategy, Digiskills training program, supportive Regulatory Regime, tax benefits for the ICT industry would help increase production of scientific, indigenous and unique advanced technology products and systems.



In other technical sessions, discussions and deliberations focused on information sharing on digital initiatives and strategies, design approaches for digital government and governance, digital government technology trends, as well as policy and operational aspects related to implementation of digital government programmes and projects. Moreover, intellectual discourse was held on open source and government digital transformation.

International Research Symposium on 'Positioning Science, Technology & Research for New Normal Industrial Challenges' (November 10, 2021)

The Executive Director of COMSATS, Dr. Akhtar Nazir (Federal Secretary, Ministry of Science and Technology (MoST), Government of Pakistan), participated virtually as a Special Guest at the Inauguration Ceremony of the 5th Biennial Research Symposium on 'Positioning Science, Technology & Research for New Normal Industrial Challenges' organized by one of the Centre of Excellence of COMSATS – Industrial Technology Institute (ITI), Sri Lanka.

Held from 10th to 12th November 2021, the Symposium had the aim to stimulate and foster the growth of scientific and technological research towards development of industries and provided a platform to research scientists, engineers and technologists to present their research findings. Inaugurated on World Science Day (November 10), the event also served as means for COMSATS' fraternity to contribute to the day's objectives. A number of senior Sri Lankan Government officials, including State Minister for Digital Technology and Enterprise Development, and Minister for Trade, were also present at the inaugural.

Inaugurating the event, Dr. G.A.S. Premakumara, Chairman of ITI, informed that launched in 2013, the Biennial Research Symposium has expanded to be an international event being held during the national science week of Sri Lanka. During his speech, Dr. Premakumara highlighted ITI's long-standing relationship with COMSATS and acknowledged its role in facilitating cooperation in science, technology and innovation for achieving sustainable development in the countries of the South, including Sri Lanka.

Underscoring contributions of ITI towards



hi-tech industrial development and technological upscaling of Sri Lanka, Dr. Radhika Samarasekera, Director General of ITI, informed that R&D, consultancy, technology transfer, training, surveys and monitoring, and mitigation of environmental pollution have remained ITI's key tools to help achieve this objective.

In his remarks read out on the occasion, H.E. Gotabaya Rajapaksa, the President of Sri Lanka, noted that science and technology have played a crucial role in dealing with new challenges and achieving the common goals. His Excellency informed that the Government of Sri Lanka has formulated a National Policy Framework: 'Vistas of Prosperity and Splendor', laying out a plan of action for sustainable development of the country. He also acknowledged the vital role played by R&D institutions during COVID-19.

Speaking on the occasion, Hon. Namal Rajapaksa, State Minister of Digital Technology and Enterprise Development/ Minister of Youth & Sports/Minister of Development Coordination and Monitoring, informed that Sri Lankan government is committed to tackling the challenges of the new normal started, inter alia, by investing in innovation and research. He reiterated his Ministry's commitment towards the

digital transformation of Sri Lanka and acknowledged the constructive role of ITI in industrialization. Hon. Bandula Gunawardena, Sri Lankan Minister for Trade, acknowledged the efforts of ITI's scientists and researchers in developing technologies to help society during COVID-19.

In his keynote address, Hon. Prof. Tissa Vitarana, Member of the Parliament, Government of Sri Lanka, stated that developing countries should make the best use of Science, Technology and Innovation in order to achieve socio-economic development. He stated that natural and agricultural resources must be utilized judiciously to boost industrialization and Science, Technology and Research can play a crucial role towards this end. He was of the view that the negative fallout of COVID-19 on industry can be

abated by taking necessary structural and organizational steps.

Speaking on the occasion, Dr. Nazir opined that adoption of appropriate Science, Technology and Research policies, and putting in place robust infrastructure for research and development would be vital for the progress and development of countries. Dr. Nazir emphasized on building strong university-research institutions-industry nexus to help find innovative solutions to the challenges of post COVID-19 era. Dr. Nazir also acknowledged the mutually beneficial cooperation between COMSATS and ITI.

At the end of the ceremony, a vote of thanks was presented by Dr. Ilmi Hewajulige, Additional Director General at ITI. Appreciation Awards, Presidential Awards for Scientific Publications, Post-





Graduate Awards, and Special Awards, among others, were also distributed among ITI Staff during the inaugural.

The technical sessions of the Symposium comprised of 39 talks focused on the topics of Food, Herbal, Environmental, Material, and Chemical Technologies; Electro and Biotechnologies; Industrial Metrology; and Microbiology. A post-symposium workshop entitled “Entrepreneurship Development in New Normal: Challenges and Way Forward” was also held virtually on 15th November 2021, for micro, small and medium enterprises (MSMEs) with participation of scientists from COMSATS’ Network.

WHO/EMRO & UNESCO’s Webinar on 'Fair, Equitable and Timely Allocation of Covid-19 Vaccines in the Arab States/ Eastern Mediterranean Region' (December 06, 2021)

Dr. Azeema Fareed, Principal Medical Officer and Focal Person COMSATS Telehealth Project, chaired one of the sessions of the World Health Organization Regional Office for the Eastern Mediterranean (WHO/EMRO) and United Nations Educational, Scientific and Cultural Organization (UNESCO) joint webinar on 'Fair, Equitable and Timely Allocation of COVID-19 Vaccines in the Arab States/ Eastern Mediterranean

Region'. Held on 6th December 2021, the webinar, gathered more than 60 field experts from the Middle East and Arab region.

The webinar had six technical sessions divided into two parts, and featured talks and panel discussions on broad topics concerning ethics, diplomacy, research, socio-economics and distribution of COVID-19 vaccine. These included: Public Good, Solidarity & Building Capacity; Role of Data & Research; Ethical Principles and Realities on Vaccine Roll-out in the Arab/EMR; Vaccine Hesitancy and Community engagement; Social impact of the COVID-19 Pandemic; and Key Ethical Principles in Time of COVID-19 Pandemic and Vaccination.

The opening session was chaired by Prof. Gamal Serour, Former President of International Federation of Gynecology and Obstetrics (FIGO), Egypt, and featured remarks of experts from WHO/EMRO, UNESCO, and League of Arab States (LGA).

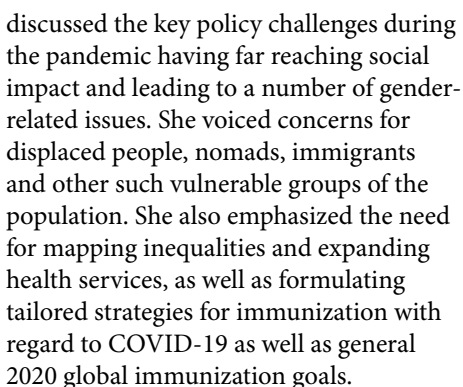
Chaired by Dr. Fareed, the fifth session on “Social Impact of the COVID-19 Pandemic” highlighted impacts of COVID-19 Pandemic on various socio-economic indicators such as health and education. Session panelists included: Dr. Abdullah Al-Joudi, Member National Committee of Health Ethics, Saudi Health Council, Saudi Arabia; Dr. Samar Elfeky, Technical Officer in Division of Healthier

Populations, WHO/EMRO; and Dr. Nijmeh Al-Attiyat, IBC member and Associate Professor, Hashemite University, Jordan.

Speaking at the session opening, Dr. Fareed opined that COVID-19 pandemic has negatively affected progress towards 2030 Agenda for Sustainable Development. Citing relevant statistics, she noted that 2.8 to 3.4 million people of Eastern Mediterranean Region (EMR) have been pushed back into extreme poverty during this timeframe. This multi-faceted crisis has precipitated into and uncovered the deep social inequalities around the globe. She went on to say that an unequal distribution of vaccines would further deepen these inequalities and widen the gap between the rich and the poor that may reverse decades of hard-won progress on human development.

Dr. Abdullah Al-Joudi highlighted the issues and measures related to governance, commerce and public health management in Saudi Arabia through statistics from different national and international reports. He mentioned that Saudi Arabia also adopted the strategy of digitalization to resume and gain positive outcomes in the field of education, economy, food supplies and public health. Dr. Al-Joudi was of the view that realistic approach should be adopted to address far reaching consequences of the Pandemic.

The second speaker, Dr. Samar Elfeky



UNOSSC Retreat 'Feasibility of Compiling Asia-Pacific Regional Report on South-South Cooperation 2021' (December 15, 2021)

COMSATS was invited by UNOSSC, for participation in UN Regional South-South and Triangular Cooperation Focal Points Network Retreat in Asia and the Pacific to discuss 'Feasibility of Compiling Asia-Pacific Regional Report on South-South Cooperation 2021', held on 15th December 2021. COMSATS was represented by Mr. Dominic Asante Opoku-Manu, Policy Analyst at SDGs Advisory Unit, Office of the President of Ghana, upon nomination of the Executive Director COMSATS.

roles of organisations in compiling the Report. Other participating institutions included: Centre on Integrated Rural Development for Asia and the Pacific (CIRDAP), Food and Agriculture Organization (FAO), International Labour Organization (ILO), International Science, Technology and Innovation Centre for South-South Cooperation under the Auspices of UNESCO (ISTIC), Partners in Population and Development (PPD), UN Capital Development Fund (UNCDF), United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP), 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), United Nations Volunteers (UNV) and World Food Programme (WFP).

Opening the session, Mr. Denis Nkala, UNOSSC Regional Coordinator for Asia-Pacific Region, introduced to the participants the purpose of the Retreat, which he communicated, is to exchange knowledge and seek cooperation on effective integration of South-South cooperation to help respond to developmental challenges in the region. He also shared historical timeline of South-South and Triangular cooperation and the





relevancy of this tool with global response to the Pandemic in current times. He further delineated on how South-South cooperation can be deployed at regional and country levels under the UN reforms.

Mr. Christophe Bahuet, UNDP Deputy Regional Director for Asia and the Pacific and Director of Bangkok Regional Hub, underlined three premises of the South-South Cooperation in the region: centrality of cooperation to the national development of countries in Asia-Pacific region; provision of development cooperation assistance by this region in a very structured and institutional way; and primacy of South-South cooperation in the work of United Nations Development System that is reflected in the Common Countries Analysis (CCA) and in the UN Sustainable Development Cooperation

Frameworks (SDCF). Professor Shahbaz Khan, Director of the UNESCO Office, pointed out that in the backdrop of pressing planetary and socio-economic challenges, sustainable and innovative digitalization solutions can deliver positively on SDGs in a high-quality, relevant and efficient manner.

Discussions during the sessions of the Retreat touched upon vital topics such as the role of South-South and triangular cooperation in digital transformation of the South and in COVID-19 response.

It was agreed during the Retreat that UNOSSC will facilitate groups of interested stakeholders to promote action under specific themes and sectors such as the digital transformation, post COVID-19 recovery and entrepreneurship.

Key recommendations made during the Retreat included:

- South-South and Triangular cooperation needs to be well-integrated in the UN reforms at country and regional levels. Besides, the UN system can play an important role in strengthening the inputs of emerging development partners by proposing international standards.
- Demands from recipient countries need to be addressed to better support them in facing their challenges relating South-South and Triangular cooperation.
- South-South cooperation can benefit marginalized and underserved communities.

ACTIVITIES OF COMSATS CENTRES OF EXCELLENCE

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• Tianjin Institute of Industrial Biotechnology (TIB), China	59
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• Council for Scientific and Industrial Research (CSIR), Ghana	60
• Sepuluh Nopember Institute of Technology (ITS), Indonesia	62
• International Centre for Environmental and Nuclear Sciences (ICENS), Jamaica	63
• Royal Scientific Society (RSS), Jordan	63
• Al-Farabi Kazakh National University (KazNU), Kazakhstan	67
• National Mathematical Centre (NMC), Nigeria	71
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• COMSATS University Islamabad (CUI), Pakistan	73
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ACTIVITIES OF COMSATS CENTRES OF EXCELLENCE

A group of twenty-four S&T/R&D and higher education institutions from different developing countries, predominantly COMSATS Member States, is affiliated with COMSATS constituting its Network of International S&T Centres of Excellence. The Network serves as COMSATS' technical resource for South-South cooperation, in line with these institutions' mandates of having programmes of scientific research and development. This chapter covers annual reports received from COMSATS' Centres of Excellence, as well as news of some Centres covered in COMSATS Newsletter over the year.



Bangladesh Council of Scientific and Industrial Research (BCSIR), Bangladesh

Bangladesh Council of Scientific and Industrial Research (BCSIR) is a non-profit multidisciplinary public-sector research organization established in 1973.

The main task of BCSIR is to foster R&D sector of the country.



Capacity-building Activities

The Institute of National Analytical Research and Services (INARS) of BCSIR organized a workshop on 'the promise of INARS, calibration service accredited according to ISO 17025 and the use of safe water', on 27th June 2021. The workshop



was presided over by Md. Shamim Ahmed, Director (In-charge) of INARS, and attended by officials from the Dhaka Water Supply and Sewerage Authority (DWASA), the Department of Public Health and Engineering (DPHE), Sanofi Bangladesh, Akij Food & Beverage Ltd., directors of various laboratories as well as senior scientists.

International Centre for Climate and Environment Sciences (ICCES), China

The International Center for Climate and Environment Sciences (ICCES) focuses its research





Prof. Lin Zhaohui

Director

International Centre for Climate and Environment Sciences (ICCES), China

Because of the challenges posed by the COVID-19 pandemic, 2021 has been a year that requires global united efforts from both governmental organizations and scientific community more than ever. ICCES acknowledges the leadership of COMSATS in fostering the international collaboration, and scientific capacity building for sustainable development among member countries.

In the past year, ICCES worked closely with COMSATS and other international networks to advance climate and environment sciences for promoting sustainable development in the developing countries. In 2022, ICCES will commit to enhancing collaboration with COMSATS' member countries to foster partnerships and develop innovative approaches in STI cooperation, education, and capacity building programmes in the South.

On behalf of ICCES, I wish COMSATS a very successful 2022.

on the key scientific problems relating to global climate and environmental changes. Established in 1991, ICCES is devoted to establishing the cooperative and innovative research center in the area of climate and environment sciences, and provide services to the developing countries with scientific support, advisory, and capacity building.

The main research fields include the development of Dynamical Earth System Model and numerical simulation, meteorological, and environmental forecast and related disaster assessment theory and technique, data assimilation theory and methodology, and earth system theory and natural cybernetics.

R&D Activities

Following scientific and research developments were made by ICCES during 2021:

- Release of data on the distribution of global sand and dust fluxes providing simulations of global sand and dust emission fluxes, sediment fluxes, loads, and optical depths from

September 1998 to August 2010 using two Earth system models (CAS-ESM2) and community Earth system model (CESM2). Besides, statistics on the characteristics of dust events at China stations was also released to aid environmental governance in countries along the Belt and Road as well as to address climate change related challenges.

- Development of grid observation data (IAP datasets) of the most important physical variables of the ocean, such as global ocean temperature, salinity, and stratification. This dataset is an important basis for research on climate change, climate monitoring, physical oceans, climate policy, socio-economic impact assessment, and other disciplines, and effectively serves the research of marine climate change in countries and regions along the Belt and Road.

Joint Collaborative Research

Prof. He Zhang and Prof. Chenglai Wu collaborated with a research team of the Northwest Institute of Eco-Environment and Resources of Chinese Academy

of Sciences (CAS), China, to conduct research on hydrometeorology of Lancang-Mekong River and Murray-Darling River basins and carried out following research studies:

- Analysis of spatial distribution characteristics and temporal changes of drought in the Lancang-Mekong River and Murray-Darling River basins by using multi-source precipitation and temperature data.
- Risk management of seasonal climate hydrology and development of a spatio-temporal downscaling method suitable for hydrological forecasting of the Lancang-Mekong River Basin to provide climate prediction elements for the hydrological model of the basin.



Collaborating with the Institute of Hydrological Information (HII) of Thailand, ICCES continued research on sub-seasonal-seasonal (S2S) forecasts. Prof. Zhaohui Lin (Director ICCES), Dr. Suutat Weesakul (Director HII), and Dr. Kritanai Torsri (HII) carried out joint research on weather-to-climate predictions to develop an S2S database for Thailand, including observational and prediction data and using CAS-ESM model. The project will help Thailand and neighboring Southeast Asian countries cope with the impacts of climate change, disaster prevention and mitigation, and water management.

In association with the Center of Regional Climate Change and Renewable Energy of Ramkhamhaeng University, Thailand, ICCES conducted 'Sino-Thai cooperation project' for studying historical climate and future climate change using CAS-ESM. Regional downscaling studies were conducted in Southeast Asia, which provided a scientific basis for climate change in this region and its response and sustainable regional socio-economic development in Southeast Asia.

Publications

Prof. Cholaw Bueh from ICCES co-published a paper with Dr. Bushra Khalid from International Islamic University (IIUI), Islamabad, Pakistan to study the relation between dengue transmission and climate and societal factors. The study provides an important factual basis and technical support for understanding the transmission mechanism of dengue fever disease in tropical and subtropical monsoon regions and has significance for the prevention of dengue infectious diseases.

Dr. Lijing Cheng, Associate Researcher from ICCES authored Chapter 1 of 'Special Report on Oceans and Cryospheres in Climate Change (SROCC)' released by United Nations Intergovernmental Panel on Climate Change (IPCC), on 25th September 2021. Dr. Cheng also contributed to chapters 3 and 5, and was



a member of the team that wrote the Summary of Decision Makers (SPM). The report is one of three special reports for the IPCC's sixth assessment cycle, focusing on key climate change facts and attributions in the oceans and cryosphere, impacts, projections of future change, adaptation responses, and more.

Capacity-building Activities

ICCES organized/co-organized the following meetings, conferences and discussion forums during 2021:

- First International Conference on 'Innovations in Agriculture to Ensure Global Food Security' under the theme 'Threats to Agriculture Being Faced by Climate Change' in collaboration with the Islamia University of Bahawalpur (IUB), Pakistan, on 10th November 2021. Overall, 150 researchers, policymakers, farmers, and students participated in the hybrid Conference from Australia, Brazil, Canada, China, Germany, Japan, Korea, Nepal, New Zealand, Pakistan, Thailand, Turkey, and United Kingdom.
- Asia and Oceania Regional Geological Conference (AOGS) sub-forum on 'Weather, Climate, Air Quality Model Development, and Its Application', on 6th August 2021. More than 30 experts from China, Japan, South Korea, Singapore, Taiwan, United States attended the forum.
- 8th internal meeting of the Global

Fire Pattern Comparison Program (FireMIP) on 9th November 2021, with the participation of speakers from Colombia, Germany, and United Kingdom and 37 participants from 13 countries.

- Online sub-forum on 'Tropical-Medium-High Latitude Interaction and Ocean Basin Interaction' at the 101st Annual Meeting of the American Meteorological Association, from 10th to 15th January 2021, with the participation of about 50 experts and scholars.

Communication and Advocacy of SDGs

ICCES is CAS-TWAS Centre of Excellence for Climate and Environment Sciences and with this privilege, it has established 'CAS-TWAS Pioneering Network for Sustainable Development'. The objective of the Network is to provide an effective platform for concrete action for the development, transfer, and dissemination of technologies for the implementation of the SDGs.

During 2021, ICCES established the digital presence of this Network by creating a website (ctnsdg.ac.cn) to help bring diverse expertise and experience across disciplines on science, technology and innovation for achieving SDGs; offer education and training programs to the youth and early-career scientists from the least developed countries; as well as provide a platform for international cooperation in achieving SDGs.

Participation

Director of ICCES, Prof. Zhaohui Lin, and other senior scientists and experts participated in the following events as invited speakers:

- ‘Sustainable Development of Earth Science in the China-Pakistan Economic Corridor (CPEC) – Natural Disasters and Risks’ organized by China-Pakistan Joint Research Center on Earth Sciences (CPJRC), on 22nd July 2021;
- ‘Ecosystem Restoration in the Global South’ co-organized by COMSATS Centre for Climate and Sustainable Development (CCCS) and the United Nations Environment Programme-International Partnership for Ecosystem Management (UNEP-IEMP), on 8th June 2021.

Tianjin Institute of Industrial Biotechnology (TIB), China

Tianjin Institute of Industrial Biotechnology (TIB), Chinese Academy of Sciences (CAS) is a non-profit national research institute jointly established by CAS and Tianjin Municipal Government in 2012. TIB's mission is to strengthen its capabilities in innovation and technology-transfer to become a global leader for research and development in industrial biotechnology.



The year 2021 marked the ninth anniversary of TIB.

