

YEAR BOOK 2017-18



Ministry of Science & Technology
GOVERNMENT OF PAKISTAN

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ACRONYMS

CDWP	Central Development Working Party
COMSATS	Commission on Science and Technology for Sustainable Development in the South
COMSTECH	Organization of Islamic Countries Standing Committee on Scientific and Technological Cooperation
CUI	COMSATS University, Islamabad
CWHR	Council for Works & Housing Research
DDWP	Departmental Development Working Party
DEA	Deputy Electronics Adviser
DSA	Deputy Scientific Adviser
DTA	Deputy Technological Adviser
ECNEC	Executive Committee of National Economic Council
ECO	Economic Cooperation Organization
EDB	Engineering Development Board
EEZ	Exclusive Economic Zone
FAO	Food & Agriculture Organization
GIKI	Ghulam Ishaq Khan Institute
HRD	Human Resource Development
IDB	Islamic Development Bank
IIEE	Institute of Industrial Electronics Engineering
JEA	Joint Electronics Adviser
JSA	Joint Scientific Adviser
JTA	Joint Technological Adviser
MIRDC	Metal Industry Research & Development Centre
MoST	Ministry of Science and Technology
NAM	Non Aligned Movement
NCST	National Commission for Science & Technology
NIE	National Institute of Electronics
NIO	National Institute of Oceanography
NODC	National Oceanographic Data Centre
NPSL	National Physical and Standards Laboratory
NUST	National University of Sciences & Technology

NUTECH	National University of Technology
OIC	Organization of Islamic Conference
PC-I	Planning Commission 1: (Standard Format for Preparing Project Proposals)
P&C	Policy and Coordination
P&D	Planning & Development
PASTIC	Pakistan Scientific & Technological Information Centre
PCRET	Pakistan Council of Renewable Energy Technologies
PCRWR	Pakistan Council of Research in Water Resources
PCSIR	Pakistan Council of Scientific & Industrial Research
PCST	Pakistan Council for Science & Technology
PEC	Pakistan Engineering Council
PHA	Pakistan Halal Authority
PMNH	Pakistan Museum of Natural History
PNAC	Pakistan National Accreditation Council
PSDP	Public Sector Development Programme
PSF	Pakistan Science Foundation
PSQCA	Pakistan Standards and Quality Control Authority
PSTC	Pak Swiss Training Centre
QCC	Quality Control Centre
R&D	Research & Development
S&T	Science & Technology
SAARC	South Asian Association for Regional Cooperation
SDC	Standards Development Centre
SME	Small & Medium Enterprises
SMEDA	Small & Medium Enterprises Development Authority
STEDEC	STEDEC Technology Commercialization Corporation of Pakistan (Pvt.) Ltd.
TSC	Technical Services Centre
UNIDO	United Nations Industrial Development Organization
WTO	World Trade Organization



Chaudhry Fawad Hussain, Federal Minister for Science & Technology

Message from Chaudhry Fawad Hussain Federal Minister for Science and Technology

It is a great pleasure for me to give this Message for the Year Book 2017-18, which highlights the activities of Ministry of Science and Technology and its Organizations including two Universities during the year.

Ministry of Science and Technology has elevated its vision to become a strategic collaborator of the industry through research, technology transfer, technology incubation and skill development. The research organizations under its administrative control are now diverting more resources towards development and implementation of projects and plans in close collaboration with their relevant stakeholders both from public and private sector.

A number of high class projects are in the process of preparation and approval under the PSDP programme. These projects cover important areas of affordable and sustainable energy, testing laboratories, health, engineering and manufacturing, environment, agriculture, mineral, food technology and food processing etc. The R&D organizations are encouraged and supported to commercialize their products and services to become sustainable over a period of time.

The MoST has initiated a major exercise of revitalizing and restructuring its various organizations to respond to its new vision. The scientists and technologists of S&T organizations are developing sound projects that ensure need based research and development necessary for conservation and harnessing of our natural resources.

It is great news for the Pakistani engineers that International Professional Engineering Agreement (IPEA) has approved the authority of Pakistan Engineering Council to award the title of International Professional Engineer (IPE) to its professional engineers. The PEC has been approved as permanent member of the IPEA. Jobs of professional engineers of the whole world are now open for Pakistani engineers.

Science Talent Farming Scheme (STFS) has been initiated by Pakistan Science Foundation as part of Pakistan Vision 2025 to attract youth towards science in early years of education. It is a great effort to promote science in the country at grass root level.

Efforts were made to develop more collaboration and cooperation with relevant stakeholders in the emerging areas of Science, Technology and Innovation, from both the public and private sectors. In this regard, R&D Organizations were given policy directives to commercialize their products and services with a view for achieving sustainability, providing employment opportunities and improving living standards of the people.

Pakistan Standards & Quality Control Authority (PSQCA) being the national standards body is committed to provide training and capacity buildings on Standards, Technical Regulations and Conformity Assessment Procedures. The PSQCA has expanded its outreach to ensure compliance of national standards. The Government of Pakistan has declared 109 products as mandatory out of which 42 are food products.

The Government is spending a substantial amount on human resource development, enhancement of infrastructure and upgradation of research potential at research institutes and universities, to promote scientific and technological research activities.

I am confident that these efforts will pay dividends in the near future and contribute towards acceleration of socio-economic development of Pakistan.



Capt. ® Nasim Nawaz, Secretary, Ministry of Science & Technology

Foreword

The Year Book 2017-18 is an official document of Ministry of Science and Technology. The Year Book indicates the activities and achievements of the Ministry, its Organizations and two Universities during the period.

The importance of science and technology developments, contributing towards socio-economic needs in the country had always been well understood by the Ministry and its affiliated organizations and the universities. The experts, scientists, technologists and professionals continued reviewing the latest trends in science and technologies and their adoptions to deliver. Mainly the thrust areas where hectic efforts were made, included: renewable energies, management of water resources, coastal and oceanic resources, industrial research, electronics, testing and quality assurance etc.

Establishment of Pak-Korea Testing Facility for Solar & Allied Equipment to facilitate the “Introduction of Quality Standards (IEC 61215:2016-1 & 2, IEC 61730:2016-1 & 2) for Imported and locally developed Solar PV Panels in Pakistan is significant step towards development as there is no testing facility available at National level. The project is being sponsored by Ministry of Science & Technology and Korea International Cooperation Agency (KOICA), Govt. of South Korea and will be executed by PCRET and KOICA.

Ministry of Science and Technology initiated and launched Scientific and Technological programs and projects, as per national needs necessary for the rapid Socio-Economic development of the country. Keeping in view the Vision 2025, R&D organizations of Ministry of Science and Technology have diverted their efforts and resources towards demand driven R&D and implementation of projects, having significant economic impact. These organizations are being encouraged and supported to transfer technology to the local industry and commercialize their products and processes, with the goal to achieve Knowledge Based Economic Development.

In the present era, development is no longer dependent merely on natural resources. Knowledge has now become the main driving force. Increasing application of knowledge at various stages of value chain and every sector of economy will only be attained by giving due priority to Education, R&D and Industry.

COMSATS Institute of Information Technology (CIIT) has been upgraded to a Federally Chartered University in April 2018 under the COMSATS University, Islamabad Act 2018. COMSATS University, Islamabad (CUI) again tops the list from Nature Index of high impact factor journal publications from Pakistan. The list consists of high-quality research outputs ranking table 2018 released by internationally reputed scientific publication house, The Nature.

National University of Technology (NUTECH) has emerged as the first ‘University for Industry’ under the umbrella of Ministry of Science and Technology and focused on promoting technology research, development and training of the youth in the relevant fields and qualifications needed by the industries, economy to ensure knowledge and technology based economic development. The university was established as a Federally Chartered University through an Act of Parliament and Gazette notified on 26th February, 2018. NUTECH aims to prepare the youth of Pakistan to take on the challenges of the twenty first century proffered by rapid technology advancements.

During the period, Ministry has initiated important initiatives in various fields. Policy focus is to ensure that Pakistan acquires world-class expertise within next few years, in accordance with the priority of the present government. Besides Human Resource Development and Capacity Building of Labs Infrastructure & Pilot Plants, R&D activities were carried out in priority areas like, Quality Assurance and Standards, Oceanography, Information Technology, Health, Food, Water etc. All these efforts are dedicated to socio-economic uplift through application of S&T in all sectors of the economy for a better & prosperous future.

The Ministry of Science and Technology would continue with these initiatives, to promote Research & Development and to make its contribution towards economic development.