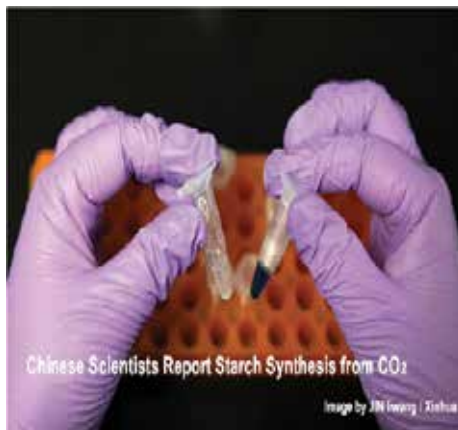
Table 7.1: Key Stats of TIB (2021)

Employees and postgraduates	866
Patents applied	155
Patents authorized	118
Published articles	214 (193 SCI)

R&D Activities

Starch is the major component of grain as well as an important industrial raw material. At present, it is mainly produced by crops such as maize by fixing carbon dioxide (CO₂) through photosynthesis. This process involves about 60 biochemical reactions as well as complex physiological regulation. The theoretical energy conversion efficiency of this process is only about 2%. To help overcome this challenge, scientists at the TIB have designed a de novo route for artificial starch synthesis from carbon dioxide (CO₂) for the first time.

The artificial route can produce starch from CO₂ with an efficiency 8.5-fold higher than starch biosynthesis in maize providing a new scientific basis for creating biological systems with unprecedented functions. In addition, it would also help avoid the negative environmental impact of pesticides and fertilizers, improve human food security, facilitate a carbon-neutral bio-economy, and eventually promote the formation of a sustainable bio-based society.



Institution Building

TIB established two International Joint Centers in the framework of the National Center of Technology Innovation for Synthetic Biology (NC SynBio).

The first is COMSATS Joint Center for

Industrial Biotechnology (CCIB) which was formally established on April 14, 2021 in collaboration with COMSATS to build an open, shared, and innovative cooperation platform to promote the development of biotechnology and bio-industry in COMSATS Member States and the “Belt and Road” countries.

The second is TIB-IB RWTH Joint Center of Biotechnology established on September 3, 2021, with RWTH Aachen University. Under the two joint centers, a series of activities were organized, such as CCIB Workshop on ‘Technical Innovation in Traditional Plant Medicine’ and the 3rd Aachen Protein Engineering Symposium (AcES).

International Cooperation

In 2021, TIB has built partnership with 34 enterprises in 11 provinces and cities with 43 projects worth 217 million yuan. So far, TIB has got 335 projects with enterprises through contracts worth 1.38 billion yuan.

Moreover, TIB has wide collaboration with the Alliance of International Science Organizations (ANSO). In August 2021, eight advanced applicable technologies of TIB were promoted to the world through ‘ANSO Outreach’ including Technology on the production of Lycopene by Recombinant Escherichia Coli, Production of γ-Aminobutyric Acid by Biological Transformation Technology, High performance Saccharomyces cerevisiae for ethanol production,

Comprehensive treatment technology of high salinity industrial wastewater by bioaugmentation and sludge regulation, Composite Enzyme and Biological Treatment Process for Textile Dyeing Pre-treatment, Development of Alginate Lyase and Preparation of Alginate Oligosaccharides, Large scale production of single cell protein (SCP) feed from waste straw by biotransformation, and multifunctional microbial fertilizer.



Capacity-building Activities

TIB hosted the Second International Training Course on Industrial Synthetic Biotechnology (ITC-ISB) from December 20 to 30, 2021. Of the 78 trainees, nearly 70 were from COMSATS Member States, including Egypt, Pakistan, Kazakhstan, Nigeria.

With the support of Belt & Road Fellowship Initiative of Tianjin Synthetic Biotechnology Innovation Capacity Improvement Project, nine young researchers from six countries along the “Belt and Road”, among whom seven are from COMSATS’ member countries, will work at TIB for periods of 2 months to 2 years.



Awards and Honors

According to the 2020 Annual Report on the Transformation of Scientific and Technological Achievements in China, TIB ranked 10th among 2072 scientific research institutes of China.

TIB got two provincial level awards in the key technology and industrialization of efficient production of L-glutamic acid and the bio-manufacturing of seaweed oligosaccharides.

University of The Gambia (UTG), The Gambia

University of The Gambia was established by an Act of the National Assembly of The Gambia in March 1999. The University has four well-equipped campuses.



UTG serves as a powerhouse for the transformation of The Gambia through the creation, application, and transfer of knowledge.

Capacity-building Activities

UTG, in collaboration with the United Nations Development Programme (UNDP), The Gambia, launched a Lecture Series on Sustainable Development Goals (SDGs). The maiden lecture of the Series

was held on 30th May 2021 and included talk by Prof. Oh Joon, Professor of United Nations Studies at Kyung Hee University in Seoul, Korea, on the theme ‘SDGs and National Development’.

UTG held its first International Conference on ‘COVID-19 Pandemic- Economics, Health and Education: Impacts and Recovery’, from 27th – 28th October 2021. Opening the Conference, the Director of the UTG’s Research and Consultancy Directorate, Dr. Muhammed Lamin Sanyang, considered the event an important platform for networking and sharing of ideas on how to deal with the impact of COVID-19. Speaking at the inaugural, Prof. Pierre Gomez, Acting Vice Chancellor of the University, was hopeful that discussions of the two-day conference would guide national policies concerning COVID-19. He added that stakeholder collaboration during the Conference would lead to joint research activities and ensure that every policy is guided by sound research. Other speakers of the inaugural included representatives from the Ministry of Higher Education and Scientific Research, and the Ministry of Health of Sudan.

Council of Scientific and Industrial Research (CSIR), Ghana

The Council for Scientific and Industrial Research (CSIR) focuses on accelerating socio-economic development in Ghana through effective utilization of science and technology. The Council was established in 1996 and formulates and implements government policies regarding S&T based development.



Capacity-building Activities

The Savannah Agriculture Research



Institute of CSIR (CSIR-SARI) trained 80 farmers from six districts in the Upper East Region on new improved agricultural technologies to increase productivity, improve crop varieties and introduce best farming practices that would lead to quality yields. The farmers were introduced to drip irrigation systems, improved agronomic practices, as well as insects, pests and diseases management strategies to cultivate the improved crop varieties to increase productivity.

Research Projects

Crops Research Institute (CRI) of CSIR in collaboration with the Centre for Agriculture Biosciences International (CABI), Esoko, International Water Management Institute and several other organizations launched a climate-smart agriculture programme to enhance Ghana's

resilience in agriculture and food systems in the face of climate change. The three-year project titled 'Accelerating Impact of CGIAR Climate Research for Africa-Ghana Cluster (AICCRA)' is funded by the World Bank and led by the International Institute of Tropical Agriculture (IITA), Nigeria. The entire project is structured around three main components: knowledge generation and sharing for effective climate-informed services, strengthening public-private partnerships for delivery, and supporting uptake of climate-smart agriculture innovations through piloting.

CRI is leading the implementation of Partnership for Agricultural Research, Education and Development (PAIRED) project in Southern Ghana. The project is funded by USAID as a result of an Agreement between the USAID and the

West and Central African Council for Agricultural Research and Development (CORAF/WE CARD). It has been implemented in 12 communities across the Ashanti, Bono and Bono East regions, since the agreement was signed in January 2020. The PAIRED project aims to improve seed quality, access to fertilizers and agrochemicals, and maize and rice production system in West Africa as well as to help implement best farming practices in the major agro-ecologies. Forestry Research Institute of Ghana of CSIR (FORIG-CSIR) provided over 2,500 seedlings to support the Green Ghana initiative. Rolled out by Ghanaian government, the project aims at planting five million trees across the country. FORIG has also joined some schools in planting trees campaigns to create climate change awareness.

R&D Activities

A team of eleven scientists from the CSIR's Forestry Research Institute of Ghana (CSIR-FORIG) discovered an endangered frog species (Atewa Slippery frog) from the Atewa Range Forest Reserve in South East of Ghana. The species has been scientifically named *Conraua sagyimase* after the Sagyimase community located at the foot of Atewa Forest in order to honor community's support towards the research as well as their anti-mining campaigns.

Technologies Developed

CSIR developed a Digital Agricultural



Innovation Hub (DAIH) to aid farmers and other stakeholders in agriculture to easily access various technologies available. DAIH hosts a set of reliable and easy-to-use integrated web and mobile-based platforms aimed at sharing knowledge and assisting the agricultural sector with innovative solutions that can be adopted to address the needs of local farmers and other value chain actors. Development of the Innovation Hub falls under the 'Modernizing Agriculture in Ghana' (MAG) programme being supported by Global Affairs Canada to support Ghana's agricultural sector development.

To help overcome challenges of land, water and fertilizer management; post-harvest losses; as well as to help increase local rice production and reduce dependency on rice imports, the Soil Research Institute of CSIR introduced a novel SAWAH technology for the integrated management of land, water and fertilizer. The Institute is also educating farmers on this new technology to increase rice yields and cultivation in the country.

Institut Teknologi Sepuluh Nopember (ITS), Indonesia

Institut Teknologi Sepuluh Nopember (ITS) is a leading science and technology university of Indonesia, which was established in 1957. ITS has seven faculties offering 32 undergraduates, 8 vocational, 20 masters, and 15 doctoral study programmes. The University also has a Science Techno Park with innovation centers in automotive, maritime, ICT and robotics, and creative industry.



COVID-19 Related Developments

Students from the Department of Electrical Engineering, and Computer Engineering of ITS developed a mask

detection system named "I-Mask: Mask Detection System using Machine Learning and Integrated with IoT for Monitoring the Use of Masks in a Place" to monitor the use of masks and hence help curb the spread of coronavirus. The innovation has also been awarded the first prize in the 2021 International IoT Challenge.

I-Mask detects whether a person is wearing mask or not and the detection video is later sent to a cloud server that is integrated with an application. The people not wearing masks are detected and not allowed to enter the space designed to be combined with an automatic door which opens only for those wearing masks and ringing an alarm for those detected without masks. Additionally, the I-Mask application has several features that provide information about the conditions of a place: from the number of visitors, weekly reports of the number of visitors to the area, the location of the I-Mask system installed, live updates from camera, to statistical data showing the conditions of the place. These features could also help identify if a certain place has met the health safety protocols or not.

R&D Activities

Some research and developments related activities at ITS during 2021 included the following:

To help curb vehicular pollution, students of the Chemistry Department of ITS created synthetic chemicals capable of

reducing motor vehicle exhaust gas by utilizing Nimo/Zeolite-Y catalysts that can optimally reduce vehicle emissions. They have also presented their idea in a paper titled 'Nimo/ Zelolit-Y Catalyst Motor Exhaust Reduction of Synthetic Hierarchy and Fabrication'.

A team from ITS developed innovative bio briquettes from bagasse and sugarcane waste in a period of just two weeks and won bronze medal in 'Smart Innovation and Ideas for Indonesia Transformation in Pandemic Era'.

ITS team developed a biomass based power plant named 'Antasena Bioelectricity' that can generate electrical energy through fuel cells and microbial fuel cell by utilizing rice husks and tempeh liquid waste.

A team of ITS students from Environmental and Instrumentation Engineering Departments of ITS developed a fruit sterilizer 'FUZER' to maintain the freshness of fruits and reduce the risk of coronavirus transmission. The device consists of several components, including UV light, ozone generator, Peltier cooler, CPU fan, Arduino Uno R3, and temperature sensor and is able to sterilize the fruit in 30 – 40 seconds. This innovation has also led to winning of a bronze medal by the team at 2021 International Invention Competition for Young Moslem Scientists (IICYMS).

A web-based application, 'E-Trash',



Prototype of Fuzer

Prototype



was developed by three students of ITS with the aim to reduce waste and encourage waste recycling for a clean and healthy environment. The application (downloadable from via <https://www.etrashidn.com>) allows people to buy and sell waste as exchange inorganic waste or used goods with coins that can be converted into cash.

ITS team designed a green hydrogen-based portable charger for the electric vehicles named Antasena Portable Charger Electric Vehicle (Antasena PCEV). Through this development, the team aims to provide solution for the lack of infrastructure for charging vehicles and the high cost of electricity in the country in a bid to accelerate the 'electric motor vehicle program' of the Indonesian government. The designed charger is capable of fast charging electric cars with a time of 1 hour 58 minutes on a 13.8-kilowatt battery.

Establishment of Technical Infrastructure

ITS entered into a partnership with Nokia and Indosat Ooredoo (a telecommunication provider in Indonesia) for developing 5G Experience Center at the Institute. The 5G Experience Center will allow students and millennials to learn the potential of 5G holistically – from applications, access technology to BTS radio technology. The programme

also aims to implement 5G in Surabaya city through the 'Shining Surabaya programme'.

International Centre for Environmental and Nuclear Sciences (ICENS), Jamaica

Established in 1984 by the Government of Jamaica and the University of the West Indies (UWI), the International Centre for Environmental and Nuclear Sciences (ICENS) is a multi-disciplinary research centre working on the applications of the 'Peaceful Uses of the Atom'. The Centre is affiliated to the Ministry of Science, Technology, Energy and Mining (MSTEM), and the University of the West Indies (Mona).



International Cooperation

Dr. Adrian Spence along with his team at ICENS joined the Forestry Department of the Jamaican Ministry of Economic Growth and Job Creation to spearhead the Government of Jamaica's national programme to become REDD+ (Reducing Emissions from Deforestation and forest Degradation) ready.

This nascent initiative by the parties to the United Nations Framework Convention on Climate Change (UNFCCC) is geared towards developing countries as a method of incentivized climate change mitigation. It does this by awarding carbon credits to the countries that have reduced or removed forest carbon emissions.

Successful execution of REDD+ programme will help Jamaica accurately report on local forest carbon emissions and profit from the successful implementation of emission reduction efforts.

Royal Scientific Society (RSS), Jordan

The Research Scientific Society (RSS) is the largest applied research institution in Jordan established in 1970. It, inter alia, provides consultancy and technical support services for scientific capacity-building.



The Society serves as the local as well as regional reference point of knowledge for science and technology. It employs excellent scientific and engineering research to power economic development and social progress.

Jordan National Metrology Institute Celebrates 15 years of Excellence on World Metrology Day



On World Metrology Day 2021, the Jordan National Metrology Institute (JNMI) of Royal Scientific Society (RSS), Jordan, celebrated its 15th anniversary. The Institute was established in 2006 as a Centre of Excellence at RSS in cooperation with the Government of Japan.



HRH Princess Sumaya bint El Hassan

President

Royal Scientific Society (RSS), Jordan

Our second year of living with an unpredictable virus and an enduring pandemic has re-emphasized that science and research are essential to keeping us safe and to guiding our sustainable progress through the most difficult periods. At the Royal Scientific Society, we are proud to have provided essential science and technology services to the public and private sectors so that life could remain as normal as possible, and so that food security, clean water, and great healthcare are continuously backed up by knowledge, technical skills, and a dedication to the highest possible standards. We are also delighted to be able to provide unique and unprecedented support in the fight against the coronavirus and the drive to keep our citizens secure, and informed.

JNMI works to uphold national standards of measurement, ensure traceability to international standards, and provide highly accurate nationally and internationally recognized metrology and calibration services to the scientific, economic, industrial, health and legal sectors, contributing to the national economy and preserving the rights, health, safety, and environment of citizens.

COVID-19 Related Developments

- Collaborating with the Jordanian Ministry of Environment and Ministry of Water and Irrigation, RSS continued to monitor air and water quality through the real-time monitoring stations spread across the country.
- RSS provided vital consultations to

the government, private and industrial sectors, including the pharmaceutical and medical supplies sectors.

- Biomedical engineering team at RSS worked closely with the Jordanian Ministry of Health to ensure thorough and efficient maintenance of equipment.
- Bio-Safety and Bio-Security Centre at the RSS played a crucial role during the COVID-19 Pandemic by testing several types of samples using molecular and serological techniques.
- New and responsive tests were developed at RSS to deal with specific aspects of the Pandemic, including those for face masks and protective suits; medical, pharmaceutical, food and sanitation products; inspection and calibration of medical ventilators; and testing, conformity

and calibration services for medical products and consumables to ensure the maintenance of Jordan's supply chains throughout the Pandemic.

- RSS conducted antiviral efficacy tests using Real-Time PCR technique; COVID-19 testing for employees of RSS and Princess Sumaya University for Technology (PSUT), Jordan; and performed seroprevalence of COVID-19 specific IgG antibodies among a scientific community in Jordan.

Technologies Developed/Transferred

RSS developed and/or transferred following technologies, products, and services during 2021:

- Testing of Jordanian dates for



Hepatitis A virus with a view to support efforts of Jordanian Ministry of Agriculture to combat national food crisis.

- Development of Adsorbent-Based System for Collecting and Condensing Water Vapor from Air (WAHA).
- Software Source Code Quality Inspection Implementation completed by RSS National Software Quality Assurance Centre (NSQAC) based on internationally recognized standards.
- A Structural Quality Certificate issued through by RSS National Software Quality Assurance Centre (NSQAC) after completing a source code assessment for a software product.

in Jordan' in collaboration with the University of the West of England (UWE);

- Completion of project on 'Enhancing Food Security Through Promoting Urban Farming Systems in Jordan' in collaboration with the Harper Adams University, United Kingdom;
- Launching of phase II of Mitigation Enabling Energy Transition in the Mediterranean Region (meetMED);
- Building Information Modelling for Improving Energy Performance in Buildings;
- Project on Diabetic Retinopathy Segmentation;
- Development of chemical inventory

system;

- Study of the occurrence and fate of pharmaceutical residues from their sources to water bodies and food chain;
- Project on super-protonic conductivity in metal-organic frameworks for proton-exchange membrane fuel cells;
- Development of COOL-UP project to reduce energy consumption in refrigeration and air-conditioning systems in Jordan and to switch to the use of environmentally friendly refrigerants; and
- Government of Jordan and the UNEP DTU Partnership (UDP) have

R&D Activities

Major research activities of RSS during 2021 included:

- The Mediterranean and Black Sea Flyway: Transboundary Determinants of Avian Zoonotic Diseases – Avian Zoonotic Disease Network (AZDN);
- MEWAC – Cooperative project FEMAR: Feasibility of MAR for safe and sustainable water supply;
- The Technology Transfer and Capitalization of Water Energy Food NEXUS (WEF – CAP);
- Designing Novel Metal-Organic Frameworks for Gas Separation and Heterogeneous Catalysis Applications;
- Projected occurrences of precipitation extremes over Jordan as presented in high-resolution climate simulations;
- Unprecedented Phenazine-Based Metal-Organic Frameworks for Improved Capture of Carbon Dioxide;
- Smart Nanomaterials for Protection and Remote-Controlled Delivery of Active Ingredients in Skin Care Products;
- Development of a nature-based solution for pharmaceutical wastewater treatment in Jordan;
- Launching of project on 'Integrating and Digitizing Resource Efficient Cleaner Production (RECP) in Food Industries: Towards Circular Economy

Table 7.2: Some Agreements Signed by RSS in 2021

Sr. #	Partnering Organization	Signing Month	Scope of Agreement
1.	United Nations Human Settlement Programme (UN-HABITAT), Kenya	December 2020	Project on 'Implementing COVID-19 in the Wastewater Cycle: Survival, Risks and Surveillance in Jordan'.
2.	Department of Earth Sciences, Uppsala University, Sweden	February 2021	Development of sustainable technologies and resilient governance of wastewater in small communities in Jordan.
3.	Palestine Standards Institution (PSI), Palestine	June 2021	For testing and inspection at RSS labs.
4.	Action Against Hunger, France	June 2021	Designing and implementation of grey water system, and training for the schools.
5.	EcoHealth Alliance, USA	July 2021	Understanding the risk of bat-borne zoonotic disease emergence in western Asia.
6.	UNEP DTU Partnership, Denmark	July 2021	Facilitating implementation of climate-resilient low-carbon development aligned with national and global goals.
7.	Abdus Salam International Centre for Theoretical Physics (ICTP), Italy, and Synchrotron-light for Experimental Science and Applications in the Middle East (SESAME), Jordan	August 2021	To promote scientific research and education, training and communication in Jordan and the Middle East and North Africa (MENA) region
8.	Physikalisch-Technische Bundesanstalt, Germany with Jordanian Ministry of Water and Irrigation, Royal Scientific Society and Jordan Standards and Metrology	September 2021	Development of quality infrastructure for efficient water management.
9.	United Nations Development Programme (UNDP)	November 2021	Project on Systematic Approach to Sustainable Urbanization and Resource Efficiency in Amman (SURE) for updating and developing five energy efficiency related building codes and guidelines.
10.	United Nations Development Programme (UNDP)		Project entitled "Scaling Up Water Innovation for Climate Security in Northern Jordan"

chosen a consortium composed of the Water and Environment Centre at RSS and the National Agriculture Research Centre to serve as a National Technical Institution (NTI) specialized in Water for Agricultural Use and Solid Waste Management to support Jordan's Nationally Determined Contribution (NDC) Action Project.

Capacity-Building Activities

RSS' events during 2021 included:

- In cooperation with the Jordan Valley Authority, RSS conducted four training sessions aimed at explaining the mechanism of work of the 'ADAPT' system;
- Online Training on 'RETScreen Expert' Programme that is specialized for Energy Projects' Management;
- Western Asia Bat Research Network (WAB-Net) Field-to-Lab Research Exchange: Molecular Detection of Coronaviruses in Omani Bat Samples and Bat Species Identification;
- Elaboration of Technical Study for the intervention in Wadi Shuayb Wastewater Treatment Plant, Jordan, under the framework of the UfM / Sida -supported Project 'MENA Water Matchmaker 2', implemented by Global Water Partnership – Mediterranean (GWP-Med);
- Online training on GHG (Greenhouse gas) inventory estimation for the Iraqi Ministry of Environment;
- MINARET II Empowering Municipal Governance for Climate Resilience Using the WEF Nexus approach;
- West Irbid Wastewater Project – Stakeholder Participation and Outreach Programme;
- Onsite Calibration for Available Laboratory Devices and Instruments at 9 Wastewater Treatment Plants;
- Facilitating implementation of climate-resilient low-carbon development aligned with national and global goals;
- Skill-development for Increased

- Economic Participation of Youths, under the GIZ project 'Support to Jordan Educational Institutions in Offering Labour Market Oriented Vocational Training (MOVE-HET)';
- Strengthening the Capacities of the Water Sector on Climate Risk Management Plans and Reporting on Water Related NDCs;
- Greywater System Design, Supply and Implementation and Trainings for the Schools in Azraq Camp;
- A National Dialogue on Air Quality and its Impact on Public Health;
- Strengthened the skills of the Ministry of Agriculture (MoA) staff on knowledge transfer on the topic of marketing and post-harvest facilities, pest control, modern agricultural technology, rural development, and integrated animal production;
- Implementation of Greywater System and Capacity building in Al Quwayrah District;
- Idea Bank: Crowd-solving for Innovation and Economic Growth in Jordan;
- Second Technical Seminar (Virtual) - SOLE Project: High Energy Efficiency for the Public Stock Buildings in Mediterranean;
- National consultation workshop to enhance the resource efficiency in the industrial sector - SwitchMed TEST III Project – Jordan;
- Enhancing resilient livelihoods and food security of host communities and refugees in Jordan and Lebanon through the promotion of sustainable agricultural development (MADAD).

Awards and Honors

Some awards and international recognition received by RSS during 2021 are:

- HRH Princess Sumaya bint El Hassan, President of RSS, Jordan, received 'Energy Globe Award 2021' for the project 'Public Schools Heating Project' implemented by the National Energy Research Centre (NERC) of



RSS. The award was presented to HRH by Austria's Ambassador to Jordan, Oskar Wüstinger, on 1st November 2021.

- Eng. Tharwh Qutaish, Manager of Environmental Monitoring & Research Central Unit, RSS was awarded gold medal in the 'Global Award for Change Makers 2021' in the water and environment area.
- The International Federation of Global Information and Communication Technology (IFGICT), conferred 'ICT Standard Award' to RSS designating it as a 'Green Business'.
- Dr. Almoayied Assayed, Director of Water and Environment Centre of RSS, won an award under 'Frontiers Champions-2021' of Royal Academy of Engineering. Dr. Assayed won the award for his project entitled 'Plant





Prof. Dr. Zhanseit Tuimebayev

Rector

Al-Farabi Kazakh National University (KazNU), Kazakhstan

I would like to express my sincere gratitude for another year of dedicated service and the commitment to promotion of science, which is a cornerstone of our partnership [with COMSATS]. Considering the world situation nowadays, it is impossible to overstate the pressing need to focus more on elevating science, technology and innovation.

The exceptional success of COMSATS is a reflection of the hard work and diligent efforts that the Secretariat has personally put. It is your dedication and enthusiasm that has given fruitful results that are certain to multiply in the nearest future. I lay my hopes on our mutual understanding that the world cannot advance, nor can we achieve SDGs without modern technology and new solutions to old problems. That in turn requires a collaborative effort, especially on nurturing researchers of a new generation, who would be capable to efficiently address arising issues and have the benefits of a modern education, up-to-date knowledge and technological awareness.

On behalf of Al-Farabi Kazakh National University, I would like to thank each member for the services and personal involvement with our shared goal of sustainable development. I am grateful to have your support and recognize the value of your contribution.

The partner relations between COMSATS and Al-Farabi KazNU is of great strength and importance, and I hope to further advance and fortify this alliance that would foster scientific, educational and technological growth within our countries. I am looking forward to working with you in 2022 and seeing our future joint achievements.

Factory in MENA Countries: A Tool to Achieve Food Security at Cities in Amidst of Climate Change'.

- The Adsorbent-Based System for Collecting and Condensing Water Vapor from Air (WAHA) of RSS won the Queen Rania National Entrepreneurship Competition (QRNEC).

Al-Farabi Kazakh National University (KazNU), Kazakhstan

One of the world's oldest leading universities established in 1934, Al-Farabi Kazakh National University (KazNU) has made enormous contributions towards the advancement of



science and technology in Kazakhstan. Named after Eastern philosopher and scholar, Abu Nasr Al-Farabi, the University is placed 165th by the International QS World University Rankings (QS WUR). KazNU is the Global Hub of the United Nations Academic Impact (UNAI) Programme on 'Sustainable Development' and has also launched 'Ban Ki-moon Institute for Sustainable Development' to coordinate activities relating to sustainable development and green economy.

Change of Leadership

During February 2021, Prof. Dr. Zhanseit Tuimebayev took charge of Al-Farabi Kazakh National University (KazNU), Kazakhstan, succeeding Prof. Mutanov Galimkair Mutanovich as the Rector of the University. The appointment was made by Kazakhstan's Minister for Education and

Science, H.E. Mr. Askhat Aimagambetov.

The new Rector has an extensive experience in leadership and diplomacy, having previously worked as the Minister of Education and Science of Kazakhstan, Deputy Chairman of the Assembly of Kazakhstan, and head of the Secretariat of the Assembly of Kazakhstan, Administration of the President of Kazakhstan. Prof. Tuimebayev is a graduate of Al-Farabi KazNU, Kazakhstan.

COVID-19 Related Developments

The faculty members of Al-Farabi KazNU, Kazakhstan, participated as experts in the preparation of documents for WHO certification of the Kazakhstani vaccine 'QazCovid-19'. Acknowledging their efforts towards the preparation of these documents, these faculty members were



awarded diplomas of the Chairman of the Board-Rector of Al-Farabi KazNU, Prof. Dr. Zhanseit Tuimebayev.

Development of Research Infrastructure

New Silk Road IT Technopark

Al-Farabi KazNU, Kazakhstan, has signed a long-term investment agreement with the Turkish company Gorkem Co. for infrastructure building for research and training of professionals in the fields of IT technologies, innovations and medicine. As per the plan, the university will launch the Alliance of Universities of the New Silk Road IT technopark based on the Silicon Valley model. The technopark intends to cooperate with more than 150 of the world's leading universities. It is also expected to build a hospital with 500 beds and a research laboratory at the Science and Technology Center.

Competence Center for Electric Vehicles

First ever competence center for the study of electric vehicles was developed by

KazNU with a view to provide knowledge and skills needed in this area. Within the Center's framework, urgent tasks with a high degree of commercialization will be tackled, such as effective and safe methods of repairing and restoring the performance of electric vehicle batteries. The development of qualification requirements, assessment methods and certification procedures for licensing activities for an authorized installation of charging infrastructure, as well as a method for determining locations and connections charging infrastructure would also be addressed.

Specialty of Neuroscience

Discussions regarding opening up of a specialty of neuroscience at Al-Farabi KazNU were held by University's Rector, Prof. Dr. Zhanseit Tuimebayev, with Prof. Dr. Bazbek Davletov, Professor at Sheffield University and honorary neuroscientist of Great Britain. Once instituted, the faculty will be one of its kind in the country and throughout the Central Asian region.

Branch of Al-Farabi KazNU in Bishkek, Kyrgyzstan

During a working visit to Kyrgyz Republic, the Rector of KazNU, Prof. Dr. Zhanseit Tuimebayev met with the Acting Mayor of Bishkek, Mr. Baktybek Kudaibergenov. The two sides discussed the prospects of opening a branch of Al-Farabi KazNU in

Bishkek, Kyrgyzstan, which was hailed as an opportunity for Kyrgyz youth.

R&D Activities

A doctoral student of Al-Farabi KazNU, Ms. Tolganay Temirgalieva, has created super capacitors using materials based on rice hulls and apricot kernels. This new generation of batteries has the benefits of long lifecycle (up to 1 million charge-discharges versus 3 thousand for lithium ones); light weight; and fast charge-discharge cycle. For now, this development can be used for electric vehicles only. However, when the volumes of super capacitors would be compressed to the size of batteries for portable devices, the scope of this application would expand significantly.

Capacity-building Activities

KazNU, Kazakhstan, hosted the 1st Kazakhstan online conference on the development of an environmental-friendly transport park. The purpose of the large-scale forum was to form a platform for a constant dialogue between parties interested in the development of environmentally friendly transport in Kazakhstan, training personnel for this industry, as well as forming an expert community to interact with government agencies in matters of market development. The conference was attended by representatives of sectoral ministries,



Table 7.3: Some Statistics of KazNU (2021)

Faculties	16
Chairs	67
Research institutes	32
Science and Technology Park	01
Bachelor specialties	87
Master specialties	98
PhD programmes	83
Total Students	27, 000



universities and business communities.

International Cooperation

During 2021, KazNU explored and expanded avenues of cooperation with the following international organizations:

European Union: With a view to discuss possibilities of cooperation in academia, research and science, the Rector of Al-Farabi KazNU, Prof. Dr. Zhanseit Tuimebayev, met with European Union Special Representative for Central Asia, Ambassador Peter Burian. The focus of the meeting was cooperation between the EU and Central Asia in areas, such as water resources, ecology and climate change, the development of civil society, gender, and youth policy. The EU Special Representative expressed readiness to cooperate with KazNU for joint scientific events and research projects as well as proposed jointly organizing an international forum 'EU – Central Asia' at KazNU.

World Bank: In the meeting with Mr. Jean-Francois Marteau, World Bank Resident Representative in Kazakhstan, possibility of increasing the number of applications for grant financing of scientific and innovative projects, internships for students and undergraduates, and prospects of joint research in relevant areas of science and

technology, social sciences and humanities were explored.

Academic Cooperation

Meetings with the representatives of following were held during 2021 to explore cooperation in various domains:

American Councils for International Education: During the meeting with the President of the Network, Dr. Dan E. Davidson, discussions were held to expand the seven-year long partnership with AC. The two sides noted the fruitful upshot of implemented joint projects and outlined a new vector of cooperation in the field of science and education.

Dr. Davidson expressed his readiness to develop partnerships with KazNU and support initiatives aimed at expanding fruitful cooperation and interaction. The two sides also decided to prepare a new project plan, and identifying areas for further cooperation.

Istanbul University, Cerrahpaşa-Turkey: The two sides discussed avenues of cooperation in the field of the medical sciences. Joint scientific and innovative developments in the field of biomedicine, academic mobility of students, teachers, researchers, as well as joint development of educational programmes for undergraduates and doctoral students were

also discussed during the meeting.

Lehigh University, Pennsylvania-USA:

The parties exchanged views on the possibilities of establishing joint research laboratories, conducting research in contemporary areas of science and technology, social and humanitarian problems, as well as exchange of publications and information materials. As the Global Hub of the UN Academic Impact Programme on Sustainability, KazNU offered Lehigh University partnership offer for implementation of educational programmes and research projects under Sustainable Development Goals (SDGs).

National University of Modern Languages (NUML), Islamabad-Pakistan:

The two Universities agreed to sign a Memorandum of Cooperation for academic mobility, advanced training courses for the teaching staff, joint research projects, textbooks translation and development of Kazakh-Urdu dictionary.

International Islamic University (IIUI), Islamabad-Pakistan:

The parties shared readiness to cooperate in such scientific areas as religious studies, cultural studies and Islamic studies, as well as to conduct joint research, conferences and seminars, and exchange of students and teaching staff. In addition to the above, meetings with following representatives of foreign missions in Kazakhstan were held with a view to fostering bilateral cooperation in the field of science and education.

Meetings with Diplomatic Missions

Rector of Al-Farabi KazNU held meetings with following members of diplomatic community in Kazakhstan to explore prospects of collaboration in various scientific areas.

H.E. Manal Yehia El Shinnawi, Ambassador of Egypt to Kazakhstan:

Prof. Tuimebayev proposed expanding cooperation with Egypt in many spheres, including joint training of specialists,



implementation of academic exchange programs, professional development of teachers, development of scientific and educational programmes, holding of international conferences and symposia as well as implementation of a double-degree education programme.

The Egyptian Ambassador expressed willingness to support joint projects in the field of science, education and culture.

Mr. Ali Riza Akinci, Consul General of Turkey in Kazakhstan: Discussions with Mr. Akinci focused on launching of double-degree academic mobility programme; development of education and science in accordance with modern requirements in the areas of advanced training for mentors; initiation of joint research projects; training of specialists in the field of tourism; and exchange of experiences.

H.E. Mr. Marco Alberti, Ambassador of Italy to Kazakhstan: It was hoped that KazNU's cooperation with leading universities and research centers of Italy would continue and expand to include training of highly qualified personnel, research and development in the field of nanotechnology and materials, archeology, as well as joint scientific and innovative projects.

Mr. Iman Prarahadian Khavid, Minister-Counselor at the Embassy of Indonesia in Kazakhstan: The need to hold joint offline and online conferences, seminars and symposia to share best practices for development of science and introduction of advanced teaching methods was emphasized during the meeting with Mr. Khavid. Moreover, importance of publishing materials and exchanging experience in the field of higher education, organizing joint research in priority areas of science and innovation was also discussed.

Mr. Peace Kennedy, Foreign Policy Advisor at the Embassy of South Africa in Kazakhstan: During this meeting, the Advisor extended proposals for the transformation of one of the best universities of South Africa into a sister university of Al-Farabi KazNU, organization of a series of master classes, and seminars on the implementation of Square Kilometer Array (SKA) project to create the world's largest radio interferometer.

Research Output

In November 2021, KazNU filed patent application for a personal portable device for COVID-19 protection. During the past three years, the University received:

- 271 positive decisions;

- 845 documents of protection, including:
 - 116 patents for inventions;
 - 167 patents for a useful model of the Republic of Kazakhstan;
 - 10 foreign patents;
 - 549 certificates of registration of rights to objects of intellectual property;
 - 3 certificates of registration of rights to trademarks.

Awards and Achievements

- Dr. Gulnar Ultanbekova, Associate Professor at the Department of Biotechnology of KazNU, was awarded 'Al-Farabi State Prize' for a scientific project on 'Development and organization of production of a new domestic original drug Roseofungin-AS (antifungal drug)'. The project was presented by a team of authors headed by the Prof. Amankeldy Sadanov, General Director of the Scientific and Production Center for Microbiology and Virology.
- Three scientific journals of Al-Farabi KazNU – the series of the Bulletin 'Chemical', 'Physical' and 'Mathematics, Mechanics and Informatics' – were included in the Russian Science Citation Index (RSCI) on the Web of Science platform. The database now indexes seven journals of KazNU which is the highest indicator among higher education and research institutes in Kazakhstan.
- The 'International Journal of Mathematics and Physics' of Al-Farabi KazNU was included Scopus – world's largest database of scientific publications. The journal highlights latest achievements in the field of mathematics and physics. Along with Scopus, the journal is also indexed in other reputable databases, such as Web of Science, EBSCO, Research Bib, Scilit, and Cite Factor.
- Al-Farabi KazNU moved three places up in QS University Rankings – Emerging Europe and Central

Asia (EECA). Competing with 450 universities from Eastern and Central European region, the University moved from 19th to 16th position.

- Launched in January 2021, the first massive open online course of KazNU on 'Methods of molecular biology' was included in the list of the 100 (out of 2,900) most popular online courses of 2021 (Class Central). The course was published on Coursera with the support of Peter the Great St. Petersburg Polytechnic University (SPbPU) of Russia.

National Mathematical Centre (NMC), Nigeria

The National Mathematical Centre

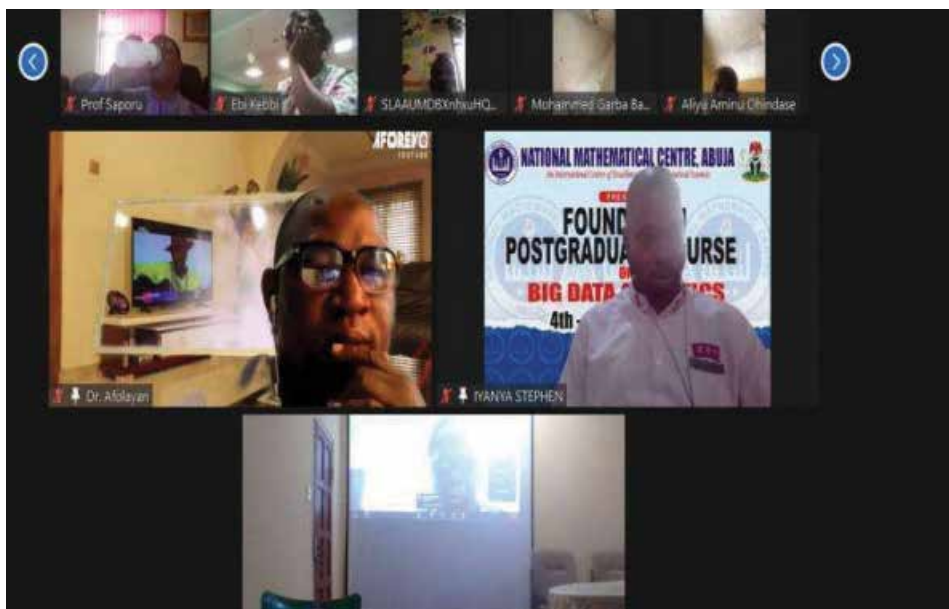
(NMC), Nigeria, is an inter-university organization that promotes research and capacity-building in mathematical sciences. NMC was established in 1989,

inter alia, to train and develop high quality human resource in Mathematical Sciences, for enhancing students' performance in Mathematics and Mathematical Sciences at all levels of Nigerian education system.



R&D Activities

- The Centre has constituted an International Research Group to work on Epidemiology of Covid-19 using Mathematical Modelling and Simulation. The research work draws researchers and experts from institutions in Nigeria, Morocco, USA and Egypt.
- NMC and Arab Academy for Science, Technology and Maritime Transport (AASTMT) have applied for research grant from DATA4 COVID19 Africa Challenge for a research project entitled 'The Modelling and Predicting the spread of COVID-19 in different Regions in Africa'.



Capacity-Building Activities

- NMC jointly organized and hosted the International Conference on Mathematical Analysis and Optimization (ICMAO 2021). The conference attracted participants from Nigeria and other countries, including the United State of America (USA). Among other gains, the conference fostered a number of new collaborations among researchers, postgraduates students across the participated institutions.
- NMC participated in and made worthy contributions to the COMSATS' Centre for Climate and Sustainability (CCCS) webinar on 'Modelling and Simulation on Climate Change and Environmental Pollution: Strengthening Resilience in the Global South' organized by the CCCS, in January 2021 with focus on United Nations' Sustainable Development Goal – 13.
- Nigerian policy makers, administrators and coordinators of academic programmes participated in training on 'Leadership Enhancement/ Integrated management/ Technological Innovation/ Ecological Environment/ Sustainable Development' organized by ANSO-BIDI School, Beijing,

China.

- NMC participated in the ten (10) day Second International Training Course on Industrial Synthetic Biotechnology held from the platform of COMSATS Joint Centre for Industrial Biotechnology (CCIB) at Tianjin Institute of Industrial Biotechnology (TIB), China.
- International Day of Mathematics 2021 was held on 14th and 15th March 2021 with the theme "Mathematics for a better world" at the NMC. This is part of the effort at raising awareness on the learning, teaching and application of mathematical sciences to solving world problems. Activities for the day included a lecture series.

Other scientific and capacity building activities organized and hosted by NMC included:

- Foundation Postgraduate Course on Soft Computing held from 7th to 18th July, 2021;
- Foundation Postgraduate Course on Big-Data Analytics held from 4th -9th October 2021;
- Foundation Postgraduate Course on Current Trends in Mathematics Education held from 18th to 22nd

- October 2021;
- Foundation Postgraduate Course on Quantum Mechanics and its Applications held from 25th to 29th October 2021;
- Foundation Postgraduate Course on Geostatistics held from 8th to 12th October 2021;
- Foundation Postgraduate Course on Gravitational waves from a Sinusoidal distribution of mass: the Riemannian approach held from 21st to 26th September 2021;
- A one-day Foundation Postgraduate Course (FPC) Seminar entitled: Inventory Control on Three Products: Case Study of Three Super Markets in Abuja. Application of Dynamic Programming to Investment Allocation for Optimal Returns held on 21st October 2021;
- Workshop on Mathematical Analysis and Optimization.