Capt. ® Nasim Nawaz

Secretary

M/o Science & Technology

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1. Science and Technology Division (S&T Division)

The Scientific and Technological Research Division (S&TRD), established in 1964, was initially responsible to administrate the National Science Council, the Council of Scientific and Industrial Research, the Atomic Energy Commission and the Space and Upper Atmospheric Research Committee. The status of S&TR Division was raised to the level of full-fledged Ministry, “Ministry of Science and Technology (MoST)” in 1972 with core responsibility at the national level for planning, coordinating and directing efforts to initiate and launch scientific and technological programs and projects as per the national agenda for developing a sound and sustainable S&TR base for the socio-economic development in Pakistan. This Division undertakes multifarious functions, as depicted under entry 36 of Schedule-II of the Rules of Business 1973. These are:

SCHEDULE II [Rule 3 (3)]

Distribution of Business among the Divisions

36. Science and Technology Division

1. Establishment of science cities.
2. Establishment of institutes and laboratories for research and development in the scientific and technological fields.
3. Establishment of science universities as specifically assigned by the Federal Government.
4. Planning, coordination, promotion and development of science and technology monitoring and evaluation of research and development works, including scrutiny of development projects and coordination of development programmes in this field.
5. Promotion of applied research and utilization of results of research in the scientific and technological fields carried out at home and abroad.
6. Guidance to the research institutions in the Federation as well as the provinces in the fields of applied scientific and technological research.
7. Coordination of utilization of manpower for scientific and technological research.
8. Promotion and development of industrial technology.
9. Promotion of scientific and technological contacts and liaison nationally and internationally, including dealings and agreements with other countries and international organizations.
Substituted vide S.R.O 622 (I)/2013 (F. No. 4-8/2013-Min-I) dated 28.06.2013.
10. Initiate promotional measures for establishment of venture capital companies for technological development and growth.
11. Support to NGOs concerned with development of science and technology.
12. Promotion of metrology Standards, Testing and Quality Assurance System.
13. National Commission for Science and Technology.
14. Pakistan Council of Scientific and Industrial Research.
15. Omitted vide Cab: Div: Notification No.4-6/97-Min.I dated 3.3.1998.
16. Pakistan Council of Research in Water Resources.
17. Omitted vide SRO 226(I)/2010 (F.No.4-4/2007-Min-I), dated 02.04.2010.
18. Council for Works and Housing Research.
- 19-20. Omitted vide SRO 226(I)/2010 (F.No.4-4/2007-Min-I), dated 02.04.2010.
21. Omitted vide SRO 634(1)/2016 (F.No.4-2/2016-Min-I) dated 22.7.2016
22. Pakistan Science Foundation.
23. National Institute of Electronics.
24. Pakistan Council of Science and Technology.
25. National Institute of Oceanography.
- 26-27. Omitted vide SRO 226(I)/2010 (F.No.4-4/2007-Min-I), dated 02.04.2010.
28. STEDEC Technology Commercialization Corporation of Pakistan (Private) Limited.
29. National University of Sciences and Technology.
30. Pakistan Standards and Quality Control Authority (PSQCA).
31. Prescription of standards and measures for quality control of manufactured goods.
32. Establishment of standards of weights and measures.
33. Development, deployment and demonstration of renewable sources of energy.
34. Pakistan National Accreditation Council (PNAC).
35. Pakistan Council of Renewable Energy Technologies (PCRET).
36. COMSATS Institute of Information Technology.

37. Pakistan Engineering Council (PEC).
38-39. Omitted vide SRO1088 (I)/2011, (4-14/2011-Min-I) dated 09.12.2011.
Substituted vide SRO 634(I)/2016 (F. No. 4-2/2016-Min-I), dated 22.7.2016.
Substituted vide SRO 634(I)/2016 (F. No. 4-2/2016-Min-I), dated 22.7.2016.

The Division is headed by a Secretary; its establishment has a strength of 208 personnel as on 01.07.2018. The Day-to-day business assigned to Ministry, as under Schedule-II of the Rules of Business 1973 is undertaken by four technical Wings each headed by BS-20 level officer, while the Administration and Finance & Accounts Wings are being headed respectively by the Joint Secretary (I) and Chief Finance & Accounts Officer (CF&AO). The Planning and Development Cell is also operating in the Ministry with specific objectives and functions.

The operational business of the Ministry is distributed as specified hereunder:-

Additional Secretary

Responsible for monitoring of all wings of Ministry of Science and Technology (MoST) and submission of Policy matters to Secretary, MoST for approval.

While adhering to this distribution of official business, further distribution amongst various Technical, Administration and Finance & Accounts Wings is given hereunder:-

Joint Secretary (I):

All administrative matters of the Ministry.

Deputy Secretary (Admn):

- Administrative and Personal Management.
- HRD, Training issues and cases.
- Maintenance / Security.
- Miscellaneous work.

a. Section Officer (Estt):

- Recruitment, Promotions, Transfer/Postings and Pension cases of officers/officials of the Ministry of Science & Technology.
- Provision of miscellaneous information to President/Prime Minister's Office, National Assembly/Senate Secretariat and Ministries/Divisions about the Ministry of Science and Technology.
- Training of officers/officials of the Ministry inland and overseas.
- Rules of Business, Secretariat Instructions, etc.

b. Section Officer (General):

- Maintenance of office building(s).
- Maintenance of vehicles, office equipment and machinery (including telephones, computers, fax and photocopier machines etc.).
- Purchase of Stationery.
- Security measures.
- Hiring of accommodation for officers/official of the Ministry.
- Record room and connected matters.
- Receipt & Issue (R&I) matters.
- Miscellaneous assignments not assigned elsewhere.
- MoST Library.

c. Section Officer (Council)

- National Assembly and Senate Secretariat Business.
- Miscellaneous matters.

(d) Section Officer (Coord):

- Administrative and personnel matters relating to:
 - Pakistan Halal Authority (PHA).
- Coordination between Ministry and its organizations

Joint Secretary (II):

All administrative matters of the S&T Organizations.

Deputy Secretary (Organizations):

Administrative matters of S&T Organizations.

a. Section Officer (Org-I):

Administrative and personnel matters relating to:-

- Pakistan Engineering Council (PEC).
- Pakistan Council of Scientific & Industrial Research (PCSIR) including National Physical & Standards Laboratory (NPSL).
- Pakistan Council for Science & Technology (PCST) including Pakistan Technology Board (PTB).
- Scientific & Technological Development Corporation (STEDEC).
- Council for works and Housing research (CWHR).
- National University of Technology (NUTECH).

b. Section Officer (Org-II):

Administrative and Personnel matters relating to:

- Pakistan National Accreditation Council (PNAC).
- Pakistan Science Foundation (PSF) including:
 - Pakistan Scientific & Technological Information Centre (PASTIC)
 - Pakistan Museum of Natural History (PMNH)
- National Institute of Electronic (NIE).
- Pakistan Council of Renewable Energy Technologies (PCRET).
- National University of Science and Technology (NUST).

c. Section Officer (Org-III):

Administrative, Financial and Personnel matters relating to:

- Pakistan Council of Research in Water Resources (PCRWR).
- Pakistan Standards & Quality Control Authority (PSQCA).
- National Institute of Oceanography (NIO).
- OIC Standing Committee on Scientific & Technological Cooperation (COMSTECH).
- Commission on Science & Technology for Sustainable Development in the South (COMSATS).
- COMSATS University, Islamabad (CUI).
- Closure of Petroman Institute.
- Specific Projects assigned from time to time.

Chief Finance & Accounts Officer (CF&AO):

- Maintenance and Reconciliation of Accounts.
- Coordination and Scrutiny of Budget: Expenditure and Receipts.
- Consolidation of Public Sector Development Programme (PSDP).

- Advice in Delegated Field.
- Processing of Cases in Non-Delegated Field.
- Public Accounts Committee (PAC) and Department Accounts Committee (DAC).
- Compliance with Rules, Regulations and Orders.
- Internal Control / Internal Audit.

(a) Section Officer (F&A):

- Budget preparation of recurring side and coordination with other Wings, S&TRD organizations and the Finance Division etc.
- Re-conciliation of accounts and expenditure of the Ministry and its S&TRD organizations.
- Liaison with DAC/PAC including appropriation of accounts, and related audit matters of the Ministry & its organizations.

(b) Accounts Officer (Development Budget):

- Preparation of NIS of all development projects.
- Release of funds to all development projects.
- The AGPR matters including timely release of funds.
- Monthly PSDP expenditure statements for FA's organization.
- Maintenance of Assignment Account of different projects.
- External Audit/Public Accounts Committee/Departmental Accounts Committee matters.
- Administrative/financial matters of employees of Project Staff including arrangements for logistic support i.e. Telephone, Stationery and CNG/POL, repair of Government Vehicles of Development Projects etc.

Technical Wings

1. Technology Wing:

- Promotion and development of industrial technology.
- Monitoring and evaluation of research and development works.
- Pakistan Council of Scientific & Industrial Research (PCSIR).
- Pakistan Standards & Quality Control Authority (PSQCA).
- Pakistan National Accreditation Council (PNAC).
- Pakistan Engineering Council (PEC).

Only technical matters relating to these organizations.

2. Policy & Coordination (P&C) Wing:

- Establishment of institutes and laboratories for research and development in the scientific and technological fields.
- Monitoring and evaluation of research and development works.
- Support to NGOs concerned with development of science and technology.
- Pakistan Council of Research in Water Resources (PCRWR).
- National University of Sciences & Technology (NUST).
- Pakistan Science Foundation (PSF).
- Pakistan Council for Science & Technology (PCST)/ National Commission for Science & Technology (NCST).

Only technical matters relating to these organizations.

3. International Liaison (IL) Wing:

- Bilateral Cooperation in S&T through Agreements/MoUs with friendly countries.
- Foreign trainings/conferences/visits etc.
- Liaison with International Organizations
- National Institute of Oceanography (NIO).
- COMSATS University, Islamabad (CUI).
- OIC Standing Committee on Scientific & Technological Cooperation (COMSTECH).
- Commission on Science & Technology for Sustainable Development in the South (COMSATS).
- ECO Science Foundation (ECOSF).

Only technical matters relating to these organizations.

4. Electronics Wing:

- Establishment of Science cities.
- Monitoring and evaluation of research and development works.
- Processing of Draft Bills of MoST Organizations established through Resolutions/Ordinances.
- Processing of the amendment Bills proposed in the existing Acts of MoST Organizations.
- Preparation of Year Book of MoST.
- National Institute of Electronics (NIE).
- Pakistan Council of Renewable Energy Technologies (PCRET).

Only technical matters relating to these organizations.

- Council for Works & Housing Research (CWHR).
- STEDEC Technology Commercialization Corporation (STCC) of Pakistan.