Awards and Honors

The NMC facilitated the Award of full Scholarship to two (2) students at postgraduate level being sponsored by Alliance of International Science Organizations (ANSO) for Young Talents in the University of Science and Technology of China (USTC).

To realize the mandate of the Centre of raising world class mathematical scientists, the Centre trained and facilitated the participation of young, promising Nigerians in a number of Mathematical Sciences' International Olympiads held virtually. Participants from the NMC who also represented Nigeria won two (2) Silver and one (1) Bronze Medals in the Pan African Olympiad (PAMO) held in Tunisia, July 2021.

International Center for Chemical and Biological Sciences (ICCBS), Pakistan

One of the leading academic research institutions in Pakistan with a strong

international standing, the International Center for Chemical and Biological Sciences (ICCBS) serves as the Centre of Excellence of COMSATS, TWAS, WAITRO, OIC and UNCSTD. Established in 1966, the Centre has also been serving as a UNESCO Category II institution since 2015. Recently, UNESCO Chair on 'Medicinal and Bio-organic Natural Product Chemistry' has been established at ICCBS.

ICCBS focuses on: research and training for producing high quality human resource; and extending diagnostic, analytical and clinical testing services to local and regional clients from public and private sectors.

COVID-19 Related Developments

- In view of the increasing healthcare needs during the pandemic, a digital healthcare platform namely – Health Hands – was launched at ICCBS Technology Park and Technology Incubation Center (ICCBS-TPTIC). The initiative is aimed at improving the quality of life by providing the best care to every patient through integrated AI-based symptom checker, clinical practices, online pharmacy, diagnostic laboratory, home care, and pharmacy counseling (<https://healthhands.net/>).
- The National Institute of Virology (NIV) working under the umbrella of Dr. Panjwani Center for Molecular Medicine and Drug Research (PCMD) at ICCBS is carrying out the



genotyping of SARS-CoV-2 (the virus causing COVID-19) and studying the genomic surveillance of SARS-CoV-2 to timely identify and contain rapidly emerging new strains of the virus.

International Collaboration

During 2021, ICCBS signed agreements with the following organizations in academic and scientific domains.

Industrial Technology Institute (ITI), Sri Lanka: Signed in the presence of the premiers of Pakistan and Sri Lanka on 23rd February 2021, the Memorandum of Understanding (MoU) aims to provide a platform for cooperation in areas of natural products/medicinal plant chemistry, food chemistry, biotechnology, nanotechnology, tropical disease research, and analytical services.

The parties agreed to undertake academic and research cooperation in scholarships, fellowships, hands-on trainings on sophisticated equipment, joint supervision of students, conducting bi-institutional workshops, exchange of research scientists and faculty members, exchange of academic materials and publications, and setting-up of analytical service laboratories.

Beijing Traditional Chinese Medicine Hospital (BTCMH), China: Signed on 9th June 2021, the Accord entails cooperation, inter alia, for conducting clinical trials of selected traditional Chinese medicine (TCM) products, TCM doctors' training, organization of conferences, symposia, seminars, and other scientific meetings, and co-supervision of post-graduate students.

Table 7.4: Some Research Infrastructure Established/Planned By ICCBS (2021)

Sr. #	Institute/Centre Name	Collaborating Organization
1	Pakistan-China Joint Research Center	Chinese Academy of Agricultural Sciences (CAAS), China
2	Medicinal Plants Research Laboratory	National Center for Research (NCR), Sudan
3	Sindh Innovation, Research, and Education Network (SIREN)	Government of Sindh, Pakistan



Neuroscience Research Centre, Iran: Dr. Panjwani Centre for Molecular Medicine and Drug Research (PCMD) of ICCBS signed an MoU with the Neuroscience Research Centre of the Shahid Beheshti University of Medical Sciences, Iran, on 6th August 2021. The scope of the Agreement entails establishment of joint research programmes in the field of neurosciences, faculty and research staff exchanges, study abroad programme, collaborative research programmes, and service programmes.

University of Sumatera Utara (USU), Indonesia: Signed on 19th September 2021, the agreement aims to promote education and academic exchanges between the two institutions. Areas of cooperation between ICCBS and USU include development of mutually beneficial academic and training programmes, exchange of faculty and staff for purposes of teaching and research, reciprocal assistance for visiting academic faculty, staff and students, coordination of such activities as joint research and transfer of technology, and exchange of information

and research materials in fields of mutual interests.

General Sir John Kotelawala Defence University (KDU), Sri Lanka: The agreement (MoU) aims to promote collaborative research and academic activities in various areas of science and research, such as allied health sciences, food sciences, herbal medicines, spectroscopy, bioequivalence studies, clinical research, disease genomics, and tropical disease research. The MoU will also support the joint supervision of five Ph.D. scholars every year in the fields of mutual interest.

Awards and Recognition

- Prof. Dr. M. Iqbal Choudhary, Director of ICCBS, was awarded '2021 Mustafa Prize' for his services in the field of bio-organic chemistry. Prof. Choudhary is one of the five scientists to receive 2021's Award in their respective fields of study; the other four belong to Iran, Bangladesh, Lebanon, and Morocco.



- The Industrial Analytical Center (IAC) of ICCBS has received a 'Certificate of Accreditation' from Pakistan National Accreditation Council (PNAC), Federal Ministry of Science and Technology, Government of Pakistan. The ISO/IEC 17043 certified IAC offers a range of professional analytical and consultancy services to more than 700 private and public sector organizations and industries in Pakistan. The Centre also provides world-class training on analytical instruments and is authorized to issue a certificate of analysis.

COMSATS University Islamabad (CUI), Pakistan

COMSATS University Islamabad, a public sector university, was established in year 1998. The University has since grown exponentially and now has seven physical campuses and a virtual campus. It has a student-body of over 34,323 students, teaching faculty of 2,143, and is offering more than 100 programmes in 22 academic departments at undergraduate and postgraduate levels.



TIMES Higher Education (THE) World Universities Rankings 2022 has placed CUI among 801-1000 world best universities; ranked at #401-500 in THE Engineering & Technology, #401-500 in Computer Science, #251-300 in Business and Economics, #501-600 in Physical Sciences and #601- 800 in Life Science subject rankings 2022. In addition, CUI was ranked among 1001-1200 world best universities as per QS World Universities Rankings for the year 2022. QS Asian Universities Rankings 2022 placed it at number 137.

Research Projects

During 2021, CUI worked on the following



Prof. Dr. Muhammad Tabassam Afzal

Rector

COMSATS University Islamabad (CUI), Pakistan

COMSATS University Islamabad (CUI) is a leading world-ranked public sector university of Pakistan working under the aegis of Ministry of Science and Technology, Pakistan. CUI is proud to be among the active and synergic collaborators of the COMSATS Secretariat sharing a remarkable journey of gaining and transmission of knowledge and creating impact by transforming lives through an enriched academic and research experience.

The capacity to translate academic and industrial research to economic gains of our people is at the root of our alliance with COMSATS. The vision of addressing common global challenges through cooperation with the countries of the South remains at the heart of our internationalization strategy.

As a result of our diplomatic and outreach efforts, CUI in 2021 has been elected as Chair of the D8-Network of Pioneers of Research and Innovation (D8-NPRI), an alliance of over 26 universities of the South. CUI has also facilitated increased cooperation with Organization of Islamic Cooperation, ICESCO as well as Association of Commonwealth Universities, UK. Our International Masters in Mathematic programme run jointly with the AS-ICTP, Italy, is a shining example of North-South Scientific Cooperation and Science Diplomacy in action. We look to COMSATS' Member States to avail opportunities of scholarship, particularly in post-graduate programs at CUI.

Together with COMSATS, CUI has contributed towards achievement of Sustainable Development Goals Agenda 2030 through its focused research on Climate Change, Advanced Biomaterials, Nanotechnology, Artificial Intelligence, Energy and Advanced Drug Research among others. While the period during 2020-2021 has been challenging due to the global Covid-19 pandemic, but the benefit passed to our researchers through various virtual conferences and COMSATS' meetings deserves applause.

CUI is well-known for its trend-setting pedagogical approach, allowing for interdisciplinary methodologies to learning and problem-solving, experimentation, and insight will continue to stand with COMSATS Secretariat as a leading Centre of Excellence of COMSATS' Network. While CUI has availed various opportunities of capacity-building through COMSATS, we remain eager to play a leading role from Pakistan in knowledge-sharing among COMSATS Member States towards attaining a prosperous South.

projects:

- The Department of Computer Science of CUI Wah Campus along with four partner universities won a project 'SAFE-RH' under Erasmus + 2020 Programme of the EU. The project is aimed at developing Remote Health Monitoring solutions to reduce the mortality rate of women and children, as well as to timely address the maternity-related issues in marginalized areas. Such a system

can also help improve monitoring, timeliness, and communications within the healthcare system.

- CUI has launched a three-year multilateral capacity building project named 'B-International' co-funded by the European Union under the Erasmus+ programme. This transnational cooperation project involves four European and four Pakistani universities and has British Council Pakistan as an associate partner. The project

aims to build capacity of partner universities to engage internationally as well as enhance capacity of all universities in Pakistan. It has six main work packages, including benchmarking strategy and training, conducting training workshops for staff, preparing online learning programme, cultivating international campuses, establishing centers for internationalization and preparation of toolkit. Project Management, Quality Assurance and Dissemination,

Table 7.5: Some Statistics of CUI (2021)

Students	Spring 2021: 34216 Fall 2021: 34323
Graduates	82000
Faculty	2143
Staff	3020
Departments	22
Laboratories	374

and Exploitation are other core activities of the project.

- In collaboration with COMSATS Centre of Excellence in Egypt, National Research Center (NRC), and Imo State University, Nigeria, CUI won grant under D-8 Project Support Fund with facilitation of COMSATS Secretariat and the Ministry of Foreign Affairs, Government of Pakistan. Dr. Toqeer Ahmad, Assistant Professor at Centre for Climate Research and Development (CCRD) of CUI, is overseeing this project entitled 'Feasibility Study for Provision of Safe Drinking Water through Water Conservation (SDWC)'.
- The project on 'Multi Objective Medium Access Control Configuration in Wireless Sensor using Machine Learning' funded under the National Research Project for Universities (NRPU), Higher Education Commission (HEC) of Pakistan, was completed during 2021. The objective of the project was to

understand the effect of different parameters on application-specific performance metrics in wireless sensors networks.

Research Output

In year 2021, three hundred and twenty-six (326) research projects and two (02) travel grant applications were submitted to different funding agencies out of which nineteen (19) research projects and one (01) travel grants was funded by different funding agencies.

In order to attract young faculty into the research mainstream, a CUI Research Grant Programme (CRGP) is in place to award grants up to PKR 300,000/- for research proposals of 1-2 years' duration. In total, 130 research proposals have been received under this programme.

CUI has also developed in-house capacity to provide IP support to its researchers and file patent applications locally and internationally. In year 2021, CUI filed seven (7) national and seven (7) international patents based on applied research. Moreover, a total of 3077 impact factor publications have been recorded for national/international journals.

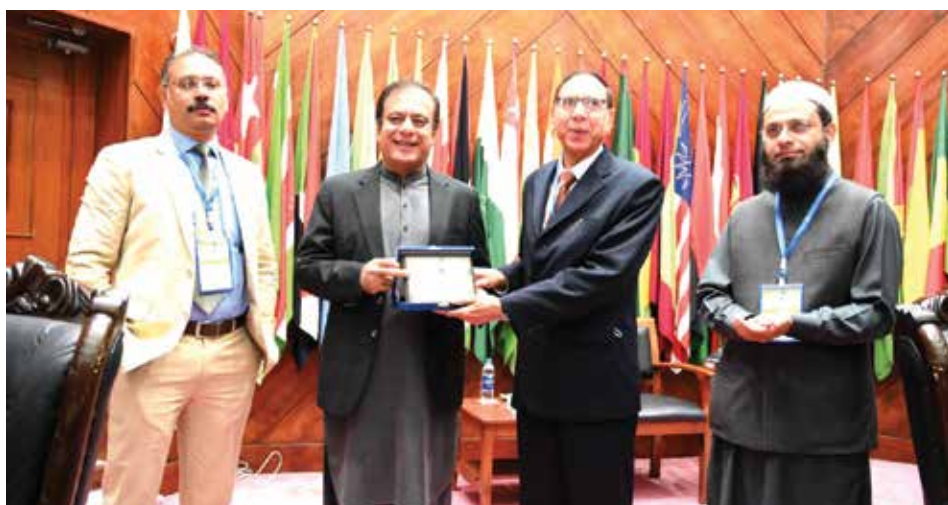
Capacity-building Activities

CUI organizes workshops, seminars,

and trainings of both national and international levels. These workshops are held in Islamabad and other campuses of CUI located at Abbottabad, Lahore, Wah, Attock, Sahiwal and Vehari. CUI's capacity building activities for students and faculties within Pakistan and abroad have greatly benefitted them and, in turn, the university. A list of some events of 2021 follows below:

- 18th International Conference on 'Frontiers of Information Technology' (FIT-2021) on the theme of 'Digital Pakistan' (13th December 2021);
- 3rd China-Pakistan Marine Information Workshop as a part of One Belt One Road initiative under China Pakistan Economic Corridor (CPEC) in collaboration with the College of Underwater Acoustic Engineering, Harbin Engineering University (HEU), China (16th November 2021);
- Symposium on 'Centennial goals of China - Learning from the past, Planning for the Future' by China Study Centre, CUI (29th September 2021);
- Training workshop on 'Capacity Building Training for Admin Personnel under Skill Enhancement & Employee Development (SEED) Program' by the Faculty Development Academy (FDA) of CUI (5th August 2021);
- Webinar on 'Introduction to GIS and Remote Sensing' under the platform of UNESCO Chair on Knowledge Systems for Integrated Water Resources Management (IWRM) (28th July 2021);
- Webinar on 'Introduction to R for Hydrology' by UNESCO Chair on Knowledge Systems for Integrated Water Resources Management (IWRM) (4th June 2021);
- Webinar on 'Chinese Language Learning and Opportunities under CPEC' by China Study Center of CUI (4th March 2021).

In year 2021, the planning division of





the Office of Research Innovation and Commercialization (ORIC) of CUI conducted 06 trainings sessions in which over 200 professionals, startups and students from a number of organizations, industries and universities were trained.

CUI's Student Startups Business Center (SSBC) conducted 06 training sessions for startups (Batch-IX) in collaboration with the department of Management Sciences. Furthermore, Business Incubation Center (BIC), of CUI organized a talk on 'Culture of Innovation at Amazon Web Service (AWS), How to Plan your Career', on 8th December 2021.

National and International Collaborations

Industrial Technology Institute (ITI), Sri Lanka:

Signed in the presence of the premiers of Pakistan and Sri Lanka on 23rd February 2021, the Intent of Cooperation (IoC) found basis for cooperation in education, research and capacity-building through joint training programs, conferences and seminars; joint academic and research activities; exchange of researchers, staff and faculty members; short-term and long-term fellowships; implementation of short-term training courses; publishing joint research journals; and sharing of scientific resources, among others.

General Sir John Kotelawala Defense University (KDU), Sri Lanka: The Document of Understanding involves cooperation between the Interdisciplinary Research Centre in Biomedical Materials (IRCBM) of CUI and KDU on respective national regulations on safety and security of sensitive materials, goods, technologies and equipment.

Heroboss Technology, China: Under a Memorandum of Understanding (MoU), the two sides will work collaboratively for product-oriented research projects in areas of cutting-edge technologies. Furthermore, CUI will host an LED Research Center jointly developed by the Chinese enterprise, and also contribute towards the capacity-building of human resource at Heroboss Technology, China.

DICE Analytics, Pakistan: Signed on 17th December 2021 by Business Incubation Center (BIC)/Student Startups Business Center (SSBC) for building industry-academia linkages wherein DICE will support CUI students in FYP as well as placement in industry.

University of Wah and International Islamic University Islamabad (IIUI), Pakistan: Under this agreement signed on 28th December 2021, CUI shall extend support to the University of Wah for the development of strategic and sustainability plan. It shall also provide support for Communications and marketing of BIC at University of Wah and Industry / startup connect for BIC at University of Wah.





National Electronics Complex of Pakistan (NECOP), Pakistan: The MoU with NECOP will promote collaboration between the two organizations for Research and Development in the areas of Computer Sciences, Electronics, Computer and Mechanical Engineering by granting access to NECOP laboratories and facilities to CUI Researchers. The two sides have also agreed to hold joint research seminars, workshops and conferences in the subjects of mutual interest.

Other Agreements signed include:

- MoU with Harbin Engineering University, China
- MoU with Technological University of Tajikistan, Tajikistan

Academic Exchanges

During 2021, a limited number of mobilities could be availed by CUI due to the pandemic. These included four students who went on zero grants and one student under Erasmus+ for Bachelors in Architecture to Middle East Technical University, Turkey. During January to December 2021, a total of 360 international students joined CUI in undergraduate and postgraduate programmes from 13 different countries mainly Afghanistan, Cameroon, China,

Gambia, Iran, Iraq, Ireland, Kenya, Nigeria, Rwanda, Sri Lanka, Sudan and Tanzania. These students are enrolled in Electrical Engineering, Mathematics, Meteorology, Management Sciences, Physics, Pharmacy, Environmental Sciences and Bio-sciences departments.

Admission was offered to these students in different undergraduate, graduate and postdoctoral programmes under CUI's admission programme for international students as well as under various scholarships programmes in collaboration with the Association of Commonwealth Universities (ACU) for Queen Elizabeth Commonwealth Scholarship programmes and Higher Education Commission (HEC) Pakistan. The latter includes 'Allama Muhammad Iqbal Scholarship programme for Afghan Students, HEC Scholarship programme for Sri-Lankan

students and HEC scholarship program of Least Developed Countries (LDC) of Organization of Islamic Countries (OIC). Furthermore, CUI, in coordination with The World Academy of Sciences (TWAS), also awarded 26 fellowships for Postdoctoral and PhD scholars (full-time/ sandwich) from developing and least developed countries. Around 220 applications were received out of which 80 applications were found eligible for consideration for fellowship.

Academic Events

The International Office CUI, organized a Student Awareness Session on "International Scholarships and Innovative Research Universities (IRU) Australia on 2nd November 2021. The session was focused on sharing information regarding a range of scholarships at Australian universities.

The International Office of CUI organized an online training session titled 'Perception vs Reality of Corporate life and how to prepare and appear for an interview' on June 14, 2021. The purpose of the session was to give an insight to the students into the realities of corporate world vs their expectations.

Faculty Development Academy (FDA) of CUI organized a 4 -Day Online Workshop on 'Excellence in Online Teaching' from May 31 to June 3, 2021. The purpose of this workshop was to promote understanding of faculty members about online teaching pedagogies, engagement in online learning environment, educational technology and

Table 7.6: Some Important Visitors at CUI (2021)

S#	Visitor	Date of Visit
1	Ms. Wang Chunping, Chairperson, M/S Heroboss Technology, China	26th January 2021
2	Mr. Hali, Deputy Project Manager, CGGC Dassu Hydropower Project Management, China	3rd March 2021
3	Ms. Deemah Alyahya, Secretary General, Digital Cooperation Organization (DCO), Saudi Arabia	17th November 2021
4	H.E. Mr. Khazar Farhadov, Ambassador of the Azerbaijan to Pakistan	9th December 2021



Table 7.7: Foreign Faculty at CUI (2021)

Name	Designation	Serving Department	Nationality
Ms. Julian Eick Aziz,	Assistant Professor	Architecture & Design, CUI, Lahore Campus	German
Dr. Shariyeh Hosseini	Associate Professor	Architecture & Design, CUI, Lahore Campus	Irani
Dr. Yasser MSA Al-Kahraman	Assistant Professor	Pharmacy, CUI, Abbottabad	Syrian
Dr. Kaneez Rabia	Assistant Professor	Physics, CUI, Islamabad	German

online evaluation strategies.

FDA-CUI also arranged a one-day online training session on Outcome Based Education (OBE) for Engineering disciplines faculty members on April 12, 2021.

A webinar on the 'University of Texalso as at Arlington' was held at COMSATS University Islamabad, (CUI), Islamabad campus on March 30, 2021. The talk was part of seminar series, organized under the programme 'Information Seminars for Higher Studies Abroad' with the objective to educate and orient CUI prospective candidates with respect to selecting, financing and applying for higher studies abroad.

A two-day online workshop on 'International English Language Testing System' (IELTS) was held at COMSATS University Islamabad (CUI), Islamabad Campus on March 15, 2021 and March

17, 2021. The workshop is part of activities, organized under the programme 'Information Seminars for Higher Studies Abroad'.

Awards and Honors

Three faculty members of CUI were awarded Pakistan's civil award 'Tamgha-i-Imtiaz' (Award of Excellence) for their meritorious services in their respective fields. These are:

- Prof. Dr. Muhammad Abid from CUI Wah Campus (Mechanical Engineering);
- Prof. Dr. Robina Farooq from CUI Lahore Campus (Education);
- Prof. Dr. Junaid Mughal from CUI Attock Campus (Science and Education).

Foreign Faculty at CUI

CUI is committed to being a part of

the regional transformation of higher education and is always welcoming qualified international faculty to be a part of this vision. This, in turn, enhances CUI's ranking prospects, which is also one of its priority goals.

Al-Quds University (AQU), Palestine

Founded in 1984, the Al-Quds University (AQU) is serving to provide excellence in academics and research. With its main campus in Abu Dis, AQU is the first Palestinian university to establish a medical school and nanotechnology research center.



International Cooperation

The President of AQU, Prof. Imad Abu Kishek, held a meeting with the delegation of the German Representative Office in Ramallah, Palestine, and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), on 4th October 2021. The two sides discussed the academic partnerships between AQU and the German government, most notably in the Dual Studies programme.



Highlighting the importance of the programme in supporting the Palestinian educational system, Prof. Abu Kishek stated that AQU encourages research and seeks to promote field training to meet students' needs after graduation. The German delegation acknowledged the tremendous achievements of the Dual Studies and thanked AQU for the ongoing mutual cooperation and ensuring the success of the programme at all levels despite the challenges posed by the COVID-19 pandemic.

Industrial Technology Institute (ITI), Si Lanka

Established in 1955, the Industrial Technology Institute (ITI) comprises of research and development divisions, and technical services divisions. The Institute conducts multidisciplinary scientific and industrial research on technology-transfer for rapid industrial development.



Establishment of Research Infrastructure

ITI opened a Techno Centre at the Rajawasa State Trust Centre of Sri Lanka State Trading (General) Corporation under the Ministry of Trade at Colombo. The Techno Centre showcases new products which are ready for technology diffusion and key ITI technologies already commercialized to MEs, SMEs and Large Entrepreneurs. This one-stop ITI Techno Center will also facilitate small business and SMEs obtain product technologies, develop business linkages and launch promotional activities. It will also help link enterprises with the ITI packaging laboratory and accredited testing laboratories to enhance product quality.

Cooperation

ITI joined hands with the State Ministry of Rattan, Brass, Pottery, Furniture and Rural Industrial Promotion for the capacity building of SME and cottage industries. The entrepreneurs aspiring to initiate new business were facilitated through ITI technology transfer programmes and to add further value to overall enterprise development by addressing the specific issues of Micro, Small and Medium Entrepreneurs (MSMEs) that have limited access to technology. Progress monitoring and technical assistance are provided until the product is commercialized. The product is analyzed to check conformity with mandatory regulations, relevant specifications of Sri Lanka Standards and process validation is undertaken and improvements are prescribed if necessary.

University Cheikh Anta Diop of Dakar (UCAD), Senegal



UCAD was established in 1957, and offers learning and research opportunities in a broad spectrum of disciplines to the population of Senegal.

International Cooperation

A delegation from UCAD visited Turkey from September 25th to October 3rd 2021. Led by the Dean of OdontoStomatology Faculty of Medicine Pharmacy (FMPOS), the delegation comprised of deans of Faculty of Letters and Human Sciences (FLSH), Faculty of Science and Technology (FST), Faculty of Legal and Political Sciences (FSJP), Director of the Higher Polytechnic School (ESP) and the Secretary General.

The visit was aimed at fostering existing cooperation and expand UCAD's field of cooperation in higher education and research. The delegates visited the R&D facilities of several Turkish universities, as

well as Turkish Aerospace.

During the meetings held at different universities, opportunities of joint research and student exchange were explored.

Tanzania Industrial Research and Development Organization (TIRDO), Tanzania

Tanzania Industrial Research and Development Organization (TIRDO) was established in 1979 with the aim of conducting industrial research and offer consultancy/ technical services to industries. TIRDO is a semi-autonomous organization under the Ministry of Industry, Trade and Investment of Tanzania.



COVID-19 Related Developments

- To help Tanzania's response to coronavirus pandemic, TIRDO developed an oral herbal remedy against COVID-19 named COVIDOL. The product is a pure herbal formulation containing alkaloids, terpenoids, flavonoids and essential oils with biological activity reported in scientific literature. The formulation is free from alcohol, sedatives and addictive drugs.
- TIRDO also indigenously produced hand sanitizers to meet national needs.

R&D Activities

TIRDO developed a drug dubbed "Buyegi" to treat conditions related to respiration. Approved by the National Institute for Medical Research, the traditional medicine is a volatile oil product made from eucalyptus and mint oil.



Prof. Hasan Mandal

President

The Scientific and Technological Research Council of Turkey (TÜBİTAK), Turkey

The Scientific and Technological Research Council of Turkey (TÜBİTAK) upholds the strategic approach of co-creation and succeeding together in the ecosystem to address complex and dynamic challenges from the pandemic to climate change. This focus is enriched with new initiatives and collaborations, including priorities that are aligned with the net-zero emissions target of Turkey for the year 2053. With this vision, TÜBİTAK continued to fulfil its mission with sustained determination during 2021, working to accelerate the mobilization of all institutions toward a better future.

Science, technology and innovation is one of the top priorities in the new economic model of our country for green, sustainable development. TÜBİTAK actively ensures that R&D and innovation processes are transformed based on the approach of co-creating and succeeding together in the ecosystem to address transdisciplinary challenges inclusively. From young to experienced researchers, researchers from the natural sciences and engineering to the social sciences and humanities, as well as entrepreneurs and private sector firms alike, we have mobilized an ecosystem that has demonstrated great efforts and commitment towards advancing a science and technology led path in combatting challenges, including against the pandemic.

TÜBİTAK launched new programmes and platforms and strengthened interactions across the ecosystem. In addition, national and international projects in critical and strategic areas have been completed successfully by TÜBİTAK's research centres and institutes within the year. Many new cooperation agreements are signed with R&D institution in the Asia, the Middle East, Balkans and Europe reaching 91 institutions across 64 countries with 34 different bilateral calls opened with 22 countries in 2021. Our cooperation with international organizations, including D-8, OIC and COMSATS, continued to be strengthened in 2021 by joint calls between the member countries and 948 successful projects were funded by the EU Horizon 2020 Program, which shows Turkey's active participation in the international R&D and innovation ecosystem.

Let me emphasize that as a member in the Network of COMSATS' Centres of Excellence, TÜBİTAK continues to work actively to enhance and deepen our relations with COMSATS to address common challenges through co-creation and succeeding together. I have confidence that our collaboration based on science, technology and innovation will lead us to making impact towards the Sustainable Development Goals. It is our primary expectation that enhanced cooperation will support all members of the Network of COMSATS' Centres of Excellence to reach a more sustainable future together.

With this annual report, we present a summary of our institution's activities within the year 2021. I would also like to take this opportunity to express my sincere thanks to the Commission that has facilitated a framework to maximize the scientific and technological cooperation between member institutions. I would also like to extend my compliments to the network members for their contribution to COMSATS' mission and success.

The Scientific and Technological Research Council of Turkey (TÜBİTAK), Turkey

Established in 1963, the Scientific and Technological Research Council of Turkey (TÜBİTAK) became COMSATS Centre of Excellence in 2019 in lieu of its Centre – TÜBİTAK Marmara Research Centre

(MAM). Established in 1963, TÜBİTAK is an autonomous institution of the Prime Ministry. TÜBİTAK has the stated goal to develop science, technology and innovation (ST&I) policies, as well



as support and conduct research and development. TÜBİTAK has implemented Turkey's strategic approach of co-creating and succeeding together, which resulted in advancing output and impact-oriented mobilization of the science, technology and innovation ecosystem.

In 2021, TÜBİTAK continued to



produce innovative solutions together with universities, industry and public institutions for the challenges that are faced by Turkey and the world. It has increased transdisciplinary approaches reaching across the Basic Sciences, Engineering and Social and Human Sciences. From informatics to defense and rail transportation to space, energy and food, polar research to the environment, TÜBİTAK's units, research centers and institutes have multiplied their achievements.

COVID-19-Related Activities

Within the scope of the “COVID-19 Turkey Platform” created under the auspices of the Ministry of Industry and Technology and with the coordination of TÜBİTAK, TÜBİTAK continued vaccine and drug development studies with the approach of co-creating and succeeding together.

Around 436 researchers, 167 of whom were university students supported under the TÜBİTAK STAR Scholarship Programme, worked intensively on vaccine and drug development projects. The Phase

1 study of the Virus-Like Particle (VLP) based vaccine candidate was conducted on 36 volunteers, including Turkey's Minister of Industry and Technology and the TÜBİTAK's President. The Phase 2 study was completed between March and August 2021 with the participation of 349 volunteers. Preparations continue for the Phase III clinical trial.

The Adenovirus vaccine candidate is the newest vaccine candidate of the platform to enter clinical trials. The innovative inactive vaccine candidate has also completed Phase 1 studies.

In order to share and disseminate the results of the completed projects with the public, TÜBİTAK organized an event with diverse participation in 2021. It has also published all the findings in a booklet titled “COVID-19 and Society:

Social, Economic and Human Impacts of the Pandemic -Findings, Results and Recommendations”.

TÜBİTAK completed two projects as part of the fight against COVID-19. Within the scope of the Voltammetric Sensor and Device Production Project for COVID-19 Disease, the work packages specified for the determination of the specific proteins of the SARS-CoV-2 virus were completed and the national diagnostic kit, device and software were produced.

Global Challenges

TÜBİTAK strengthened its earthquake infrastructure and raised awareness about earthquakes through its “Turkey Earthquake Platform”. It carried out the first of the marine research expeditions between May and June to investigate the seismicity of faults in the Aegean Sea through the platform.

With a special call, TÜBİTAK supported 80 research projects involving 394 researchers from 41 different institutions in the multidisciplinary field of earthquake research.

Table 7.8: Some Stats Relating COVID-19 (2021)

Researchers Working	436
Product-Oriented Projects	42
Investment Agreements	Worth 5.5. Million
TÜBİTAK Supporter Projects	97

TÜBİTAK mobilized 157 researchers from 59 different institutions and organizations to combat mucilage in the Sea of Marmara. Through a special call, TÜBİTAK also executed 37 projects providing solutions for domestic and national level issues and shared them with the public by organizing the 'Call for Mucilage Research Projects Virtual Conference'.

TÜBİTAK carried out special studies for the green transformation of the Turkish economy and industry in line with the steps taken towards green economic transformation at the global level. TÜBİTAK has also prepared the Guidance on Priority R&D and Innovation Topics in the scope of the European Green Deal.

R&D Activities

In 2021, TÜBİTAK gave priority to projects that were directly related to Priority R&D and Innovation Topics. Preference was given to these research subjects in TÜBİTAK-1001 programmes for 2021. As a result, more than a quarter of all academic-based projects supported in 2021, focused on topics in this area.

Projects in line with Turkey's 2053 zero emission target: TÜBİTAK initiated the 'Green Growth Technology Roadmap (TYH)' studies in cooperation with the Ministry of Industry and Technology in order to support the fight against climate change and environmental problems in

Funds Spent for R&D Projects	90.3 million TL
R&D Projects Supported	3,943
Companies supported	2,766
Projects carried out by SMEs	2,809
Worth of SMEs Projects	594.5 million TL
Universities Supported for R&D	170
University Projects Supported	3,720
Amount of Funds to University Projects	1.29 Billion TL
Researchers Supported	19,817
Graduate Scholarships	8841
PhD and Postdoctoral Research Fellowship Programmes	3215
No. of Patents	413 (103 on application and 310 registered)
Technologies Tranferred	10
License Agreements	18

priority R&D and innovation issues.

Project on 'Raw Material and Energy Recovery From Treatment Sludge As A Conceptual of Zero Waste' started in 2021. Funded by Alliance of International Science Organizations (ANSO), the project will be carried out by TÜBİTAK MAM in partnership with the Tanzania Industrial Research and Development Organization (TIRDO), Al-Quds University (AQU) and COMSATS University Islamabad (CUI) in 36 months.

As part of the 'Networking of National and Regional Community Research Programmes (CORNET)', a health-

friendly and ecological epoxy resin system is planned to be developed. The primary aim of the research project is to produce bio-based epoxy resin systems and formulations from almost exclusively renewable raw materials. The project focuses on the development of a bio-based two-component epoxy resin systems. The project partners are TÜBİTAK MAM, Fraunhofer IMWS, SKZ, FSKZ, Sakarya Chamber of Commerce and Industry.

As a bilateral project funded by The National Centre for Research and Development, Poland (NCBR), and TÜBİTAK, selected regions of Turkish marine habitats will be explored to derive



Some R&D Activities of TÜBİTAK (2021)

- İMECE Satellite Project to develop high-resolution satellites
- TÜRKSAT 6A Project, Turkey's first domestic/national communication satellite
- Turkish Astronaut and Scientific Mission Project (TABM) and the Moon Program (AYAP)
- Enhanced X-ray Timing and Polarimetry Mission (eXTP) Project
- Ballistic Mark Image Analysis and Recognition System
- Electric locomotive and traction system
- National Motor Project, smart systems and railway signaling
- A robotic system - "Robot Eye" to detect leaks and faults in natural gas line
- Continuous waste water monitoring system
- Dissolved oxygen probe for wastewater treatment plants
- Determination of receiving body based discharge limits
- Artificial intelligence-based container HEPP Project.
- Herbal medicine and food supplement infrastructures unit
- Supercritical extraction facility for medicinal aromatic plant processing
- "Food Innovation Center" in Gebze and food testing laboratories in Şanlıurfa and Giresun
- Production of lithium hydroxide-based calipatron for 6 new type submarines and delivery for the 1st submarine in 2021
- Production and delivery of catalysts for the disposal of explosive hydrogen gas released in the battery chambers of submarine platforms
- Traditional herbal medicinal product from the plant Hedera helix L. (wall ivy)
- Pressable plastic bonded explosive production process
- Production of reactive nanoadsorbent and semipermeable polymeric membrane
- Development of new generation decontamination products
- Development of Sonar Marine Unit
- Testing and delivery of space-qualified solar panel we produced for the İMECE Satellite
- Field studies based on various geophysical measurements under scope of Seismic Hazard Project in Gaziantep City
- Installation of Seismology and GPS Stations network installed at the Sinop Nuclear Power Plant site
- TÜBİTAK ULAKBİM increased the capacity of TRUBA Supercomputer with the new data center supporting computing clusters containing 8000 core processors and 72 graphics processors



antimicrobial compounds from their microbiota and provide an environment-friendly alternative to antibiotics.

Moreover, 24,257 scientists and young people were supported through 45 different programmes of TÜBİTAK with funds amounting to 374 million TL.

The ZERO BRINE project with industrial saline wastewater (brine) component ended in November 2021. Four industries in diverse geographies implemented the

ZERO BRINE technology: demineralised water production, coal mining, silica production and textile manufacturing.

Capacity Building Activities

By the end of 2021, TÜBİTAK opened 66 Experiment Technology Workshops in 55 provinces as part of the Experimental (Denayap) Turkey Project. In addition to 2,880 existing students, new students started their education in a total of 66 Experimental Technology workshops.

Within the scope of Experiment Technology Workshops, TÜBİTAK provide free technology training for 3 years in the fields of Design and Production; Robotics and Coding; Electronic Programming and Internet of Things; Software Technologies; Advanced Robotics; Aviation and Space Technologies; Energy Technologies; Nanotechnology and Materials Science; Artificial Intelligence; and Cyber Security.

The 5th National Polar Sciences Workshop and the 2nd Polar Festival were held in 2021.

In 2021, TÜBİTAK organized a series of internationally inspiring online seminars in various fields of basic science and interdisciplinary fields with the participation of world-renowned scientists, especially Nobel Prize-winning scientists, within the body of TÜBİTAK Basic Sciences Research Institute (TBAE). These seminars were held as Advanced Research and Education Seminar Series and Popular Talks Series in six different areas with a total of 57 events, 41 of which were held in 2021.

Table 7.10: TÜBİTAK's Science and Society Projects (2021)

Science and Society Projects	5,535
Provinces involved	81
Funds utilized in Science Society Projects	44 million TL
Science magazines	3
Subscribers	172,000
Prints	3.4 million
Book Sales	3 million
Books published under TÜBİTAK Popular Science Books	26
Books reprinted	96
Total Books printed	Over 1 Million

Science and Society Activities

TÜBİTAK reached approximately 18 million people in 2021 with its Science and Society support and activities. TÜBİTAK Board of Directors decided to give 3 Science Awards and 14 Incentive Awards in 2021. It was also a matter of pride that 47% of these Awards went conferred to female scientists. The list of TÜBİTAK's award-winning scientists is available at <https://www.tubitak.gov.tr/tr/haber/tubitakin-2021-yili-odulleri-sahipleri-buldu>.

In 2021, first thematic science center of Turkey, the Gökmen Space and Aviation Training Center, was opened in Bursa, whereas studies to establish science centers in Antalya, Gaziantep, Şanlıurfa, Düzce and Denizli continued. These science centers were visited by 240 thousand

people in 2021 and 25 thousand people attended the educational workshops at the science centers.

As organizing partner of TEKNOFEST'21, TÜBİTAK held 12 out of 36 competitions and supported projects on subjects, such as Unmanned Aerial Vehicle, Efficiency Challenge (Electric Vehicle), Autonomous Vehicle, Rocket Development and Biotechnology Innovation (Table 7.10).

TÜBİTAK Support Programmes

TÜBİTAK Support programmes in 2021 included (Table 7.11):

- The number of frontier R&D laboratories supported within the scope of the "Frontier R&D Laboratories Support Programme" was increased to 5.

- Cooperation continued with the General Directorate of Agricultural Research and Policies (TAGEM) and the Ministry of Youth and Sports.
- TÜBİTAK continued to support projects within the scope of 'The Technology- oriented Industry Action Programme.'
- In cooperation with the Ministry of Culture and Tourism, linkages were developed between undergraduate students and world-renowned scientists at the Göbeklitepe Archaeological Site, known as the 'zero point of history'.
- TÜBİTAK brought together 23 private sector organizations, 19 universities, 4 research infrastructures and 2 public R&D centers in 8 High-Tech Platforms.

International Cooperation

- With 948 successful projects in the EU Horizon 2020 Program, TÜBİTAK brought 391.5 Million Euros of funds to Turkey, including the IPA co-financing contribution. Within the scope of the Green Agreement, which is the last call of the Horizon 2020 Programme, 6 organizations with 5 projects from Turkey were entitled to receive a total of 1,175,425 Euro funding.
- In 2021, TÜBİTAK increased the number of scientific and technological cooperation agreements to 64 countries and 91 institutions in order to support the international R&D and innovation cooperation of Turkish researchers.
- Cooperation with institutions in COMSATS member countries continued to be strengthened based on the 42 supported bilateral scientific and technological projects within the scope of joint calls.
- With bilateral joint calls between the member countries of D-8, TÜBİTAK have supported 33 scientific and technological projects in 2021.
- 22 different countries in 2021 are supported within the scope of



Table 7.11: Some Stats on TÜBİTAK Support Programmes (2021)

No. of projects on nature-related issues supported	101
Social sciences projects supported	42
Education-training programme beneficiaries under "TÜBİTAK Science Fairs Support" Programme	5339 schools supported in 81 provinces
Funds for science fairs	30 million TL
Science culture & communication projects supported	53
Patent license income of the TTOs supported by TUBITAK	8 million TL
Composition of Industry Innovation Networks	41 companies, 18 universities and 5 research centers, 18 of which are SMEs and 23 large-scale enterprises, in 4 platforms with total 87 projects
Technology transfers supported by patent-based technology transfer support programme	38 (protected by 38 national and 21 international patents and total value of 27 million TL)
Co-financing support	132 projects
Mentoring support	301 SMEs

TÜBİTAK Support Programme for increasing the capacity to benefit from international research funds and participation in international R&D collaborations. This programme allows calls for academy, academy-industry cooperation and industry to be coordinated under a single support programme. 34 different bilateral cooperation calls were launched.

- The 6th High Council Meeting (HCM) of the D-8 Technology Transfer and Exchange Network (D-8 TTEN) was held as hybrid by

TÜBİTAK on 14th December 2021. The deliberations of the meeting included the progress report on activities of the D-8 TTEN Secretariat.