Planning & Development (P&D) Cell

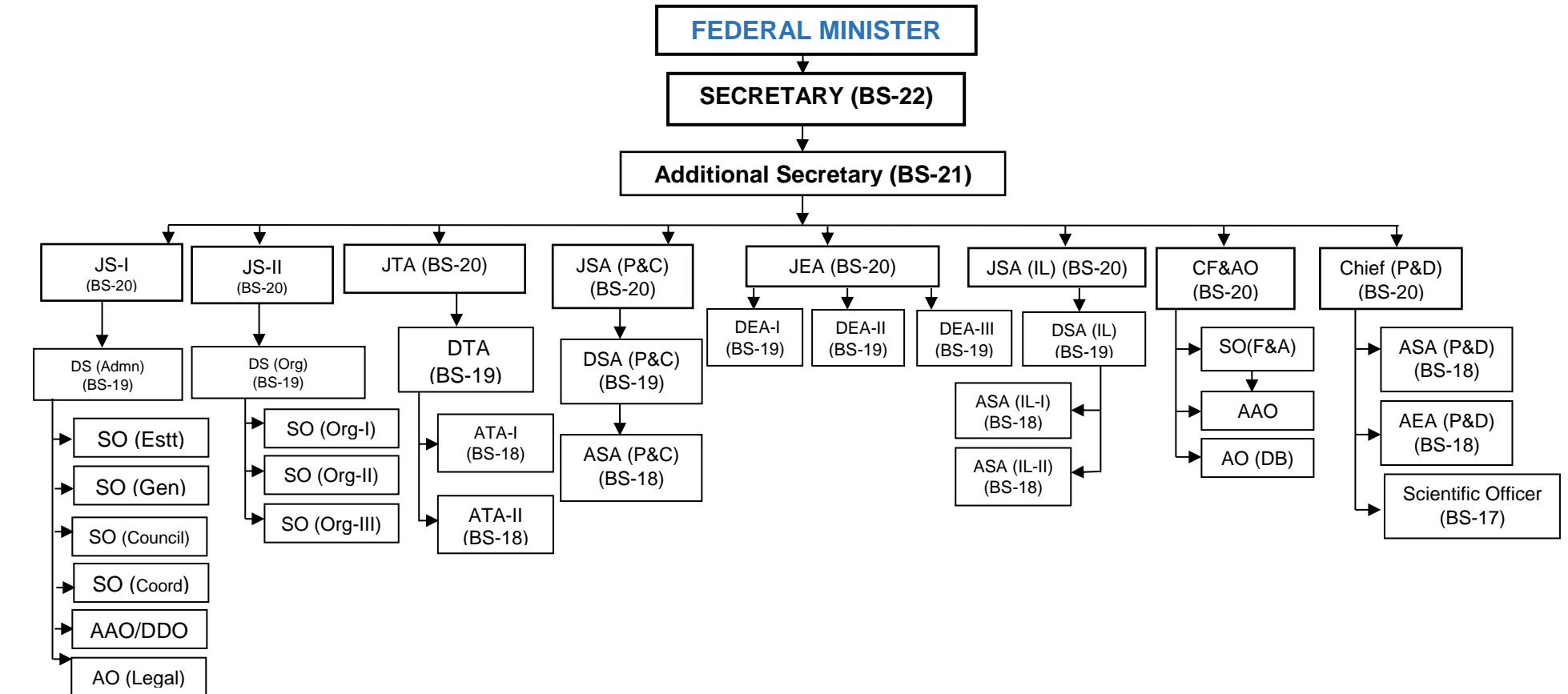
- Projects Appraisal/Projects Review
- Organizing DDWP meetings in MoST and coordination with M/o PD&R for CDWP/ECNEC consideration.
- Processing of PSDP Projects through DDWP/CDWP/ECNEC.
- Preparation of Development Budget.
- Monitoring of Development Projects.
- Provision of material to M/o PD&R on S&T sector for preparation of Annual Plans, Five Year Plan, Vision exercise etc.
- Processing of development fund releases in coordination with the M/o PD&R and Finance.
- Managing of foreign aid for development projects through Economic Affairs Division.
- Preparation of replies to DAC, PAC and Senate/National Assembly regarding questions related to development activities.

Strength of Ministry of Science & Technology
As on 01.07.2018

Nomenclature of the Post	BS	Sanctioned posts
Secretary	22	1
Additional Secretary	21	1
Joint Secretary	20	2
Joint Technological Adviser	20	1
Joint Electronics Adviser	20	1
Joint Scientific Adviser	20	2
Chief Finance & Accounts Officer	20	1
Deputy Technological Adviser	19	1
Deputy Electronics Adviser	19	3
Deputy Scientific Adviser	19	3
Deputy Secretary	19	2
Science Counsellor, Beijing	19	1
Assistant Technological Adviser	18	2
Assistant Scientific Adviser	18	4
Assistant Electronics Adviser	18	3
Accounts Officer	18	1
Section Officer	17/18	8
Private Secretary	17	4
Assistant Accounts Officer	17	2
Scientific Officer	17	1
Admin. Officer (Legal)	16	1
Superintendent	16	2
Assistant Private Secretary	16	25
Total:		72

Assistant	15/16	26
Sub-Librarian	15	1
Stenotypist	14	19
Upper Division Clerk	11	3
Lower Division Clerk	9	9
Technician	6	1
Staff Car Driver	4	13
Dispatch Rider	4	2
Daftary	2	2
Qasid	2	2
Naib Qasid	1	46
Electrician-cum-Plumber	1	1
Chowkidar	1	5
Frash	1	2
Sweeper	1	4
Total:		136
Grand Total:		208

Ministry of Science & Technology



JTA = Joint Technological Adviser
 JSA = Joint Scientific Adviser
 JEA = Joint Electronics Adviser
 JS = Joint Secretary
 CFAO = Chief Finance Accounts Officer
 DS = Deputy Secretary
 DSA = Deputy Scientific Adviser
 DTA = Deputy Technological Adviser
 DEA = Deputy Electronics Adviser

SO = Section Officer
 ASA = Assistant Scientific Adviser
 ATA = Assistant Technological Adviser
 AEA = Assistant Electronics Adviser
 AO = Accounts Officer
 AO (Legal) = Admin Officer (Legal)
 AAO = Assistant Accounts Officer

Admn. = Administration
 Org = Organizations
 Estt. = Establishment
 GA = General Administration
 Coord = Coordination

F&A = Finance and Accounts
 P&C = Planning & Coordination
 P&D = Planning & Development
 DB = Development Budget
 H = Human Resource Development

International Liaison (IL) Wing

Introduction

International Cooperation in Science & Technology constitutes an integral function of the Ministry of Science and Technology under Schedule-II [[Rule 3 (3)]-28 (9)] of Rules of Business-1973. It provides opportunities for Pakistani Scientists and Engineers to interact with their international counterparts to enhance individual as well as institutional capacities on the principles of equality, reciprocity and mutual benefits. The International Liaison Wing, MoST is responsible for enabling S&T organizations in Pakistan to develop linkages and pursue cooperation with friendly countries and relevant international organizations.

The main functions of the International Liaison Wing are:

- To manage matters pertaining to bilateral and multilateral fora cooperation in Scientific & Technological fields under the umbrella of Bilateral Agreements/MRAs/PoCs/MoUs, Joint Economic Commissions, Joint Ministerial Commission and Working Groups on Science & Technology.
- Negotiations and subsequent signing of Bilateral, Multilateral Agreements/MoU, Programs & Protocols on Scientific & Technological Cooperation with friendly countries, regional, international & intergovernmental agencies and bodies.
- Soliciting the approval of the Cabinet/Prime Minister/President (as the case may be) to initiate and sign S&T Cooperation Agreements/MoUs/Programmes of Cooperation (PoC)/Protocols/ Executive Programs.
- Providing briefs /inputs on Science & Technology to Economic Affairs Division, Ministry of Foreign Affairs and other Ministries /Departments.
- Cooperation with the intergovernmental bodies like UN Agencies, Economic Cooperation Organization (ECO), South Asian Association for Regional Cooperation (SAARC), Centre for Science and Technology of the Non-Aligned and other Developing Countries (NAM S&T Centre), United Nations-Asian and Pacific Centre for Transfer of Technology (UN-APCTT), Organization of Islamic Cooperation (OIC), International Center for Theoretical Physics (ICTP) etc. to facilitate participation from Pakistan in their Projects/Programs in the fields of Science & Technology and benefit from their assistance (technical and financial) to meet requirements of the S&T Organizations in their Programs and Projects.
- Preparation Reports/Briefs for high level Pakistan delegations & Missions to facilitate their purposeful participation in International Meetings, Conferences etc. on Scientific & Technological Research matters.
- All Technical/Semi Technical matters/works related to NIO, CUI, COMSTECH, COMSATS and ECO-SF.

During 2017-18, the International Liaison Wing has been undertaking coordination of the following activities within the framework of bilateral cooperation with friendly countries and through framework of multilateral cooperation with Regional and International organizations dealing with Science and Technology:

Bilateral Cooperation:

Algeria: The draft MoU on Cooperation in the field of Standardization and Conformity Assessment between IANOR (Algeria) and PSQCA was initiated by Algerian side. MoST after obtaining the views/comments of PSQCA, initiated the process of Codal formalities i.e. political clearance and legal vetting from MoFA and Ministry of Law & Justice respectively. After obtaining clearance from the stakeholders the draft MoU was shared with Algerian side through MoFA for the initiation of negotiation with Algeria.

China: The Scientific & Technological (S&T) Cooperation between Pakistan and China is being pursued under an agreement, signed in May, 1976, through which mutual benefits have accrued satisfactorily. More than 350 items of cooperation comprising Study Visits, Training Programs and Joint Research Projects were accomplished through Seventeen Protocols.

In pursuance of the 18th Session of the Pakistan-China Joint Committee on Science & Technology held in Islamabad in July, 2017 and fulfilling all Codal formalities, a MoU for funding Joint Research Projects under the Protocol was approved and signed.

- **The Young Scientists Program (TYSP):** MoST has been actively facilitating Pakistani young scientists and researchers for participation in the capacity building programs being offered by the Chinese Government through TYSP at China Science and Technology Exchange Centre (CSTEC). So far 115 scientists have availed this programme.
- **Counsellor Technical Affairs:** Recruitment and posting of Counsellor Technical Affairs at the Pakistan Embassy in Beijing, China was processed by MoST. An orientation/training Programme in Islamabad was conducted by the IL Wing for the incumbent Counsellor TA in Islamabad before joining at Beijing, China.