- Scientific Cooperation Meeting between Turkey and Bulgaria was held at TÜBİTAK Marmara Research Center (MAM) on November 5, 2021. Also in 2021, interactions with delegates from Kenya, Sri Lanka, and Romania led to some mutually beneficial discussions.
- TÜBİTAK released Pardus 21, the new generation version of National

Operating System Distribution Pardus, which was developed in cooperation with the Ministry of National Education. The special version of Pardus for Interactive Boards has reached over 100 thousand installations.

- R&D Support to Turkish Armed forces and defense industry continued to help build national defence and deterrence.
- Digital Turkish Lira Collaboration Platform was created with the participation of the Central Bank of Turkey, TÜBİTAK BİLGEM, Aselsan, Havelsan, and BKM in order to carry out the technological research, development and testing processes of the Digital Turkish Lira R&D project.
- ÇAKIL, the first single-core national processor of Turkey, passed the tests successfully and was exhibited for the first time at IDEF in 2021.
- The fiber optic-based perimeter security system, developed in cooperation with BİLGEM and SAMM Technology, is used in the perimeter security of facilities with high security needs.
- The first phase of the Digital Forensic Analysis Technology Development Platform was completed. The platform was launched with the aim of developing a national digital forensic analysis platform and making it available to law enforcement agencies to prevent foreign dependency and



Table 7.12: TÜBİTAK Open Science Activities (2021)

Number of publications in our TÜBİTAK Open Archive Aperta database	55,437
Journals	2,064
Scientific Articles	530,450
Registered Users	437,997
Electronic Resources National Academic License (EKUAL) project databases	20 (benefitting 297 institutions; has had 33.6 million searches and 46.3 million articles downloaded)

loss of intelligence in this field.

Awards and Achievements

- In 2021, TÜBİTAK won 13 awards in Regeneron ISEF, the world's largest Science and Engineering Competition, winning 8 awards, including a first prize, in the European Union Contest for Young Scientists.
- Turkish students brought home 60 medals and 2 honorable mentions
- TÜBİTAK started the Polar Research Projects and Climate Change Research Projects Contests for high school students.
- 'TÜBİTAK Science High School' was opened with the aim of raising the bright minds and the science stars of the future within the R&D ecosystem.
- TÜBİTAK published a 4-volume Social Sciences Encyclopedia

consisting of 20 subject areas and 1,255 articles. These involved the contributions of 700 scientists.

- Turkey became a full member of The Scientific Committee on Antarctic Research (SCAR) and The Council of Managers of National Antarctic Programs (COMNAP).
- In the European Commission's 2021 Turkey Report, TARAL's work in coordination with the European Research Area (ERA) and Turkey's success in Horizon 2020 were mentioned with appreciation.

Other Activities

- Announcement of Entrepreneurial and Innovative University Index for 2021.
- Completion of design for Scientific Research Station in Antarctica.



SPECIAL ASSIGNMENTS

• COMSATS Telehealth (CTH)	88
• COMSATS Internet Services (CIS)	90
• COMSATS Center for Climate and Sustainability (CCCS)	93
• COMSATS Science Diplomacy	96

SPECIAL ASSIGNMENTS

For the benefit of its Member States, COMSATS undertakes special assignments, such as conducting scientific studies, undertaking pilot projects, and implementing educational programmes. Other than CUI, two of COMSATS' flagship projects, COMSATS Internet Services (CIS) and COMSATS Telehealth (CTH) continue their operations under the oversight of COMSATS Secretariat. The administration related to graduate students from Member States studying at CUI is also a special assignment of the Secretariat. Activities of COMSATS Centre for Climate & Sustainability (CCCS) that have grown recently and are included in this Chapter. COMSATS' Science Diplomacy have also been covered in this Chapter, an important means of which was COMSATS' publications.



COMSATS Telehealth (CTH)

During 2021, the pandemic with its variants continued to loom over world population. Meanwhile, the health and field experts world over continued their efforts for vaccine development, dissemination, solidarity, equity, and diplomacy to abate the pandemic. Being an ardent advocate and supporter of SDG-03, COMSATS Telehealth (CTH) continued its effort for bringing health to the remote population of Pakistan by means of digital technologies, as well as geared up programmatic activities in the field of health.

Tele-consultations

CTH has been making healthcare accessible to the marginal areas of Pakistan since 2001. So far, Telehealth Resource Centre (currently operating from COMSATS Internet Services

(CIS)) has provided 100,000+ tele-consultations through 19 telehealth clinics in remote areas connected with CTH resource center in Islamabad. Healthcare facilitation in outpatient care, pediatrics, gastroenterology, chronic ailments, gynecology and dermatology is being provided by the health professionals virtually connected with Telehealth clinics, to patients from remote areas.

With the surge of use of digital health all over the world in recent years, COMSATS Telehealth has experienced growing acceptance of Telemedicine as a tool to seek healthcare, especially in Balochistan province of Pakistan. This is evident from the fact that 15 new Tele-clinics and a mobile Tele-clinic have been established during 2021 in collaboration with Government of Baluchistan and People's Primary Health Initiative (PPHI).

Since 2020, the pandemic has also been

an impetus for enhanced programmatic activities of COMSATS Secretariat towards health, in addition to the on-going tele-consultations, awareness raising and capacity building on key health issues and current challenges faced across the globe.

Collaborations and Capacity-Building

During 2021, CTH collaborative activities included capacity building activities and intellectual exchanges and advocacy in collaboration with COMSATS University Islamabad (CUI), Ministerial Standing Committee on Scientific and Technological Cooperation of the OIC (COMSTECH), United Nations Educational, Scientific and Cultural Organization (UNESCO), Ministry of National Health Services Regulation and Coordination (MoNHSR&C), and World Health Organization (WHO)/EMRO. A brief summary of these is as below:



- **Joint Event with CUI:** To observe World Mental Health Day 2021, COMSATS in collaboration with its Centre of Excellence, COMSATS University Islamabad (CUI), Islamabad, organized a Workshop on 'Engaging University Faculty for Mental Health Wellbeing of Youth', on 14th October 2021. Held at CUI, Islamabad, the Workshop had physical and virtual participation of 30 faculty members belonging to various fields of arts and science. The subject event along with the overarching theme of mental health and wellbeing of youth also contributed to Sustainable Development Goals 3 (Good Health and Wellbeing) and 4 (Quality Education). (Details in Chapter 4)
- **Engagement with COMSTECH:** Collaboration between COMSATS and COMSTECH was explored in meetings and reciprocal visits during 2021. It was based on COMSTECH's willingness to collaborate with COMSATS in order to pass on the benefits of telehealth to common member states of the two organizations, with a special focus on African countries. (Details in Chapter 3)
- **Participation in WHO/EMRO-UNESCO Event:** COMSATS participated in the World Health Organization Regional Office for the Eastern Mediterranean (WHO/EMRO) and United Nations Educational, Scientific and Cultural Organization (UNESCO) joint webinar on 'Fair, Equitable and Timely Allocation of COVID-19 Vaccines in the Arab States/ Eastern Mediterranean Region', held on 6th December 2021. Dr. Azeema Fareed, Principal Medical Officer and Focal Person COMSATS Telehealth Project, chaired this webinar's session entitled "Social Impact of the COVID-19 Pandemic". (Details in Chapter 6)
- **Participation in Consultation Meetings of National Digital Health Framework of Pakistan (2022-2030):** Pakistan's Ministry of National Health Services Regulation and Coordination (MoNHSR&C), in collaboration with World Health Organization (WHO) Pakistan Office, held a meeting to draft and devise strategy and framework to promote and regulate digital health in Pakistan. The meetings held at Federal capital and national levels were attended by Dr. Azeema Fareed, Pr. Medical Officer and Focal Person CTH Project at COMSATS Secretariat, who gave her inputs, suggestions and shared her experience related to Telemedicine to help draft the national framework.

Observance of International Health Days/Campaigns

World Cancer Day: One 2nd February 2021, a lecture on 'Applications of Radiations in Cancer Management' was organized by COMSATS to mark the World Cancer Day. Held virtually, the lecture was delivered by Dr. Muhammad Sohaib, a nuclear medicine specialist, currently serving as the Director of Nuclear Medicine & Oncology at Pakistan Atomic Energy Commission (PAEC). (Details in Chapter 4)

World Hepatitis Day: The World Cancer Day 2021 bearing the theme "Hepatitis Can't Wait" was celebrated by COMSATS with a Q&A session with the Focal Person of Government of Pakistan for Hepatitis and Zoonosis, Dr. Huma Qureshi. (Details in Chapter 4)

World Mental Health Day: To observe World Mental Health Day 2021, a workshop for university faculty members for the mental health wellbeing of youth was organized by COMSATS Telehealth Desk. The subject activity aimed to make faculty members aware of the mental health red flags in students. (Details in Chapter 4)

Eminent Visitors

Member of Prime Minister's Task Force on COVID-19, Government of Pakistan and her team: On special invitation from COMSATS, Prof. Dr. Ghazna Khalid,



Member of Prime Minister's Task Force on COVID-19, Government of Pakistan; Mr. Yahya Akhunzada, Commissioner Dera Ismail Khan; and Dr. Zia Khattak, Director of Planning and Development, Khyber Pakhtunkhwa (KPK) visited CTH resource centre at COMSATS Internet Services (CIS), on 8th January 2021. (Details in Chapter 1)

Dr. Khalid Saeed Khan, Member of Government of Pakistan's Task Force on COVID-19: Dr. Khalid Saeed Khan, Member of Government of Pakistan's Task Force on COVID-19, and Distinguished Investigator, University of Granada, Spain, visited COMSATS' flagship projects in Pakistan, COMSATS Telehealth Centre and COMSATS University Islamabad (CUI), on 26th January 2021. (Details in Chapter 1)

Social Media and Networking

In recent years, CTH has started effectively utilizing social media handles, inter alia, for spreading COMSATS' and CTH's mandates, raising awareness and interest on key topics of health and telemedicine, and apprising stakeholders with new developments and undertakings. CTH currently manages two social media handles: Telehealth Twitter (https://twitter.com/COM_Telehealth) and Instagram (https://www.instagram.com/com_telehealth/) that have helped improve connectivity, visibility and advocacy. Of the two, CTH Instagram account was created in 2021 to maximize its outreach and garner interest of stakeholders, prospective partners, decision and policy makers, and local populations.

From both these accounts, awareness messages using different visuals, such as designed texts, videos and infographics, were shared. These were also utilized to support international days and campaigns, World Health Day, International Day of Action for Women's Health, World Environment Day, Blood Donor day, World Antibiotics Awareness Week and World Aids Day.



During 2021, both these accounts showed a satisfactory organic growth and remained active in spreading awareness on matters of personal care, health, digital health, public health campaigns as well as to showcase CTH activities. CTH social media handles also served as a platform for building connections with the relevant organizations both at national and international levels and seeking potential partners and collaborators for the advocacy of SDG3.

CTH's Advocacy of and Contribution to SDGs

The world entering into the new century and millennium brought realization of millions remaining below poverty line or without shelter, while many lacked food and clean water facility. Many around the globe were left behind in terms of basic health and education facilities that were either scarce or sub-par. The UN 2030 Global Agenda through 17 Sustainable Development Goals (SDGs) took up the ambitious tasks left unfinished by MDGs and more. These SDGs, designed to elevate the living standard of every individual without any discrimination in gender, age, region, and ethnicity, are a race that must be won for sustainable future. Health, digital innovation, gender parity,

protection and inclusion remains at the heart of these as does in CTH activities. The scope of these activities have been broadened especially after COVID-19 leading to more contribution towards a wide range of SDGs. Table 8.1 provides an overview of how COMSATS Telehealth and health activities in the reporting year contributed to UN 2030 Agenda.

COMSATS Internet Services (CIS)

COMSATS Internet Service (CIS) is the pioneer Internet Service Provider (ISP) of Pakistan established in 1996. It offers diverse services like Wireless broadband, Domain & Web Hosting, On demand broadband, Data Center Services, Video conferencing, Website Designing and Development, Search Engine Optimization, Virtual Private Servers, Networking, IT training, Telehealth and internet related research facilities.

The ISP is currently operating in 20 cities and has customers belonging to prominent organizations in public and private sectors, national and international companies and firms, software and business companies, foreign missions, non-governmental organizations, universities, social development and research organizations.

Table 8.1: CTH and SDGs

	Elevate wellbeing to reduce poverty: Healthy body and mind go hand in hand with reduction in poverty. Telemedicine provided to thousands of patients in the remote areas promotes good health and wellbeing in local population so that they are fit enough to earn and raise living standard of their families.
	Healing from distance & health advocacy: Being an advocate of good health and wellbeing for all at all ages and contributing to sub-target 3.8, i.e., “Universal Health Coverage”, through the blend of digital technologies in conventional health systems, CTH strives to make access to quality healthcare possible for the people living in marginal areas of Pakistan, by means of 19 (currently functional) Tele-clinics. Other CTH activities (those not related to Telemedicine) also aimed at additional sub targets of Goal 3. For instance, the lecture on application of radiations for cancer management focused on target 3.4, informative session on hepatitis prevention and control contributed towards target 3.3, and the workshop for university faculty for the mental health wellbeing of youth aimed at target 3.4.
	Contributing towards educated communities: CTH is cognizant of the fact that provision of equitable quality education and lifelong learning opportunities can only be assured through healthy minds and healthy bodies. Creating awareness among teachers about mental health wellbeing of youth in a workshop held this year helped raise teaching standards, along with better understanding of young population’s mental health issues.
	Female Centeric Telehealth service: Besides many other basic rights, when it comes to health, women remain highly neglected in the developing world. Misconceptions prevail that women health needs pertain only to pregnancy and other gynaecological issues. The global goal 05 of Gender Equality demands equality of both genders and basic human rights. The Telehealth service also contributes to SDG – 05 due to women being major beneficiaries of this programme and having 80 percent of female providers and team members at both rural and urban locations.
	Creation of job opportunities: CTH programme contributes to decent work and economic growth targets of global goal 08 by creating job opportunities for both men and women at Basic Health Units (BHUs) and Resource Center. During 2021, inauguration of 15 new Tele-clinics broadened the access to care and created job opportunities.
	Joining hands for sustainable tomorrow: Seeking collaborations and partnerships with national and international organizations especially in the field of Telehealth including building of joint centers, holding of capacity building events and awareness campaigns etc., has been mainstay of COMSATS for building holding health related activities. During the calendar year 2021, CTH joined hands with COMSTech, PPHI, COMSATS University and WHO to expand its services and also continue health advocacy and promotional activities.

A self-sustaining organization, CIS generates its revenues from Internet and value added services. For the last 26 years, CIS has been recognized as one of the top rated ISPs in Pakistan. CIS affairs are managed by a Board of Management (BOM) headed by the Executive Director COMSATS.

All processes and procedures of CIS are ISO9001:2008 certified.

Data Centers

CIS has well-equipped data centers in Islamabad, Lahore, Faisalabad and Karachi which offer a variety of services,

including Virtual Private Servers, Domain Registration, Website Hosting, Co-location of Server’s and Rack’s space to customers. Hosting services on both Windows and Linux platforms are also offered.

CIS has expanded its IT & Data Center infrastructure with state-of-the-art technologies at CIS Technology Park. It offers Data Center services space for CIS existing and potential customers. Salient features of the new data center include:

- Capacity of 1,526 Sq. ft. and around 45 racks can be accommodated;
- IPV6 enabled and it is 27001:2013 ISO Certified;

- Precision cooling system with humidity controller;
- Fire suppression along with four stage fire alarm;
- N+1 electric system that includes UPS and backup electric generators;
- Power backup facility;
- Deployed L-Root Servers;
- Fully backed cyber security system with round the clock surveillance;
- Fully biometric security system;
- Protected with advanced Huawei & Juniper firewalls.

Software Department

Prism is a software and web development

service of CIS that offers website and software development using PHP, ASP, .Net and Java. CIS has developed websites for many prominent organizations including Pakistan Army, Pakistan Navy, Nova Technologies and Universal Services Fund as well as developed many useful software applications in Java and .Net that can be used by customers in the Billing system, Helpdesk system and Purchasing Management system.

IOT Department

CIS is designing essential IoT tools for innovative solutions, upgrading of conventional technologies with the prospect of futuristic developments and inventions based on “SMART”. CIS IoT introduced SMART concepts in Renewable Energy with a “One Click” theme. Net Metering solutions with real time reports on energy utilization were developed.

CIS’ Soil Moisture Detection development bears prospects for utilization in Agriculture and in Horticulture.

CIS’ Surveillance System development provides a secure environment in and around view via the DATA/Broadband connectivity.

On-going plan and implementation of IoT-based sensors for civic bodies include:

- Portal development to connect Vehicle Tracking system for online and precise tracking of organizational fleet;
- Cyber Security solution to connect with peripheral devices to bound network security;
- State of Art ERP and “One Window Online” development;
- Solutions for securing Network bounding and online threats;
- R&D for motion based sensors in field on Network Surveillance and in Agriculture;
- R&D and co-development of Artificial Intelligence based software for detection of cancerous tumor and primary health prenatal issues.

COMSATS Telehealth (CTH) at CIS

COMSATS Telehealth (CTH) currently housed at CIS with technical and human resource devoted to due execution of the programme. Advanced digital diagnostic health facilities are delivered to the people living in inaccessible areas online for medical and specialist professionals from Islamabad.

Network of nineteen Telehealth Clinics project has been successfully executed in Pakistan where Telehealth facility is being provided at the rural Basic Health Units (BHUs) located in Jhelum and remote areas of Balochistan.

All centers are fully equipped for the OPD and specialist consultation facilities with the latest digital diagnostic equipment, including vital signs monitor, digital stethoscope, examination camera, ENT, and derma scope and ultrasound probe. All the centers are further linked with CIS Telehealth Center Islamabad through live video-conferencing with medical specialists. So far, 110,490 patients have been examined through the system. The database of patients is maintained at CIS Islamabad for referral and research purposes.

Under an agreement with PPHI Balochistan, CIS has established 14 new Telehealth centers in far flung BHUs in Balochistan. These centers are located at Mastung, Qila Abdullah, Washuk, Jaffarabad, Dukki, Sibi, Kachhi, Sohbatpur, Musakhail, Punjgour, Chagai, Dera Bughti, Sohrab and Lasbela. One mobile unit has also been established for arranging medical camp on need basis and as per area requirement. It is expected that 19 additional clinics will also be established by December 2022.

The local population has deeply appreciated CTH that has provided medical and specialist healthcare services in their close proximity and free of cost.

Trainings

Comtrain is a technical training service of CIS that has delivered technical trainings to more than 2000 IT professionals and students over the last twenty-three years. Training courses provided included: conferences, CCNA, CCNP, Microsoft Office, Linux Administration, Window TM Administration, ONO recording Hardware, ITIL TM V3 Foundation, PMP TM, Web Development, Java Development and .Net Development delivered throughout the years. Specialized technical training for reputed organizations were engaged for these trainings.



Video-Conferencing

CIS provides video-conferencing facilities using the traditional equipment as well as on cloud to corporate customers within the country and abroad. CIS has well-equipped video-conferencing studios, two of which are situated in Islamabad while others are located in Lahore, Karachi & Peshawar. During 2021, CIS conducted video-conferencing for a number of its potential customers as per their requirements and overall demand.

Bandwidth Growth

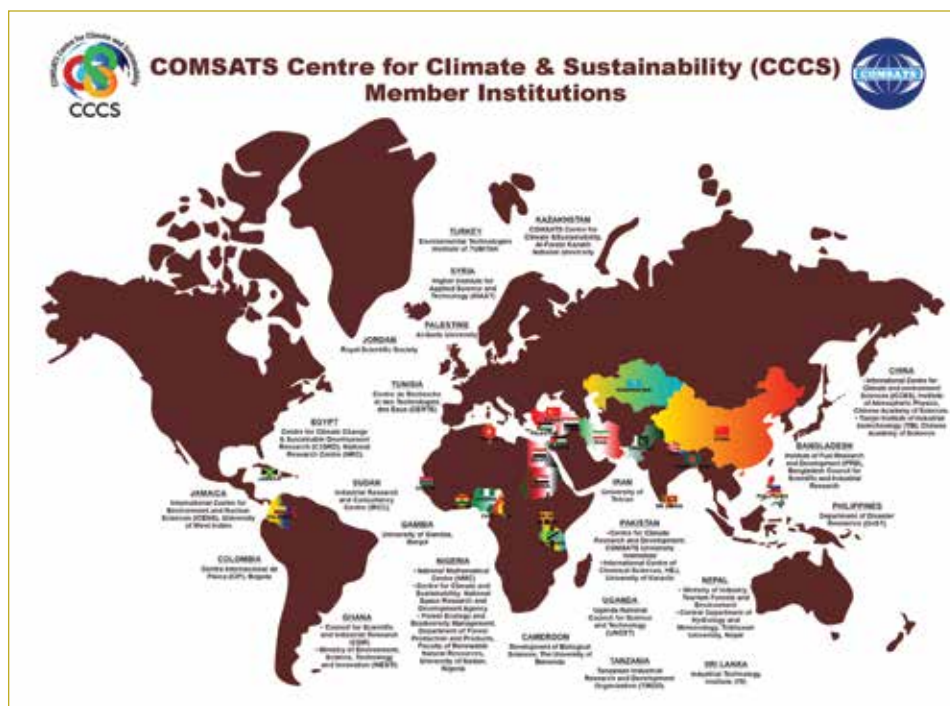
To ensure high uplink and downlink speeds for customers, CIS gets bandwidth from multiple providers. Bandwidth of CIS was enhanced from 6.7 GBPS in 2020 to more than 8 GBPS (current bandwidth) in 2021.