Japan: Japan remains a key development partner of Pakistan for decades. Both countries have developed close cooperative relations in a wide range of fields including politics, security, economy and education. Japan's cutting-edge technology and quality education is famous world-wide. Therefore, in pursuance of the importance of the formal S&T cooperation, S&T/R&D organizations under MoST were requested to submit priority areas along with proposals of cooperation which enabled IL Wing to prepare a draft MoU on S&T cooperation between the two countries. The draft MoU was shared with Ministry of Foreign Affairs under intimation to Parep Tokyo, response from Japanese side is still awaited.

Kyrgyzstan: The Agreement between the Ministry of Economy of the Kyrgyz Republic and Islamic Republic of Pakistan on Cooperation in the Field of Halal Industry was initiated by Kyrgyz side through MoFA. MoST in consultation with PNAC and PSQCA provided its response to MoFA for onward sharing it with Kyrgyz side, response from counterpart is still awaited.

Romania: MoST has initiated Codal formalities regarding the proposal of MoU between COMSATS University Islamabad (CUI) and University Politehnica of Bucharest, Romania.

Russia: H.E. Mrs. O. Vasilyeva, Minister of Education and Science of the Russian Federation invited H.E. Mr. Rana Tanveer Hussain, Federal Minister for Science and Technology of the Islamic Republic of Pakistan, to participate in 5th anniversary of Moscow International Education Fair (MIEF), which was held in Moscow from 18-21, April, 2018. The Fair was the major event in education in Russia, an open forum and the largest exhibition of new educational technologies, infrastructural and intelligent solution, as well as a platform for dialogue between educational and expert communities, state institutions, and business on the present and future of the educational system. The Ministerial Forum "Sustainable Development Goals 4: the Global Dialogue on the Implementation of ICT in Education" was the key event of the MIEF held on April 18-21, 2018. The Forum was organized by UNESCO Institute for Information Technologies in Education together with the Ministry of Education and Science of the Russian Federation. The Forum served as a unique intellectual platform for the leading experts and top professionals to present the best practices of developing affordable and high-quality education. Mr. Rana Tanveer Hussain, Minister for Science and Technology and Mr. Khizar Saleem Khokhar, DSA (IL-I) attended the International Education Fair.

Saudi Arabia: IL Wing, MoST received draft Technical Cooperation Program between the Saudi Standards, Metrology and Quality Organization (SASO) and Pakistan Standards and Quality Control Authority (PSQCA). The draft was initiated by PSQCA. IL Wing after getting approval from competent authority has initiated the process of completion of Codal formalities regarding this draft technical program, which will be beneficial for both the countries.

Tajikistan: Cooperation in S&T between Pakistan and Tajikistan was reviewed at the 5th session of the Joint Ministerial Commission (JMC) held at Islamabad. Under the provisions of Agreement on S&T Cooperation-1992, the two sides have pursued a programme of Cooperation between Academy of Sciences of Tajikistan and PMNH, by exchange of Researchers. A Proposal of a MoU on Standards between Pakistan Standards for Quality Control Authority (PSQCA) and Agency of Standardization, Metrology, Certification and Trade Inspection, Tajikistan was also pursued. The draft Mutual Recognition Agreement (MRA) initiated by PSQCA was forwarded to Ministry of Commerce in February, 2018 for onwards sharing it with Tajik counterpart.

Cooperation at Multilateral Fora

Ministry of Science and Technology, Government of Pakistan is the Focal Ministry for the following Intergovernmental and Regional organizations and facilitates them in the activities mentioned below:

i. OIC Ministerial Standing Committee on Scientific and Technological Cooperation (COMSTECH)

The COMSTECH General Assembly adopted a Ten Year OIC Action Plan on Science, Technology and Innovation for presenting it to First OIC Summit on Science and Technology was held at Astana, Kazakhstan on 10-11th September, 2017. The Action Plan was subsequently circulated by COMSTECH to member states for providing their comments and views. MoST firmed up its views and comments on the Action Plan in consultation with stakeholders.

ii. Pakistan's annual contributions/payments for the year 2017-18 were processed by the IL Wing in respect of the following Networks and Organizations:-

- i. Inter-Islamic Network on Space Sciences & Technology (ISNET)
- ii. The Centre for Science and Technology of the Non-Aligned and other Developing Countries (NAM S&T Centre)
- iii. UN-Asia Pacific Centre for Technology Transfer (UN-APCTT)
- iv. Abdus Salam International Center for theoretical Physics (AS-ICTP)

iii. United Nations Commission on Science & Technology for Development (CSTD):

CSTD is a subsidiary body of the Economic and Social Council (ECOSOC) based in Geneva, Switzerland. It was established in 1992. The Commission provides the General Assembly and ECOSOC with high-level advice on relevant issues through analysis and appropriate policy recommendations or options in order to enable those organs to guide the future work of the United Nations, develop common policies and agree on appropriate actions. Pakistan being an elected member of the commission for a four year term, now ending in 2018, participates regularly in the annual as well as inter-sessional panels of the CSTD at the policy and expert levels. IL Wing processed the case of the Additional Secretary, MoST to participate in the 21st Annual Session of the United Nations Commission on Science and Technology for Development (CSTD), in Geneva, Switzerland from 14-18, May, 2018.

Participation in Meetings/Training Workshops and Seminars Abroad:

During the FY 2017-18, around 150 Scientists/Engineers and officers from MoST and its S&T organizations proceeded abroad for participation in various scientific activities as a result of interactions at the bilateral and multilateral levels. Approvals of competent authority were processed and summaries were submitted in a number of cases to Prime Minister's Office.

S&T Organizations of MoST

IL Wing, MoST facilitated the following R&D/S&T organizations in their technical, semi-technical and administrative matters during the year 2017-18:

- i. COMSTAS University Islamabad (CUI)
- ii. National Institute of Oceanography (NIO)
- iii. ECO-Science Foundation
- iv. COMSATS Headquarters
- v. COMSTECH Secretariat

Technology Wing

Introduction

Technology Wing has been entrusted to initiate and monitor various programmes for technology development and industrialization in the country. This Wing also acts as liaison between various ministries and national and international bodies for the development of technology based projects. The Wing is headed by a Joint Technological Adviser, assisted by one Deputy Technological Adviser and two Assistant Technological Advisers.

Objectives & Functions

- Promotion and development of industrial technology.
- Promotion of Metrology, Standards, Testing and Quality Assurance System.
- Establishment of accreditation system in the country.
- Focal point for WTO affairs relating to science and technology.
- Establishment of Common Facility Centers to provide SMEs Training, Product Development, Consultancy and Quality Improvement.
- Technical matters of PCSIR, PNAC, PSQA, PEC and PHA.

Following Organizations are working under Technology Wing as per their mandate:

Pakistan Council of Scientific & Industrial Research (PCSIR)

PCSIR was established in 1953 as an autonomous body under the administrative control of this Ministry and mandated to build a strong scientific and technological base for the economic progress of the country.

The mandate of the PCSIR is to undertake, promote and guide scientific and technological research in respect of problems connected with the establishment and development of industries under conditions prevailing in Pakistan, and to encourage the extension of the results of research to various sectors of the economic development of the country in the best possible manner. It started with manpower of about 20 scientists and technicians in borrowed naval barracks in Karachi. By the Grace of Allah, it has established, over the years, a network of four multi-discipline laboratories at Karachi, Quetta, Lahore and Peshawar, four mono-discipline centers like the Fuel Research, Leather Research, both at Karachi, Hyderabad Laboratories and National Physical and Standards Laboratory, Islamabad and 07 technical training centers at Karachi, Quetta, Lahore, Peshawar, Daska and Sakardu.

PCSIR, since its inception, has contributed immensely not only in terms of production activity and technological processes to boost the national industry, but also in term of human resource development to meet the requirements of academic and R&D institutions of the country.

National Physical and Standards Laboratory (NPSL)

NPSL is a unit of PCSIR, working under Ministry of Science & Technology. It is an apex body in the field of metrology and is the sole custodian of National Standards of Measurement in the country.

Objective & Functions

- To establish, maintain and disseminate coherent National Measurement Standards / System of base and derived SI units for Physical and Chemical Metrology in the country;
- To improve and develop measurement techniques in the field of Physical and Chemical Metrology;

- To produce secondary and working standards/equipment for supporting the Scientific and Legal Metrology;
- To acquire/develop SRMs for specific chemical and industrial applications;
- To help establish Lab. Quality Management / Assurance System through consultancy / advisory to R&D organizations, industries & academic institutions and other customers;
- To impart training in the field of metrology and Lab Quality Management System to industry, academic institutions, R&D organization and other stakeholders;
- To maintain linkages for cooperation with regional / international Metrology Bodies like APMP/BIPM, APLAC/ILAC and National Metrology Institutes of other countries.

Pakistan Standards & Quality Control Authority (PSQCA)

Pakistan Standards and Quality Control Authority (PSQCA) established through an Act of Parliament (Act-VI of 1996) is providing one window services for standardization and quality control. This authority works through three integrated components namely: Standards Development Centre (SDC), Quality Control Centre (QCC) and Technical Services Centre (TSC).

Main function of PSQCA

- Development of National Standards;
- Enforcement of marks scheme National Standards under compulsory/voluntary certification marks scheme;
- Research and development work on standardization, Analytical / testing techniques in chemical, metallurgical and other fields;
- setting up, assisting in, establishing and authorizing various inspection and testing centers and agencies at important industrial sites and towns;
- inspection and testing of products and services for their quality specifications and characteristics during use and import and export purposes;
- examination of manufacturing plants for the designated products or processes for approval of marks of the Authority;
- grant, renewal, suspension, cancellation or withdraw of a license or certificate in relation to use of any of the Authority Marks;
- Collection, circulation of statistic and other information relating to standardization, quality control, metrology, applied research etc;
- Testing and inspection of products and services for quality;
- Registration of inspection agencies.

Pakistan National Accreditation Council (PNAC)

Pakistan National Accreditation Council (PNAC) is an apex body working under the administrative control of Ministry of Science & Technology, established on 7th January, 1998 with a mandate to accredit Conformity Assessment Bodies (CABs) including laboratories (testing / calibration / medical), inspection bodies and certification bodies etc. to improve the quality of products and services for enhancement of export. PNAC has established, maintained and implemented quality management system based on ISO/IEC 1701.

Objective & Functions

The main functions of the Council are stated below:

- Functioning of the Council in accordance with ISO/IEC 17011 (General requirements for accreditation bodies accrediting conformity assessment bodies)
- Accreditation of certification bodies in accordance with ISO/IEC 17021.
- Accreditation of testing and calibration laboratories in accordance with ISO/IEC 17025.
- Accreditation of medical laboratories according to ISO 15189.
- Accreditation of inspection agencies in accordance with ISO/IEC 17020.
- Accreditation of Halal certification bodies in accordance with PS 4992.
- Conduct courses/workshops/seminars on conformity assessment standards like ISO/IEC 17021, 17025 and ISO 15189.
- Act as a focal point for coordination with relevant international and national organizations.

Pakistan Engineering Council (PEC)

Pakistan Engineering Council (PEC), a statutory/autonomous body, was constituted through an Act of Parliament in 1976 to regulate the Engineering Profession and engineering education in the country. Presently, PEC maintains its secretariat at Islamabad with branch offices at all the provincial capitals including Gilgit-Baltistan and liaison offices at Sukkur, Multan, Hyderabad and Muzaffarabad.

The Technology Wing deals with the technical matters of PEC such as:

- Formulation of Bye-laws for:
 - Registration of Engineers and Consulting Engineers
 - Conduct and Practice of Consulting Engineers
 - Construction & Operations of Works
 - Continuing Professional Development (CPD)
- Regulations for Engineering Education.
- Manual of Accreditation (Engineers).
- Manual of Accreditation (B-Tech).
- Standard Bidding Documents for Procurement of Engineering Goods, Works & Services.
- Code of Ethics & Conduct for Engineers.

Major Functions / Objectives

- Maintenance of a Register of persons qualified to work as registered engineers, professional engineers, consulting engineers, constructors and operators.
- Accreditation of engineering qualifications for the purpose of registration of registered engineers, professional engineers, consulting engineers.
- Promotion of engineering education and review of study courses in consultation with the Universities.
- Ensuring and managing of continued professional development.
- Establishing standards for engineering contracts, cost and services.

- Assistance to the Federal Government as a Think Tank.
- Providing forum for arbitrations, pertaining to dispute in construction and consultancy contracts.
- Facilitating engineering sector industries.
- To recommend the bills for legislation pertaining to engineering profession, engineering education and engineering works.
- Promotion of engineering profession in totality.

Pakistan Halal Authority (PHA)

Pakistan Halal Authority (PHA) under administrative control Ministry of Science and Technology has been established through an Act of Parliament in March, 2016 to promote imports and exports, trade and commerce with foreign countries and inter-provincial trade and commerce in Halal articles and processes. The powers and functions of PHA are:

- Inspect and test Halal products and processes for their quality, specification and characteristics with relation to the Halal Standards, for purposes of imports and exports, trade and commerce with foreign countries and inter-provincial trade and commerce;
- Prohibit production, storage and sale in the Islamabad Capital Territory of such Halal products that do not conform to the Halal Standards;
- Develop and implement strategies, plans and programmes for promotion of imports and exports, trade and commerce with foreign countries and inter-provincial trade and commerce in Halal articles and processes;
- Recommend the Halal Standards developed for articles and processes, to be notified in the official Gazette by the Federal Government for adoption and notification by the National Standards Body;
- Recommend mechanism for the Accreditation of Halal Certification Bodies and adoption of Halal Certification systems;
- Develop policies, plans and programmes for ensuring compliance of Halal articles and processes with the Halal systems;
- Develop and authorize use of Halal logo for Halal articles and processes;
- May operate as a certification body after obtaining due accreditation from the National Accreditation Body;
- Levy fees for issue or renewal of the Halal certificate and / or authorizing the use of Halal Logo;
- Maintain register of all persons, firms and companies authorized to use the Halal logo;
- Secure international recognition of the Halal logo to build confidence in the Halal Certification system and Pakistani Halal products abroad;
- Coordinate with national and international organizations for strengthening the Halal sector.

The authority is under process of operationalization.

Policy & Coordination (P&C) Wing

Introduction

Policy & Coordination Wing is headed by Joint Scientific Adviser (JSA), assisted by a Assistant Scientific Adviser (ASA) and is responsible for dealing with matters related to National Science, Technology and Innovation Policy initiatives and identifies areas for S&T research to respond in emerging technologies according to the national requirements.

Objectives & Functions

- Establishment of S&T/R&D institutes and laboratories for research and development in the scientific and technological fields.
- Monitoring and evaluation of research and development work.
- Dealing with technical matters of the Pakistan Council of Research in Water Resources (PCRWR), Pakistan Council for Science and Technology (PCST), Pakistan Science Foundation (PSF), Pakistan Museum of Natural History (PMNH), Pakistan Scientific and Technological Information Centre (PASTIC) and National University of Sciences and Technology (NUST).
- Coordination with Federal & Provincial S&T Councils/Departments/Organizations and NGOs dealing with S&T.
- Matters related to National Commission for Science and Technology (NCST) and its Executive Committee (ECNCST).
- Civil Awards for Scientists and Technologists.
- President's Medal for Technology.
- Research Productivity Award (RPA) for scientists.
- Miscellaneous matters.

Regular Activities

Regular activities of P&C Wing include:

- S&T Policy related issues and coordination on technical matters of MoST's Organizations and other Ministries.
- Coordination with Defence R&D organizations.
- Civil Awards for Scientists and Technologists.
- President's Medal for Technology for Scientists/Technologists.
- Technical matters of PCRWR, PCST, PSF, PMNH, PASTIC and NUST.
- Matters relating to Environmental Pollution/Bio-safety and Bio-security in coordination with Ministry of Climate Change.
- Scientific NGOs.

Activities Performed During the Year under Report

• President's Medal for Technology

25 nominations were received from universities and R&D organizations of the country for consideration of the President's Medal for Technology, 2017. All nominations did not meet the criteria for the award of President's Medal for Technology.

- **Civil Awards for Scientists & Technologists**

Nominations for different categories of Civil Awards are processed in the Cabinet Division. Secretary, Ministry of Science and Technology is the chairperson of Awards Sub-Committee on Science, Engineering and Education. R&D organizations and Pakistan Academy of Sciences have forwarded nominations for consideration of Civil Awards – 2018. Policy & Coordination Wing examined credentials of the nominees as per approved Quantified Criteria and recommended 03 nominees for different categories of Civil Awards. Following 02 scientists have been conferred with Civil Awards which were recommended by this Ministry:

i.	Dr. Shahzad Alam, Chairman, Pakistan Council of Scientific & Industrial Research, Islamabad.	Tamgha-i-Imtiaz
ii.	Engr. Dr. Nasir Mahmood Khan Senior Additional Registrar Pakistan Engineering Council (PEC), Islamabad.	President's Award for Pride of Performance

- **National Science, Technology and Innovation Strategy and Action Plan**

Draft National Science, Technology and Innovation Strategy has been revised to make it more focused, determine timelines and clearly delineate the roles and responsibilities of various government entities for development of Science and Technology in the country. Strategy document has been prepared after a number of meetings with clear implementation mechanism like identification of implementation agency, major stakeholder, duration, estimated cost/funding, milestones, deliverables, and key outcomes on prioritized list of science and technology policy actions. The draft National Science, Technology and Innovation Strategy and Action Plan would then be presented as an agenda item for National Commission for Science and Technology (NCST) for approval. Prime Minister of Pakistan is the chairman of National Commission for Science and Technology.

- **Coordination with MoST's organizations**

- Coordination regarding BoGs/BoDs/BoTs of PCRWR, PCST, PSF & NUST on various technical matters.
- Organized meetings at MoST to discuss Draft National Science, Technology and Innovation Strategy.
- Organized meetings on National Research Priority Areas and Research Productivity Award at MoST.
- Coordination with PCRWR for commercialization of its patents/products for the provision of safe drinking water and facilitation for operationalization of National Capacity Building Institute (NCBI) for water quality management.
- Review of Monthly Progress Reports of PCRWR, PCST, PSF, NUST, PASTIC and PMNH and provided technical support for research activities.
- Collaboration with newly established 'National University of Technology' by working on the following lines:
 - Resource sharing i.e. sharing of available facilities, equipment, especially sophisticated equipment with students, teachers and researchers.
 - Sharing of experience of R&D organizations for demand driven research in collaboration with industry for university/firm collaboration and to create R&D liaison with the industry.