COMSATS Center for Climate and Sustainability (CCCS)

COMSATS Centre for Climate and Sustainability (CCCS) was established in 2019 to promote partnerships and collaborations among developing countries for joint action to combat climate change. CCCS recognizes the model of South-South and Triangular Cooperation as an innovative means to jointly addressing shared challenges of climate change.

The premise of CCCS is built on two pillars: 1) Paris Agreement 2015; and 2) UN Sustainable Development Goals Agenda 2030. The primary objective of CCCS is to foster partnerships, collaborations, expertise exchange, and resource and knowledge sharing among the countries of the South.

To utilize well the principle of South-South cooperation and vision of COMSATS, CCCS connects scientists and experts working on Climate and Environmental Science primarily from COMSATS Member States, as well as other institutions across the globe.



CCCS serves as a platform to foster multi-partnerships, collaborations for science-based joint actions for common challenges of Climate Change. The working mechanism of CCCS is based on four Cs: Connectivity, Communication, Coordination, and Collaboration.

Membership

CCCS brings together scientists, experts, researchers and policy-makers working on climate science and management and its related areas for achieving relevant Sustainable Development Goals.

Primarily, COMSATS Centres of Excellence (CoEs) that work on climate related areas are members of CCCS and, so far, 25 institutions from 20 COMSATS Member States are members of CCCS network.

Currently, CCCS is hosting total 32 members from COMSATS Member States and other states from Asia, Africa, and South America.

Focus SDGS

United Nations 2030 Global Agenda-Sustainable Development Goals (UN SDGs) and Climate Change are interconnected. Of the 17 goals, Climate Action (SDG13) is the most pertinent.

A number of focused research areas of CCCS come under 7 SDGs which are also linked to Climate Action (SDG 13). These are SDG-2 (Zero Hunger), SDG-3 (Good Health and Well-being), SDG-6 (Clean Water and Sanitation), SDG-7 (Affordable and Clean Energy), SDG-11 (Sustainable Cities and Communities), SDG-13 (Climate Action), and SDG-15 (Life on Land).

Above mentioned focused SDGs were selected after the consultation with experts of CCCS network and they agreed to work on relevant areas. Subsequent to the consent of experts, CCCS prepared a list of focused research areas under the umbrella of specific SDGs.

SDGs-wise categorization of CCCS' events during 2021 is given in Table 8.2.

Table 8.2: SDGs-wise categorization of CCCS webinars

S #	Webinar Name	Relevant Goals
1.	Webinar on 'Modeling and Simulation on Climate Change and Environmental Pollution: Strengthening Resilience in the Global South', January 12, 2021	- SDG3 – Good Health and Well-being - SDG11 – Sustainable Cities and Communities - SDG-13 – Climate Action
2.	Webinar on 'Sustainable Management of Forests and Challenge of Deforestation in the Global South', February 18, 2021	- SDG-11 – Sustainable Cities and Communities - SDG-13 – Climate Action
3.	Virtual Conference on Ecosystem Restoration in the Global South, June 07, 2021	- SDG-11 – Sustainable Cities and Communities - SDG-13 – Climate Action

Webinar Series

Due to COVID-19 pandemic, CCCS held most of its activities virtually, which resulted in a number of webinars on different topics related to focus SDGs with researchers, policy makers, students, and academicians across the globe as target audiences, participants and beneficiaries. The speakers of these events belonged to various institutions globally (Table 8.3).

During 2021, CCCS co-hosted three webinars on the following topics, i.e., 'Modeling and Simulation on Climate Change and Environmental Pollution: Strengthening Resilience in The Global South', 'Sustainable Management of Forest and Challenges of Deforestation in the Global South', and 'Ecosystem Restoration in the Global South'.

In the view of importance of mathematical modeling and simulation of changing climate patterns and events, CCCS co-hosted the webinar on the aforementioned subject in the partnership with COMSATS Centre of Excellence, National Mathematical Center, Nigeria, in which researchers across the globe participated as panelists. (Details in Chapter 4)

Deforestation is one of the main contributors of global warming and it is the subject of concern and interest for environmentalists, foresters and ecologists. Besides the CO₂ emissions, deforestation also contributes to desertification and water scarcity.

In this regard, CCCS partnered with COMSATS Centre of Excellence, the Council for Scientific and Industrial Research (CSIR), Ghana, to co-host the webinar on Sustainable Management of Forest in the Global South, in which researchers and experts from Asia, Africa and South America shared valuable insights. (Details in Chapter 4)

CCCS partnered with United Nation Environment Programme International Ecosystem Management Programme (UNEP-IEMP) to host the UN World Environment Day 2021 with the theme of Ecosystem Restoration. Distinctiveness of this year's World Environment Day was the launch of UN-Decade of Ecosystem Restoration. Malik Muhammad Amin Aslam Khan, Special Advisor to Prime Minister of Pakistan on Climate Change, graced the event from the host country of this year's World Environment Day. (Details in Chapter 4).

CCCS Resource Person's Participation in GCISC Training Workshop

Global Change Impact Studies Center (GCISC) in the collaboration with Asia Pacific Network (APN) conducted a hands-on training on 'Monsoon Variability and Extremes in a Changing Climate' from 12th to 14th October 2021, in Islamabad. The workshop was held under a project Towards Robust Projections of Climate Extremes and Adaptation Plans over South Asia.

From the platform of COMSATS Center for Climate and Sustainability, Mr. Saifullah Khan, Programme Officer at COMSATS Secretariat, attended this training. Mr. Khan is the designated resource person of CCCS and coordinates with experts, scientists and researchers working on climate and environment in CCCS network. This training participation aimed to build COMSATS' capacity further for making CCCS operations more effective.

During this 3-day activity, Mr. Khan was trained on different modeling and simulation software, mathematical modeling of weather patterns and statistical models of heat waves and extreme weather events.

Trainers of this hands-on session were from different international institutions, i.e., Universidade Federal de Itajubá,



Table 8.3: CCCS Events – International Participation

S #	Speaker Name	Designation/ Profession	Institute	Country
1.	Dr. Tonjock Rosemary Kinge	Associate Professor of Mycology at Department of Biological Sciences	University of Bamenda	Cameroon
2.	Dr. Linxiu Zhang	Director	United Nations Environment Programme – International Ecosystem Management Partnership (UNEP-IEMP)	China
3.	Ms. Guoqin Wang	Programme Manager	United Nations Environment Programme – International Ecosystem Management Partnership (UNEP-IEMP)	China
4.	Dr. Yu Liu	Deputy Director	Synthesis Center of Chinese Ecosystem Research Network (CERN), Chinese Academy of Sciences (CAS)	China
5.	Mr. Mauricio Andrés Valencia Camelo	Environmental Engineer	International Centre for Physics (CIF)	Colombia
6.	Dr. Daniel Benefoh	Deputy Director of Climate Change Unit	Environmental Protection Agency (EPA)	Ghana
7.	Mr. Jacob Amoako	Measurement, Reporting and GIS officer	Climate Change Directorate of the Forestry Commission of Ghana	Ghana
8.	Prof. Daniel A. Ofori	Director	Forestry Research Institute of Ghana	Ghana
9.	Dr. Ernest G. Foli	Principal Research Scientist	Council for Scientific and Industrial Research (CSIR)	Ghana
10.	Dr. Ernest Foli	Principal Research Scientist	Council for Scientific and Industrial Research (CSIR)	Ghana
11.	Dr. Lucy Amissah	Senior Research Scientist	CSIR-Forestry Research Institute of Ghana (FORIG)	Ghana
12.	Prof. Dr. Ghasem Azizi	Professor at Department of Physical Geography	University of Tehran	Iran
13.	Prof. Terrence Forrester	Director of UWI Solutions for Developing Countries (UWI SODECO)	University of the West Indies, Mona Campus	Jamaica
14.	Prof. Dr. Maher J. Tadros	Professor at Department of Natural Resources and Environment	University of Science & Technology	Jordan
15.	Dr. Dinara Abiyeva	Managing Director of GIS-Centre	JSC 'Institute of Geography and Water Security	Kazakhstan
16.	Ms. Kerstin Stendahl	Head of Ecosystems Integration Branch	United Nations Environment Programme (UNEP)	Kenya
17.	Dr. Steve Makungwa	Forest Measurements, Modeling, and Climate Change Expert	University of Agriculture and Natural Resources	Malawi
18.	Mr. Shiva Pariya	Forest Officer	Ministry of Industry, Tourism, Forests and Environment	Nepal
19.	Prof. B. O. Oyelami	Head of Mathematical Modeling and Simulation Research Group	National Mathematical Centre (NMC)	Nigeria
20.	Prof. Stephen Onah	Director/Chief Executive	National Mathematical Centre (NMC)	Nigeria
21.	Dr. O. Abiri	Senior Research Fellow	National Mathematical Centre (NMC)	Nigeria
22.	Dr. Samuel Olalekan Olajuyigbe	Senior Lecturer at Department of Forest Production and Products	University of Ibadan	Nigeria
23.	Dr. Zia Ur Rehman Hashmi	Head of Water Research Section	Global Change Impact Studies Centre (GCISC), Ministry of Climate Change	Pakistan
24.	Mr. Ashiq Ahmad Khan	Scientific Representative	EvK2CNR Association	Pakistan
25.	Dr. Rangika Bandara	Senior Lecturer at Department of Zoology and Environmental Management	University of Kelaniya	Sri Lanka
26.	Dr. Hüseyin Toros	Professor of Climate Change, Air Quality and Modelling	Istanbul Technical University (İTÜ)	Turkey
27.	Mr. Jamil Ahmad	Director of Intergovernmental Affairs	United Nations Environment Programme (UNEP) Office, New York	USA
28.	Mr. Bilal Anwar	General Manager	Commonwealth Climate Finance Access Hub	Mauritius



Brazil; Oak Ridge National Laboratory, USA; ICIMOD, Nepal; Alliance of National Science Organizations, Institute of Tibetan Plateau, China; and Chinese Academy of Sciences.

COMSATS Science Diplomacy

Since its inception, COMSATS has been advocating the centrality of science and technology for prosperity, human development and social progress in its Member States.

An ardent advocate of science as means to connect nations, finding common grounds for bilateral and multilateral cooperation, and use of science for peace and prosperity, COMSATS has long practiced the principles of Science Diplomacy in its conventional dimensions. Efforts in this respect were further formalized through launching of COMSATS' Science Diplomacy Programme in 2015. Launched in response to the recommendations of COMSATS Coordinating Council made in its 17th meeting (May 2014), the programme was geared towards improving international relations among developing countries and supporting their efforts to achieve foreign policy objectives through cooperation in S&T.

COMSATS' Science Diplomacy activities during 2021 are summarized below.

COMSATS Lecture Series on 'South – South and Triangular Cooperation for Socio-economic Development in the South'

During late 2020, COMSATS launched an online lecture series on South-South and Triangular Cooperation for socio-economic development in the South, in which eminent experts from the member countries and international partner organizations shared their insights on how to effectively address the socio-economic needs of the developing countries through South – South and Triangular cooperation in science and technology.

With session one taking place in late 2020, 11 lectures during eight sessions were arranged during 2021, with erudite and expert participation from Belgium, China, Egypt, Italy, Pakistan, Palestine, Sri Lanka, and Turkey. The lectures were attended by a number of participants from COMSATS' Focal Points, Centres of Excellence, and COMSATS Secretariat. Summaries of these are given below:

Session 2: Lecture by H. E. Nebil Dabur, Director General of Statistical, Economic and Social Research and Training Centre for Islamic Countries (SESRIC), Turkey (5th January 2021)

H. E. Nebil Dabur presented historical perspective of South-South Cooperation (SSC) highlighting the principles,

components and modalities of such cooperation framework. In his lecture on 'South – South Cooperation for Socio-economic Development of the South: The Experience of SESRIC', he mentioned that capacity development, horizontal partnerships, diversity of choices, cost effectiveness, demand driven character and adaptability are key features of SESRIC' interventions relating to SSC. He considered sharing of experiences and good practices, capacity building, and strengthening of networks and partnerships imperative for sustainable South-South Cooperation.

Dr. Dabur shed light on the mandate and activities of SESRIC. He shared with the participants, his Organization's report titled 'South-South in Action: Transforming Potential into Shared Prosperity'. It was also informed that being the subsidiary organ of OIC, SESRIC is engaged in research, training and statistical analysis, short-term statistical training courses, technical missions, workshops, and online courses in the areas pertaining to South-South Cooperation. He further informed that SESRIC has also been conducting implementation surveys, strategies and cooperative frameworks and sectorial reports. Dr. Dabur informed that SESRIC is planning to hold capacity-building activities in the fields of tourism, diplomacy, environment, poverty alleviation, agriculture and health sector, among others.

Concluding his lecture, the Dr. Dabur welcomed cooperation from COMSATS' Network in the areas of mutual interest.

Session 3: Lectures by Prof. Mohamed Hashem, President of National Research Centre (NRC), Egypt; and Mr. Bradley Emerson, CEO of Business Athletes, Sri Lanka (19th January 2021)

During the third session of COMSATS' Lecture Series on 'South – South and Triangular Cooperation for Socio-economic Development in the South' Prof. Mohamed Hashem and Mr. Bradley



Emerson delivered talks on 'South – South Cooperation for Socio-economic Development of the South: The Experience of the NRC, and Short and Long-term Plans', and 'Socio-economic Needs in the Diginomic Environment – Impact of the Fourth Industrial Revolution', respectively.

During his talk, Prof. Hashem informed about South-South collaborations of his Centre with other S&T Centres of Excellence of COMSATS during the past few years. These included: establishment of the Centre of Excellence for Research & Applied Sciences on Climate Change & Sustainable Development in collaboration with the International Center for Climate and Environment Sciences (ICCES) of China; as well as agreements with ICCES, China; COMSATS University Islamabad (CUI), Pakistan; and Bangladesh Council of Scientific and Industrial Research (BCSIR), Bangladesh. It was also informed that NRC is actively collaborating with the COMSATS Centre for Climate and Sustainability (CCCS) in its Network activities.

Furthermore, Prof. Hashem shed light on some joint initiatives of Egypt in the African region. He mentioned that Egypt launched 'H.E President Al-Sisi's Initiative' to treat one million hepatitis patients in 18 African countries. Furthermore, the Egyptian Agency of Partnership for Development (EAPD) organized capacity-

building programmes in the field of diplomacy, health, agriculture, education, judiciary, information technology, and food security that benefitted 7,000 participants from 24 countries. Sharing the future plans of his organization, Prof. Hashem looked forward to having collaboration in different fields of S&T, in particular, agriculture and health.

In his lecture, Mr. Emerson highlighted COVID-19's impact on the economic growth of the East Asia and Pacific region. Citing the World Bank's economic growth statistics in this regard, he opined that this situation has also created an opportunity for diginomic (digital economics) environment.

Further in his presentation, Mr. Emerson highlighted Prosperity, Connectivity and Leadership as key features of the emerging geopolitical landscape. He opined that rigid power structures and institutions

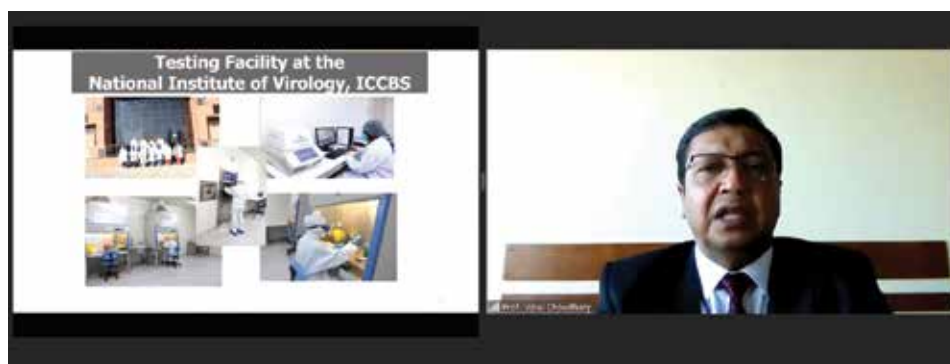
hamper economic development, and the absence of major structural and financial adjustments in developing countries slows GDP.

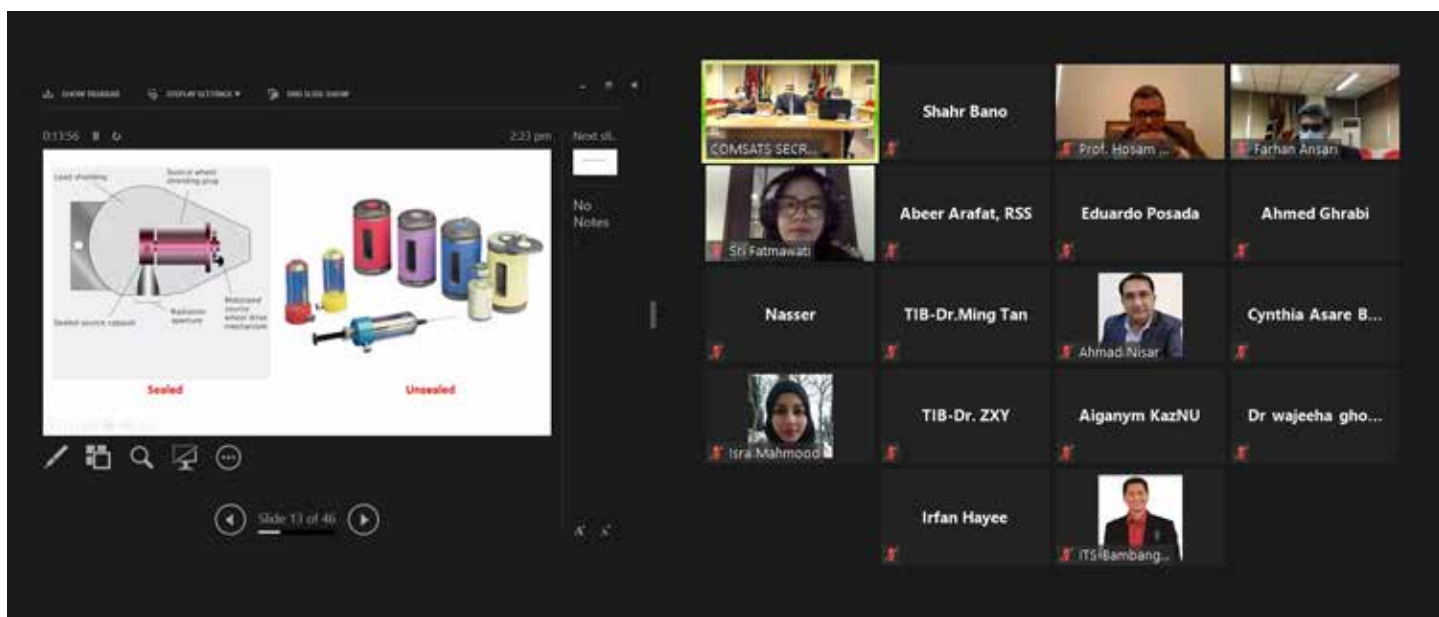
Mr. Emerson stated that proactive and integrated national and international policy development is vital to achieving sustainable growth. He also regarded multilateral cooperation in S&T essential to addressing multifaceted development challenges of present times.

Session 4: Lecture by Prof. Dr. M. Iqbal Choudhary, Director of International Center for Chemical and Biological Sciences (ICCBS), Pakistan (26th January 2021)

Prof. Dr. M. Iqbal Choudhary gave a lecture on 'Pandemic-associated Advances in Research and Development: Science and Technology at work in OIC Region'.