- Sharing of expertise of scientists working in R&D organizations of Ministry of Science and Technology to encourage scientific mobility.
- Meetings of the committee to peer review criteria for the research productivity award/productive scientists of Pakistan.
- Prepared a Concept Paper on the need for National Institute of Nanotechnology.
- Advised PCRWR to prepare two reports (one compound and other partial reports) about Arsenic Contamination in Drinking Water on the work done by PCRWR under different projects/surveys on arsenic contamination.
- Collaboration with Ministry of Climate Change for implementation of National Climate Change Policy 2012 and submitted projects of PCRWR and PCRET.
- Coordination with PCST regarding provision of S&T Data of Pakistan to UNESCO Institute of Statistics.
- Meeting on activities and progress of Pakistan Museum of Natural History (PMNH), with Secretary, MoST in chair at PMNH, Islamabad.
- Coordination for Three days workshop on “CPEC – Harnessing the Opportunities and Addressing the Challenges” at NUST.
- Coordination with NUST regarding provision of land for establishment of National University of Sciences and Technology (NUST) Campus at Sambrial, District Sialkot.
- Scrutiny of the documents for appointment of Chairman, Pakistan Science Foundation (PSF) and Chairman, Pakistan Council for Science and Technology (PCST) and Chairman, Pakistan Council of Scientific and Industrial Research (PCSIR).
- **Coordination with other Ministries/Participation of P&C Wing.**
 - Circulation of the King Salman Award for Disability Research amongst the R&D organizations of MoST received from Embassy of Saudi Arabia in Islamabad.
 - Appropriate themes/sub themes relevant to MoST organization’s field of activity for the development/updation of policy was provided, to National School of Public Policy, for development/updation of policies for National Management Course.
 - Summary for the Prime Minister was prepared for establishment of National Science Centre at Islamabad.
 - Recommendations along with inputs to the 2nd committee meeting constituted by Prime Minister to finalize the procedure for implementation of recommendations approved by the Prime Minister on advancement of mathematics and science education in Pakistan held in Ministry of Federal Education and Professional Training.
 - Meetings with South Asian Strategic Stability Institute (SASSI) University, Islamabad on details of future collaborative projects.
 - Coordination between NUST and National Assembly Standing Committee on Establishment of National Science & Technology Park (NSTP) at NUST.
 - Provided input on draft rules for appointment of Executive Director, Global Change Impact Studies Centre (GCISC) under the administrative control of Ministry of Climate Change.
 - Prof. Dr. Muhammad Ashraf, Chairman, Pakistan Science Foundation, Islamabad and Syed Nawazish Ali Shah, Joint Scientific Adviser (P&C) and Dr. S. Zaheer Hussain, Assistant Scientific Adviser (P&C), Ministry of Science and Technology, Islamabad were nominated as members for National Biosafety Committee (NBC), Ministry of Climate Change to represent the Ministry of Science and Technology.

- A meeting was arranged with Nestle Pakistan at MoST on Nestle Pakistan Water Plan Presentation – A Perspective Partnership with PCRWR.
- Coordination with Team of Pakistan Navy Engineering College (PNEC), NUST, Karachi regarding their presentation to Governor Sindh, which highlights the achievements & initiatives of the team of PNEC in the Shell Eco-Marathon: an international event wherein specially built and designed eco/environment friendly vehicles with less-usage of fuel take part and compete.
- **Workshops and Conferences**
 - Participated in the Consultative Workshop on Draft National Food Security Policy organized by Ministry of National Food Security and Research.
 - Attended the meeting on Science City in Punjab organized by Lahore Knowledge Park Company.
 - Attended the National Stakeholders and Donors meeting for the Development of Common Hazardous Waste Treatment, Storage and Disposal Facility for Ship Breaking Industry and Hub Industrial Estate at Hub/Gaddani at Ministry of Climate Change.
 - Attended the meeting of the Committee for Performance Evaluation of officers holding MP Scales in Higher Education Commission.
 - Attended the short listing committee meetings for appointment of Chairman, Pakistan Science Foundation (PSF) and Chairman, Pakistan Council for Science and Technology (PCST).
 - Attended the meeting on Science Popularization through Literature at PSF, Islamabad.
 - Attended the Seminar on Sustainable Development Goals – The Role of Universities at Serena Hotel, Islamabad.
 - Attended the Programme on “Science-A Human Right”, World Science Day for Peace and Development-2018 at PSF, Islamabad.
 - Attended the Inaugural Ceremony of “Project Formulation Workshop” organized for R&D Organizations of MoST at PSF, Islamabad.
 - Attended the meeting on “Join the Discussion on Pakistan as an Emerging Knowledge Economy” organized by Centre for Excellence in Molecular Biology, Lahore.

Finance and Accounts Wing

Introduction

This Wing is headed by Chief Finance & Accounts Officer (CF&AO) assisted by an Accounts Officer (Development Budget), Section Officer (F&A) and Assistant Accounts Officer (F&A). According to System of Financial Control and Budgeting as notified by the Finance Division's O.M. No.F.3 (2) Exp.III/2006 dated 13th September, 2006 in each Ministry/Division, there shall be a Chief Finance and Accounts Officer (CFAO) equivalent to Joint Secretary under the Principal Accounting Officer who shall assist him and report to him as part of his team. The CFAO works directly under the Principal Accounting Officer and assists the Principal Accounting Officer in matters relating to reconciliation of accounts, internal control/audit, monitoring and coordination with DAC, PAC and financial proprieties of expenditure and receipts, risk management, and asset protection. He/she shall coordinate his/her work with the Financial Adviser's Organization.

Duties and Responsibilities:

The duties and responsibilities of the Chief Finance and Accounts Officer are as under:-

(i) Maintenance and Reconciliation of Accounts:

The CFAO shall systematize proper maintenance of accounts and their timely reconciliation with the CGA/AGPR and maintenance of 'Liability Register' in the Ministry/Division, its Attached Departments and Subordinate Offices.

He shall monitor the progress of the expenditure and receipts and furnish, with the approval of the Principal Accounting Officer, a monthly statement of departmental expenditure and receipts to Financial Adviser's Organization and the Finance Division (Budget Wing) by the 10th and the reconciled statement of expenditure and receipts by the 25th of the month following the month to which it relates.

(ii) Coordination and Scrutiny of Budget Expenditure and Receipts:

He shall undertake coordination and internal scrutiny of budget estimates of expenditure as well as receipts of Ministry/Division, its Attached Departments and Subordinate Offices, including Budget Order (BO) and New-Items Statement (NIS) in accordance with the Budget Call Circular issued by the Finance Division and proposals for additional funds to be met out of Supplementary Grant.

(iii) Consolidation of Public Sector Development Programme (PSDP):

He shall be responsible for consolidation of PSDP so that the development schemes of the Ministry are prepared in accordance with the prescribed procedure and instructions under the supervision and with approval of the Principal Accounting Officer.

(iv) Advice in Delegated Field:

He shall tender advice to the Principal Accounting Officer in the delegated field, where called upon, in all matters of payment and matters affecting the accounts or any other matter concerning propriety and regularity of transactions.

(v) Cases in Non-Delegated Field:

He shall process, in accordance with the prescribed rules and procedure, cases relating to the non-delegated field, and matters relating to foreign exchange, and demands for Supplementary Grant, which are required to be referred to the main Finance Division through the Financial Adviser.

(vi) Public Accounts Committee (PAC) and Department Accounts Committee (DAC):

He shall be responsible for the work relating to PAC, DAC and audit observations on Appropriation Accounts and Audit Reports, ensuring compliance with the PAC observations and recommendations. He shall assist the Principal Accounting Officer, prepare necessary Briefs for PAC/DAC and attend the meetings of the PAC and DAC along with the Principal Accounting Officer in the case of PAC and Additional Secretary/equivalent officer in the case of DAC.

(vii) Compliance with Rules, Regulations and Orders:

He shall tender advice to the Principal Accounting Officer for compliance of rules, such as General Financial Rules (GFR), Fundamental Rules (FR), Supplementary Rules (SR), Federal Treasury Rules (FTR) and other regulations, instructions and orders issued by the Finance Division from time to time.

(viii) Internal Control:

He shall be responsible for observance of Internal Control prescribed by the CGA in the Ministry/Division, Attached Departments and Subordinate Offices. He shall assist and advise the Principal Accounting Officer for preventing irregularities, waste and fraud and shall exercise internal checks as provided in Para 13 of GFRs Volume-I, which reads that:

- (a) Rules on handling and custody of cash are properly understood and applied;
- (b) An effective system of internal check exists for securing regularity and propriety in the various transactions including receipt and issue of stores etc., if any, and
- (c) A satisfactory arrangement exists for a systematic and proper maintenance of Account Books and other ancillary records concerned with the Initial Accounts.

(ix) Internal Audit:

He shall conduct the Internal Audit of the Ministry/Division/Attached Departments and Subordinate Offices and incorporate the results of these inspections in the form of an inspection report and furnish the Internal Audit Report to the Principal Accounting Officer. The Principal Accounting Officer shall, after scrutiny of the report, communicate to Audit, copies of the report along with remarks and orders/action(s) taken thereon.

Principal Accounting Officer in the Ministries/Divisions and Departments are delegated powers and may exercise these powers without consulting the Financial Adviser. The Chief Finance and Accounts Officers may, however be consulted. His advice can however, be overruled by the Principal Accounting Officer who may record reasons for overruling the advice.

(x) Reference to Financial Adviser/ Finance Division:

In cases where a reference to the Financial Adviser/Finance Division is necessary, the Chief Finance and Accounts Officer shall ensure that:-

- (a) the case is properly examined in accordance with the relevant rules and orders;
- (b) the facts of the case and the point of reference are clearly stated in a self-contained note or office memorandum which shall be submitted in duplicate; and
- (c) such further data and information is furnished as may be asked for by the Financial Adviser/Deputy Financial Adviser/Finance Division for the proper disposal of the issues referred to him.

The following five Department Accounts Committee meetings were held during financial year 2017-2018:-

DATE	SUBJECT
18-7-2017	DAC meeting was held to discuss the Special Audit and Inspection Report on the accounts of PSDP project “Construction on Office Building for Ministry of Science and Technology (MoST) and its Organizations”.
18-7-2017	DAC meeting was held to discuss the Draft Paras for the financial year 2016-17 on the account of National University of Sciences & Technology (NUST), Islamabad.
19-9-2017	DAC meeting was held to discuss the Audit and Inspection Report on the Account of Pakistan Council of Scientific and Industrial Research (PCSIR), Islamabad for the year 2014-15.
7-11-2017	DAC meeting was held to discuss the Proposed Draft Paras selected from the Audit & Inspection Report on the Accounts of Cast Metals and Foundry Technology Daska, Silakot at project of PCSIR, Islamabad for the year 2015-16.
24-1-2018	DAC meeting was held to discuss the Implementation Status of PAC Directives on Audit Reports for the years 1999-2000, 2000-2001, 2004-2005, 2005-06, 2006-07 and 2008-09 on the account of Ministry of Science & Technology, Islamabad.

Electronic Wing

Introduction

Electronic Wing is providing supervision, guidance and evaluation of research and development works and scrutiny / monitoring of development projects in the fields of Electronics and Renewable Energy Technologies. The wing also coordinates development programs in the fields of electronics and renewable energy. The technical matters / affairs of National Institute of Electronics (NIE), Pakistan Council of Renewable Energy Technologies (PCRET), Council for Works and Housing Research (CWHR) and STEDEC Technology Commercialization Corporation of Pakistan (Private) Limited are dealt by this Wing.

Electronic Wing has been assigned the task for the preparation and processing of the draft Bills, for providing legal cover to the organizations under MoST, which were created through Resolutions / Executive Orders etc. and other legislative matters/issues related to the S&T Sector.

Processing, coordination, implementation and trainings related to the IT and E-Government in the S&T Division.

Electronic Wing also provides necessary technical opinion on standardization of electronic components, devices, processes and attended the meetings, organized by Pakistan Standard and Quality Control Authority (PSQCA), regarding the same.

Activities of Electronic Wing

- * Dealt with the technical affairs of National Institute of Electronics (NIE), Pakistan Council for Renewable Energy Technologies (PCRET), Council for Works and Housing Research (CWHR) and STEDEC Technology Commercialization Corporation of Pakistan (Private) Limited. In particular, provided necessary guidance for the completion of extension plans of NIE, PCRET, CWHR and STEDEC, which have been planned to enhance their technical activities.
- * Drafted and processed Bills for the enactment of organizations under MoST, created through Resolutions / Executive Orders etc.; which have no legal status and other related legislation.
- * Implementation of E-Government initiatives and IT Security instructions in S&T Division, as directed by the Cabinet Division.
- * Pursued the decisions taken in the meetings of the Standing Committees of the National Assembly and Senate on S&T and actions taken for their implementation, related to PCRET, NIE, CWHR and STEDEC.
- * Dealt with the matters of National Electric Power Regulatory Authority (NEPRA) and necessary technical opinions / views were conveyed to NEPRA, for awarding Power Generation Licenses/Licensee Proposed Modifications (LPM) to different organizations/companies.
- * Participated in 02 meetings of the National Computing Education Accreditation Council (NCEAC), Higher Education Commission (HEC) for awarding accreditation certificates to different educational institutes, offering degree courses in Computer Sciences i.e. Software Engineering, Computer Science, Information Technology etc.
- * Participated in the BoG meetings of the Alternative Energy Development Board (AEDB), Bahria University, Air University, COMSATS Internet Services (CIS) and Pakistan Institute of Emerging and Applied Sciences (PIEAS).
- * Cases of National Telecommunication and Information Technology Security Board (NTISB), Cabinet Division regarding security threats were examined and circulated to all organizations of MoST for awareness, necessary measures and strict compliance.
- * Committee was constituted for Identification of Research Products of R&D organization of MoST for commercialization by STEDEC. First meeting of the Committee was held on 23rd September, 2017 at STEDEC, Lahore. Second meeting of the Committee was held on 19th January, 2018 at MoST, Islamabad.
- * Data for Finance Minister's Budget Speech was collected from wings of MoST and forwarded to Finance Division after approval of the Competent Authority.

- * Data regarding preparation of Year Book of MoST 2016-17 was collected from organizations/wings of MoST, examined/vetted and forwarded to PASTIC for final printing and its distribution to the quarters concerned.
- * Processing the case about demonstration of indoor Solar Cookers for President's Secretariat by PCRET.
- * Provided the data of MoST to Pakistan Institute of Legislative Development And Transparency (PILDAT) for printing of annual report.

Details of the Activities

A. Evaluation and Monitoring of NIE, PCRET, CWHR and STEDEC:

Monthly performance/progress reports of National Institute of Electronics (NIE), Pakistan Council of Renewable Energy Technologies (PCRET), Council for Works and Housing Research (CWHR) and STEDEC Technology Commercialization Corporation of Pakistan (Private) Limited were expedited, evaluated and necessary guidance provided to the above said organizations.

The bottlenecks pointed out by NIE, PCRET, CWHR and STEDEC regarding implementation of their projects and administrative matters were taken up with the concerned Ministries / departments for consultancy.

B. Legislation:

In pursuance to the instructions of the Establishment Division, the draft Bills of the organizations under MoST have been processed. Details of the organizations are as under:-

Draft Bills of the Organizations under process at MoST:-

- **National University of Technology (NUTECH) Act, 2018**
NUTECH Act has been Gazette notified on 26-02-2018, as NUTECH Act No. VI of 2018.
- **COMSATS University, Islamabad Act, 2018 (Upgradation of CIIT to CUI)**
CUI Act has been Gazette notified on 28-04-2018, as COMSATS University, Islamabad Act, 2018.
- **Pakistan Council of Renewable Energy Technologies (PCRET) Bill**
Pakistan Council of Renewable Energy Technologies (PCRET) Bill was introduced in the National Assembly on 10.08.2016 and was referred to the National Assembly Standing Committee on S&T for their report.
- **National Metrology Institute of Pakistan Bill, presently working as National Physical and Standards Laboratory (NPSL)**
After accorded approval in principle by the Cabinet, National Metrology Institute of Pakistan (NMIP) Bill, presently working as NPSL was forwarded to the Law, Justice and Human Rights Division for vetting. As per the advice of the Law, Justice and Human Rights Division the same was forwarded to the Council of Common Interest (CCI) for their consideration/approval. CCI approved the same and later on it was again vetted by Law Division for its further processing till 30.06.2018.

C. Meetings on Standardization

Meetings on standardization of electronic components and devices / processes were attended and technical opinions were provided for the finalization of standards.

E-Government

Electronic Filing system has been launched in the Ministry of Science and Technology (MoST) in coordination with Ministry of Information Technology and Telecommunication (MoIT&T) to establish paperless environment in the Ministry. It not only improved the archaic system of filing, but also speeded up the disposal of official business.

E-Office is a software application developed to automate functions common to all the Federal Ministries/Divisions, in order to enhance efficiency and delivery of the Government services in a transparent and efficient manner. E-office application consists of the following six modules which include:

- i) Internal Communications and Movement of Files;
- ii) Project Management;
- iii) Human resource Management;
- iv) Inventory and Procurement Management;
- v) Budget and Accounts Management; and
- vi) Dynamic Portal.

MoST has procured computers, printers, scanners and installed network infrastructure and Optical Fiber Connectivity as per organizational structure and reporting hierarchy, for e-filing system. Computers and allied equipment have been installed in all offices of MoST.

Training on e-Office system has been provided to all officers/officials of Ministry of Science and Technology at National Information Technology Board (NITB), Ministry of Information Technology and Telecommunication (MoIT&T). E-Office application has been implemented in 25 sections of MoST and almost all files have been moved through e-Office application by 86 users.

National Computing Education Accreditation Council (NCEAC)

Ministry of Science and Technology participated in the BoG meeting of National Computing Education Accreditation Council (NCEAC), Higher Education Commission (HEC) for awarding accreditation certificates to different educational institutes, offering degree courses in Computer Sciences.

Alternative Energy Development Board (AEDB)

Ministry of Science and Technology participated in the BoG meetings of the Alternative Energy Development Board (AEDB), an autonomous body, established under Act No. XIV of 2010, for the purpose of implementing various policies, programmes, and projects in the field of alternative/renewable energy technologies.

Pakistan Madrasah Education Board (PMEB)

Joint Electronics Adviser, Ministry of Science and Technology participated in the meetings of the Pakistan Madrasah Education Board (PMEB), Ministry of Religious Affairs and Interfaith Harmony (MoRA&IH).

Pakistan Institute of Engineering and Applied Sciences (PIEAS)

Ministry of Science and Technology participated in the 21st BoG meeting of the Pakistan Institute of Engineering and Applied Sciences (PIEAS).

Parliamentary Business

Forwarded replies for the National Assembly and Senate questions related to National Institute of Electronics (NIE), Pakistan Council of Renewable Energy Technologies (PCRET), Council for Works and Housing Research (CWHR) and STEDEC Technology Commercialization Corporation of Pakistan (Private) Limited. This wing is also pursuing aggressively, for the implementation of the decisions made by the Standing Committees related to NIE, PCRET, CWHR and STEDEC.

Public Sector Development Programme 2017-18

Introduction

The Ministry of Science and Technology (MoST) is the national focal point and enabling arm of Government of Pakistan for planning, coordinating and directing efforts to initiate and launch scientific and technological programs and projects as per national needs necessary for rapid socio-economic development of the country.

Achievements in 2017-18

Following are some of the key highlights of the progress made on the development side by MoST during 2017-18:

- MoST is guiding and supporting Small & Medium Enterprises (SMEs) for exploring and adopting new trends and requirements of intentional competitiveness, improved industrial productivity and quality according to the requirements of internationally recognized standards and guidelines. A total of 259 applications received and considered from various SMEs across country for the award of Incentive Grant against various Certification schemes during 2017-18 so far. 75 applicant firms were approved by the Incentive Award Committee (IAC) for award of the Incentive Grants till December, 2018. 5th Incentive Award Committee (IAC) meeting is to be held shortly.

For the capacity building of SMEs personnel, Training Programmes were designed in consultation with the Chambers of Commerce & Industries, sector specific Trade Associations, SMEs and other stakeholders. The Training Programme element of the project has been outsourced to M/s Bureau Veritas Pakistan (Pvt.) Ltd. through open bidding. Under the contract, M/s Bureau Veritas Pakistan (Pvt.) Ltd. will conduct / deliver/ run 2-Day (non-examination based) training courses against 19 certification standards and 5-Day (examination based) lead auditor courses against 08 certifications / accreditation standards. This training programme will be completed within 06 months period and will train 2000 personnel of SMEs.