His lecture highlighted COVID-19 response of OIC Member States with special reference to Pakistan. Discussing the coronavirus situation in OIC region since the outset of the disease, Prof. Choudhary shared some identified key challenges faced by the Muslim world during this interval that included: inadequate testing facilities, fragile healthcare system, divided governance system, lack of indigenous capacity, and infodemic on coronavirus. He was of the view that the pandemic has reinforced the need of having good governance system, social justice, investment in health and education, and building indigenous capacity in S&T.





While sharing S&T-related interventions of OIC countries in the face of the Pandemic, Prof. Choudhary stated that OIC countries achieved the self-reliance in the production of PPEs, face masks, diagnostic kits, and other biomedical and bioanalytical equipment, contact tracing and tracking, as well as participation in the global clinical trials for COVID-19 vaccines.

Further, to encourage R&D as well as to support various research initiatives, Islamic Solidarity Fund of Islamic Development Bank (IsDB), Islamic World Educational, Scientific and Cultural Organization (ICESCO), and other institutions in OIC countries announced R&D support programmes. The Statistical, Economic and Social Research and Training Centre for Islamic Countries (SESRTC) and COMSTECH also created COVID-19 R&D observatories.

Prof. Choudhary also highlighted some of COMSTECH's initiatives during the pandemic, including: Launching of a new 'Scholarship Programme for Capacity Building in Virology and Vaccine Development'; establishment of "OIC Network of Laboratories for Development of Diagnostics"; establishment of a web-portal to project latest technological

developments against COVID-19 pandemic in the OIC world; launching of webinar series on the pandemic and its socio-economic fallout; and holding of exhibitions to showcase technologies to help combat coronavirus.

Further, during his presentation, Prof. Choudhary detailed on the COVID-19 response of Pakistan and informed that Pakistan established a 'National Task Force on COVID-19' in March 2020 to help support science-backed solutions and response to the pandemic. It was also informed that Pakistan built indigenous testing capacity from 0 to over 50,000 tests per day at 16 'super labs'.

The initiative 'Attack Coronavirus and Offer a Cure' was also launched by Pakistan to support drug discovery against COVID-19 and clinical trials were initiated in combination with other countries in OIC Member States.

ICCBS, he informed, is conducting genomic surveillance to sequence the complete genome of the virus. Other research underway includes the study of mutations of SARS-CoV-2 virus; 100 SARS-CoV-II genome project; and vertical transmission studies, among others.

Session 5: Lecture by Prof. Dr. Hosam El-Sayed, Assistant Vice President for Research, National Research Centre (NRC), Egypt (2nd February 2021)

During the session, Prof. Dr. Hosam El-Sayed delivered lecture on 'Towards SDGs-Oriented Amalgamated Research Plans Among COMSATS' Centres of Excellence'. The main idea of Prof. El-Sayed's lecture was creation of clusters of Centres of Excellence (CoEs) based on mutual interest and expertise to help meet their institutional and the Network's goals, national needs as well as meet the targets of 2030 Global Agenda.

To improve collaboration in the Network, he proposed some areas for joint research activities, such as: chronic and endemic diseases; pharmacology; life sciences; chemical industries; engineering industries; ICTs; water and environment; renewable energy; agriculture and food sciences; and frontier sciences. In the same vein, he put forth the idea of formulating groups of CoEs for the achievement of various Sustainable Development Goals (SDGs), in particular SDG1, 2, 3, 4, 6, 7, 9, and 12. Prof. Hosam proposed the Egyptian Science, Technology, and Innovation Funding Authority (STIFA), Egyptian Agency of



Partnership for Development (EAPD), Islamic Development Bank (IsDB), and Islamic World Educational, Scientific and Cultural Organization (ICESCO) as potential funding partners for different R&D activities.

Prof. Hosam also conveyed the willingness of Prof. Dr. Mahmoud M. Sakr, President of the Academy of Scientific Research and Technology (ASRT), Egypt, to support project submitted by COMSATS for the benefit of COMSATS Member States.

Session 6: Lecture by Mr. Ali Salman, Founder and Executive Director of the Policy Research Institute of Market Economy (PRIME), Pakistan; and Engr. Samer Hussein, Director General for Technical Education, Ministry of Higher Education and Scientific Research (MOHESR), Palestine (9th February 2021)

Mr. Ali Salman delivered a lecture on 'Food Security during the Pandemic: Importance of South-South Regional Cooperation'.

Inspired by a paper on "Food security in Pakistan during the pandemic year (Democracy Reporting International (DRI), Pakistan, December 2020), Mr. Salman's lecture highlighted various dynamics of food security, food inflation, as well as fiscal, administrative and policy measures taken by federal and provincial governments in Pakistan during the pandemic.

Discussing the implications of COVID-19 in various sectors in Pakistan, Mr. Salman cited UNDP's report and highlighted useful predictions and projections it included. He also discussed disruptions in food supply chain in Pakistan. Some recent challenges towards agriculture and food security recalled by him in Pakistan included: damage to tomato crops and relevant economic toll due to reduced imports from Iran and locust attacks resulting in serious crop losses. Mr. Salman suggested some policy measures to remedy the adverse effects of these losses.

He was of the opinion that the federal government should identify population pockets suffering from severe shortage of food, whereas the provincial governments should re-direct budgets available within the provincial departments for provision of food packages comprising of essential food items.

The second lecture of the session was on 'Science, Technology and Innovation to address COVID-19 in Palestine'. During the lecture, Engr. Samer Hussein shared

some key statistics regarding the higher education sector of Palestine. Mr. Hussein opined that distance-education and learning have become an indispensable tool during the pandemic and accordingly, the government of Palestine adopted measures for technical strengthening of the education sector. He shared some of these measures: development of a crisis cell for technical facilitation of teachers; capacity-building and skill development in digital technologies, web applications and platforms; and creation of informational videos for awareness and education of staff and students.

It was informed that Al-Quds University also produced medical artificial respirator in collaboration with specialists from medical fields, and computer sciences. The device is based on an innovative design having 360-degree mechanical steering system, a water spray system, as well as pneumatic propulsion system. It contains two tanks having 300-liter capacity. Moreover, it was informed that an alarm device, a Smart Medal for wireless charging of smartphones, as well as a hand sanitizer package were also designed by Palestinian researchers.

Session 7: Lecture by Prof. Dr. Jinghua Cao, Executive Director of the Chinese Alliance of International Science Organizations (ANSO) (23rd February 2021)

Prof. Dr. Jinghua Cao, gave a lecture on 'Insight on South-South and Triangular





Cooperation in S&T'.

During his presentation, Prof. Cao gave an overview of ANSO's operations stating that this 56-member strong Alliance is advocating UN Sustainable Development Goals (SDGs) and providing science-based consultancy for policy making. He also highlighted some of the programmes of the organization that include scholarships, fellowships and prizes.

Prof. Cao also highlighted ANSO's efforts for combating coronavirus, which pertained to:

- Drug research;
- Clinical trial of recombinant protein vaccine;
- Webinars to support collaboration for vaccine development with participation from Chile, Brazil, Ghana, Kazakhstan, the Philippines, Pakistan, South Africa, Senegal, Sri Lanka, Turkey, and Uzbekistan; and
- Information sharing on COVID-19 with ANSO members and partners; and publication of special issues on

COVID-19.

Prof. Cao informed that China created 'South-South Cooperation Assistance Fund' worth US\$3.1 billion to support other developing countries in their efforts towards finding innovative solutions for challenges relating to climate change, biodiversity, health biosafety, etc. China, he further informed, also supported establishment of Sino-Africa Joint Research Center (SAJOREC) in Kenya to promote research on Modern Agricultural Technology Integration and Demonstration as well as to support food security efforts in African countries. In the same vein, CSL Joint Research Center was established at the University of Peradeniya in Sri Lanka with the patronage of China. Establishment of this Centre, it was informed, had materialized as a result of S&T cooperation between China and Sri Lanka.

Two other research centres established with patronage of Chinese Academy of Sciences (CAS) are Southeast Asia Biodiversity Research Institute (SEABRI) in Myanmar, and China-Pakistan Joint Research Centre on Earth Sciences (CPJRC) in Pakistan. The former is aimed at biodiversity conservation and sustainable development in Southeast Asian countries with the support of Belt and Road Initiative (BRI), whereas, the latter focuses on earth sciences, hazards and risks, and regional sustainable development by bringing together eminent

experts from South Asia, West Asia, Central Asia and North Africa. Some other projects and initiatives highlighted by Prof. Cao included: ANSO Association for Rice & Wheat Variety Technology Innovation and Transfer (ANSO-RWIT); Alliance of Poverty Reduction and Development (APRD); R&D of Artemisinin use in Africa; Thailand-China Joint Laboratory on Microbial Biotechnology; Ethiopia Green Enzymatic Bone Gelatin Manufacture Demonstration Project; application of non-contact vital-signs monitoring technology; and preparation and industrialization of low-cost thermal insulating coatings for tropical industrial plant in Philippines.

In the end, possibilities of collaboration with ANSO in various fields of S&T were explored by the participating Centres. It was also learnt that ANSO offers trainings in various areas, including biodiversity, eco-system management, leadership skills etc., and they are also available for COMSATS Member States.

Session 8: Lectures by Prof. Dr. Romain Murenzi, Executive Director of The World Academy of Sciences (TWAS), Italy; Prof. Dr. M. H. A. Hassan, President of Council, The World Academy of Sciences (TWAS), Italy; and Mr. Declan KIRRANE, Director, Intelligence in Science (ISC), Belgium (9th March 2021)

The eighth session featured a lecture by





Prof. Dr. Romain Murenzi, in which he shared various programmes of TWAS. These have been playing a vital role in the capacity-building of scientific community, helping improve research infrastructure, supporting early-career scientists, promoting and catalyzing research links, as well as rewarding scientific excellence in the developing countries. He informed that TWAS provides grants to individuals and research units in some developing countries for specialized equipment, consumable supplies, in partnership with the Islamic Development Bank (IsDB) and Swedish International Development Cooperation Agency (SIDA). 'TWAS Exchange Programme' is facilitating scientific exchanges and mobility in partnership with Deutsche Forschungsgemeinschaft (German Research Foundation, DFG), UNESCO, Italian National Agency

for New Technologies, Energy and Sustainable Economic Development (ENEA), COMSATS University Islamabad, Accademia Nazionale dei Lincei, and Scuola Internazionale Superiore di Studi Avanzati (SISSA), among others.

Prof. Murenzi also informed that TWAS recognizes excellence in scientific research in the developing world through various awards, such as: TWAS – Lenovo Science Award; TWAS Awards; TWAS-Siwei Cheng Award in Economic Sciences; TWAS Medal Lectures; TWAS-C.N.R. Rao Award; TWAS-Atta-ur-Rahman Award; TWAS-Al-Kharafi Award; TWAS-Abdool Karim Award; TWAS-S.Omar Innovation for Sustainability Award; TWAS-CAS Young Scientists Award for Frontier Sciences; TWAS-Mohammad A. Hamdan Award; and TWAS Regional Awards. Dr. Murenzi also informed that TWAS Young

Affiliates Network (TYAN) initiative is promoting scientific cooperation through research on emerging diseases, climate change, food and water safety, preservation and utilization of biodiversity, etc.

Concluding his lecture, Prof. Murenzi emphasized the need for having effective partnerships between scientists, policymakers and diplomats to help deal with various challenges.

Second lecture of the day was by Prof. Dr. Hassan, who shed light on the concept of Science Diplomacy during his lecture entitled 'Science Diplomacy and Scientific Migration'. He noted that the following three trends shaped the concept:

- passion of scientists to collaborate with the best in their field;
- use of scientific tools to improve



- relations between countries having politically strained relations; and
- need for global partnership in STI to achieve SDGs.

He was of the view that Science Diplomacy and science, technology and innovation (ST&I) are essential for the achievement of Sustainable Development Goals (SDGs) by 2030. He deemed Paris Agreement on Climate Change (2016) a great example of science diplomacy where 195 countries pledged to limit global warming to two degrees Celsius. He also hailed Mission Innovation (MI), a global initiative of 24 countries and the European Commission, for its commitment to double public investment in clean energy R&D. To that effect, it was informed that a group of prominent private investors pledged to invest in clean energy technologies to help ensure scaling and commercialization of best innovations with real impact on climate change.

‘TWAS-AAAS Science Diplomacy Course’ was highlighted as a useful programme aimed at bringing together scientific, policy making and diplomatic communities to jointly address critical transboundary issues and publish case studies, as well as build capacity of young scientists in Science Diplomacy through interactions with Science Diplomacy Ambassadors.

It was informed that a workshop was organized to help refugee scientists by TWAS, National Institute of Oceanography and Applied Geophysics (OGS), and

Euro-Mediterranean University (EMUNI), in Trieste, during March 2017. Fifty participants, including policymakers, science leaders, diplomats, refugee administrators, and refugee scientists from 20 countries in Europe and the Middle East/North Africa region participated in the workshop. Challenges and opportunities for the refugee scientists were discussed during the workshop and some useful recommendations were made to help cater to their needs.

The third lecture of the session was titled “The Contribution of the EU Horizon Europe and Neighborhood, International Development and Cooperation Instrument, NDICI, to Science Capacity Building to Support the United Nations Sustainable Development Goals, and the Potential Role for COMSATS”.

During the lecture, it was informed by Mr. Declan Kirrane that Horizon Europe is the main research and science programme funded by the European Union (EU) having various editions, including Horizon 2020. The programme supports EU’s collaborative research activities and has opportunities for all to participate and contribute. It was learnt that new Horizon programme will be launched in April 2021, which would also provide a platform for COMSATS Member States to engage and collaborate with EU to help address global issues. Additionally, a meeting has been scheduled for June 2021, the focus of which would be collaboration between EU and Africa.



Neighborhood, Development and International Cooperation Instrument (NDICI) was mentioned as another programme of the European Union, which was proposed by the European Commission on 14 June 2018, as part of a dedicated communication titled ‘a modern budget for a union that protects, empowers and defends’. NDICI programme is the principal instrument whereby the European Union supports development. The programme holds science central to achieving its objectives in the areas of education, agri-food, economic development, and governance. Mr. Kirrane urged COMSATS Member States to engage in priority setting process which is handled by EU delegations in each of the eligible nations. He also informed that NDICI programme of the European Union offers opportunities for over 80 countries.

Mr. Kirrane proposed organizing “COMSATS Information Day” to help explore synergies with Horizon Europe as well as other organizations participating in the event.



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FINANCIAL AFFAIRS

Major source of financing operations of COMSATS is annual contributions from the Government of Pakistan towards running cost of the organization's Secretariat. Other member states of COMSATS pay voluntary Annual Membership Contribution (AMC) towards COMSATS. The AMC received from member states is kept as 'Trust Money' and spent on activities related to the respective contributing country. In order to have a regular source of financing for technical programmes, COMSATS Secretariat instituted creation of an Endowment Fund of US\$ 10.00 million during the 2nd General Meeting of COMSATS, held on 16-17 April 2012 in Islamabad, Pakistan.

Host Country (Pakistan) Contribution

The Government of Pakistan, being host country of COMSATS, has been meeting the running costs of COMSATS Secretariat under an international agreement since establishment of COMSATS in 1994. The fixed annual grant (contribution) is revised from time to time as per requirement of the organization. The amount of annual contribution was last revised/fixed to PKR 40.00 million in 2009. Due to increase in expenditure and inflation rates, the amount was found insufficient to meet the organization's needs.

Accordingly, COMSATS Secretariat requested the Government of Pakistan for enhancement of contribution. The Government of Pakistan has paid an additional grant of PKR 47.00 million during the financial year 2020-2021. In addition, the Government of Pakistan is paying Annual Membership Contribution (AMC) towards COMSATS on regular basis.

Annual Membership Contribution (AMC)

COMSATS Member States are paying

Annual Membership Contribution (AMC) towards COMSATS on voluntary basis. The AMC received from COMSATS Member States is kept as "Trust Money" and is utilized to support technical activities and programmes of the contributing member state. During the reporting period (January to December 2021), COMSATS received AMC from China, Jamaica and Pakistan.

COMSATS Endowment Fund

In order to improve financial sustenance of COMSATS and its technical activities, an endowment fund of worth US\$ 10.00 million was created during the 2nd General Meeting of COMSATS held on 16-17 April 2012 in Islamabad, Pakistan. A proposal, in this regard, was made during said meeting by the then Prime Minister of Islamic Republic of Pakistan, in his capacity as the Chairperson of COMSATS. During this meeting, a seed money of US\$ 1.00 million (PKR 100 million) was pledged on behalf of the Government of Pakistan as its contribution towards the fund and representatives of other member states also made pledges to contribute towards COMSATS Endowment Fund. So far, the Government of Pakistan has contributed PKR. 10.00 million towards the fund against its total commitment

of PKR. 100 million (US\$ 1.00 million). Efforts continue at COMSATS Secretariat to build the Fund to its initially proposed levels.

Audits

The accounts of COMSATS Secretariat are managed and maintained as per international practices and in compliance with the International Accounting & Financial Standards. The financial year of COMSATS Secretariat begins from 1st July and ends on 30th June of the succeeding year. The accounts of COMSATS Secretariat are audited by a reputed chartered accountancy firm every year. The audited accounts and the auditors' report are submitted to COMSATS Management Committee for endorsement and the Coordinating Council for approval.

The accounts of COMSATS Secretariat for the financial year ending on June 30, 2021, have been audited by M/s HLB IJAZ TABUSSUM & Co., Chartered Accountants.

The auditors' report and financial statements for the year 2021 will be submitted to the Coordinating Council of COMSATS for approval in its next meeting.

LIST OF FOCAL POINTS IN COMSATS' MEMBER STATES



Hon. Architect Yafesh Osman

Minister
Ministry of Science and Technology
People's Republic of Bangladesh



H.E. Mr. Wang Zhigang

Minister
Ministry of Science and Technology
People's Republic of China



Hon. Mr. Tito José Crissien Borrero

Minister
Ministry of Science, Technology and
Innovation
Republic of Colombia



Prof. Dr. Mahmoud M. Sakr

President
Academy of Scientific Research and
Technology
Arab Republic of Egypt



H.E. Dr. Badara A. Joof

Minister
Ministry of Higher Education, Research,
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Republic of The Gambia



H.E. Dr. Kwaku Afriyie

Minister
Ministry of Environment, Science,
Technology and Innovation
Republic of Ghana



H. E. Prof. Mohammad Ali Zolfigol

Minister
Ministry of Science, Research and
Technology
Islamic Republic of Iran



Hon. Daryl Vaz

Minister
Ministry of Science, Energy and
Technology
Jamaica, West Indies



Hon. Dr. Dia-Eddin Arafah

Secretary General
Higher Council for Science and
Technology (HCST)
Hashemite Kingdom of Jordan



**Hon. Mr. Askhat Kanatovich
Aymagambetov**

Minister
Ministry of Education and Science
Republic of Kazakhstan



H.E Mr. Jang Chol

President
State Academy of Sciences
Democratic People's Republic of Korea



Hon. Prof. Abdellatif Miraoui

Minister
Ministry of Higher Education, Scientific
Research and Innovation
Kingdom of Morocco



Hon. Dr. Ogbonnaya Onu

Minister
Federal Ministry of Science, Technology
and Innovation
Federal Republic of Nigeria



Ms. Humaira Ahmed

Federal Secretary
Ministry of Science and Technology
Islamic Republic of Pakistan



H.E. Prof. Mahmoud Musa Abu Mowais
Minister
Ministry of Higher Education and
Scientific Research
The State of Palestine



Hon. Fortunato T. De La Peña
Secretary
Department of Science and Technology
Republic of the Philippines



Hon. Dr. Cheikh Oumar Anne
Minister
Ministry of Higher Education, Research
and Innovation
Republic of Senegal



Hon Eng. Abdullahi Abukar Haji
Minister
Ministry of Education, Culture and Higher
Education
Federal Republic of Somalia



Hon. Jayantha De Silva
Secretary
Ministry of Education
Democratic Socialist Republic of Sri Lanka



H.E. Prof. Mohammed Hassan Dahib
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Ministry of Higher Education and
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Republic of the Sudan



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Minister
Ministry of Higher Education
Syrian Arab Republic



Hon. Prof. Adolf Mkenda
Minister
Ministry of Education, Science and
Technology
The United Republic of Tanzania



Hon. Prof. Moncef Boukather
Minister
Ministry of Higher Education and
Scientific Research
Republic of Tunisia



Prof. Dr. Hasan Mandal
President
The Scientific and Technological Research
Council of Turkey (TÜBİTAK)
Republic of Turkey



Dr. Martin P. Ongol
Executive Secretary
Uganda National Council for Science and
Technology (UNCST)
Republic of Uganda



Hon. Prof. Dr. Khalid Ahmed Alwosabi
Minister
Ministry of Higher Education and
Scientific Research
Republic of Yemen



Hon. Prof. Dr. Amon Murwira
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Ministry of Higher and Tertiary Education,
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