- For Capacity Building and HRD in S&T Sector, Science Talent Farming Scheme (STFS) is being implemented under the Vision 2025 to groom the selected youth and support them all the way to highest degree by progressively exposing them to advanced topics in science with application of inquiry based approach to learning.

A group of 25 students visited scientific organizations and universities of London and participated in London International Youth Science Forum from 28th July to 10th August 2017. Summer Camp was organized in 1st week of July 2017. Visits to S&T organization including PINSTECH, NARC, NCP, NINVAST, NUST, PMNH, PASTIC, PSF and PAS were conducted. Inquiry Based learning sessions and motivational lectures were arranged. 550 students participated in the activities. Under the scheme, Pakistan Science Foundation has paid monetary benefits to 600 students.

- Upgradation of Overall R&D infrastructure of the Labs and Facilities of MoST Organizations was continued to enhance the internal research capability of these organizations.

The Capacity Building Institute (NCBI) for Water Quality Management at PCRWR is set for completion by June 2018. The institute will train the qualified manpower in water sector and train in-service water supply professionals (managers, engineers, scientists, field staff in Water Quality Management) and fresh students to develop skills in planning and optimum utilization of available water supply infrastructure.

Activities to establish Gems & Mineral Cutting and Polishing Centre at PCSIR Skardu, Gilgit Baltistan initiated for facilitation of gemstone miners to curb the precious and semi-precious stones wastage at mining level. Up-gradation of Fruit Processing, Analytical Laboratory and up-gradation of existing fruit processing/preservation centre for value addition & minimization of post-harvest losses of fruits and vegetables of Gilgit-Baltistan also initiated during the year under review.

- Industry Focused R&D is the prime impetus at Pakistan Council of Scientific and Industrial Research (PCSIR). Presently, PCSIR is promoting lab scale development to Pilot scale level in areas of Pharmaceutical and Chemicals, Food, Herbal, Minerals and Cosmetics etc. PCSIR has developed processes and leased out to different industries, patents registered and provided consultancy services to various industry clients.
- Trade Related Interventions by MoST are being undertaken through Pakistan Standards and Quality Control Authority (PSQCA), Pakistan National Accreditation Council (PNAC) and National Physical and Standards Laboratory (NPSL). These organizations are actively involved in export enhancement, trade increasing and improving health and safety of consumers through mandatory and voluntary standards. PSQCA formulates and promulgates standards. PNAC assists in expansion of trade through accreditation of laboratories and certification bodies, whereas NPSL is responsible for traceability of metrology standards.
- In Health Sector, MoST is undertaking the project “Establishment of Medical Devices Development Center (MDDC) at NUST, Islamabad”, wherein full-fledged stent manufacturing system would be developed.

Budgetary Overview of Development Activities

During the fiscal year 2017-18, an amount of Rs. 2538.727 Million was allocated against 33 development projects. Out of this, Rs. 843.118 Million released and utilized, whereas Eight (08) projects completed during the year under concern.

Monitoring of Development Projects

Monitoring and Evaluation of PSDP projects were carried out during the period under report. The overall progress/ assessment regarding monitored projects remained satisfactory. The system of internal monitoring and audit within executing agencies was also kept active to overcome all retardants affecting progress and implementation of development projects. This is in line with the endeavor of MoST for effective and efficient utilization of development funds.

Pakistan Council of Research in Water Resources (PCRWR)

Introduction

Pakistan Council of Research in Water Resources (PCRWR), a corporate body of Ministry of Science & Technology, Government of Pakistan, conducts, organizes, coordinates and promotes research in various aspects of water resources. The organization has a wider mandate to manage water resources by putting efforts to save water and maintain its quality as per required standards. Therefore, the organization promotes partnerships with national and international research organizations to deal with the emerging issues and future challenges in water sector especially under climate change scenario. PCRWR carries out R&D activities in various disciplines, specifically irrigation, drainage, surface & groundwater management, groundwater recharge, watershed management, rainwater harvesting, desertification control and water quality.

Major Activities

- Conducting research on all aspects of water resources and designing/ implementation of R&D projects in water sector.
- Monitoring water quality in urban and rural areas of Pakistan, to develop technologies for providing safe drinking water to public.
- Keeping liaison with national and international research and development organizations, and non-government organizations working in water sector.
- Dissemination of research outcomes to farmer's community and Government departments/agencies by holding seminars, symposiums and training programs.
- Providing services to public on drinking as well as irrigation and groundwater investigation.
- Publication of research reports, to disseminate the research findings.

Achievements/Outcomes

- Motivated farmers to adopt cultivation of crops and fruit plants on beds/ridges. Resultantly, 53 farmers in Punjab province cropped wheat on beds/ridges, 120 farmers cropped rice in Punjab and 31 farmers planted banana in Sindh province on beds/ridges. Moreover, 3 demonstration sites of low head drip irrigation system for high value orchards in Quetta were established.
- Constructed and commissioned a state of the art building to house National Capacity Building Institute (NCBI). The Institute was furnished with requisite equipment received as grant in-aid for water quality laboratory. In addition, seminars and trainings for the professionals have been started on regular basis to impart knowledge and develop capacity for addressing the pressing water issues.
- Introduced solar powered drip and sprinkler irrigation system in Mianwali, Bhakkar and Khushab for cultivation of high value fruit plants such as olive, fig, grapes etc. and staple crops.
- Installed 42 multilevel observational wells in Hyderabad, Jamshoro, Tando Muhammad Khan and Badin for monthly monitoring and analysis of variations in groundwater quality to study seawater intrusion.
- Conducted a comprehensive study on (WATA) Water Governance Program comprising water quality monitoring, water quality standards for drinking, irrigation and livestock and water balance including soil hydraulic properties.
- Introduced low cost innovative recharge techniques i.e. leaky dams (1), check structures (3), inverted wells (1) in Pishin and Quetta districts of Balochistan which are economical and

efficient to recharge groundwater as compared to delay action dams. The interventions resulted in water table rise and rejuvenation of adjacent karezes and wells.

- Carried out a study on “Rehabilitation and Sustainable Management of Karezes in Balochistan”.
- Regularly provided weekly irrigation advisory services to 20,000 farmers of 41 districts through text messaging and recorded feedbacks from farmers about the effectiveness of the services towards water saving and improvement in agriculture production.
- Monitored targeted compounds of Persistent Organic Pollutants (POPs) (Organo-Chlorine Pesticide (OCPs), Polychlorinated Biphenyl’s (PCBs), Polybrominated Diphenyl Ethers (PBDEs) and Per Fluorinated Compounds (PFCs)) of Surface Water Bodies of Pakistan by analyzing 48 samples of surface water, 28 groundwater, 51 sediments and 9 of fish.
- Monitored bottled water of different brands on quarterly basis and shared the results with the stakeholders and general public for awareness and regulatory measures.
- Monitored water quality of 12 major cities, six reservoirs (Khanpur, Simly, Mangla, Tarbela, Warsak and Hub), 14 rivers and four lakes (Keenjar, Manchar, Attabad and Satpara).
- Manufactured/sold 8,450 microbiological testing kits and 305 mehfooz pani tablets.
- Developed liaison with national and international organizations (ABAD, PARC, ICIMOD, IWMI, ACIAR, UNESCO, WHO, ICARDA etc.) to conduct and disseminate research on emerging water-related issues.
- Published 05 technical report, 01 manual, Annual Report and 04 quarterly Newsletters.
- Generated revenue amounting to Rs. 82.471 million having an increase by 320% as compared to previous year.

Progress of On-going Projects/Studies

- **Demarcation of Groundwater Quality Zones in the Indus Plain and Marginal Areas for Sustainable Development and Management of Groundwater (Lower Indus Plain):** Groundwater resources are depleting rapidly due to indiscriminate pumping to meet ever increasing water demands. After investigating and mapping the groundwater of Upper Indus Plain, PCRWR is investigating Lower Indus Plain using geophysical methods such as resistivity survey, well drilling, isotopes hydrology, water quality evaluation and computer modeling. During the year, conducted electrical resistivity survey at 31 sites, drilled 160 bore holes (100 m), 35 bore holes (150 m) and 10 bore holes (300 m) for mapping groundwater zones in lower Indus Plain. Also generated 118 ER Models at district D.I. Khan, Ghotki, Hyderabad, Jamshoro, Kashmore, Larkana, N. Feroze, Rajanpur, Shahdad Kot, S.B. Abad and Shikarpur.
- **Establishment of National Capacity Building Institute for Water Quality Management:** It is of significant importance to provide safe drinking water to the community. In this connection, it is necessary to impart regular training and capacity building of the professionals working on quality drinking water supplies. Taking initiative, PCRWR with the financial assistance of Korea International Cooperation Agency (KOICA) has established a permanent national level setup and constructed a state of the art building to house National Capacity Building Institute (NCBI). During the year, the Institute was commissioned with requisite equipment provided by KOICA for water quality laboratory, furniture, computers and audio-video systems for imparting quality trainings. In addition, seminars and trainings for the professionals were conducted on regular basis to impart knowledge and capacity building for meeting the challenges of water quality, quantity and climate change implications.
- **Integrated Water Resources Management in the Highly Depleted Pishin-Lora Basin of Balochistan:** Pishin-Lora basin is one of the highly depleted groundwater areas of Balochistan. This project would provide over all groundwater status of the Basin to develop

management and mitigation practices introducing efficient artificial groundwater techniques. During the year, constructed one leaky dam at Zhara Nallah, UC-Bagh, District Pishin, three check structures, one inverted well for groundwater recharge of depleted aquifer. In addition, six piezometers were also installed to monitor the impact of the interventions on ground water level in the project area.

- **Exploration of Groundwater Potential and Promotion of Interventions for Rainwater Harvesting and Biosaline Agriculture in Thar:** Water scarcity is the fundamental problem in the Thar Desert as the groundwater is mostly saline. Recurrent droughts over the past decades have led to the realization that this is a regular phenomenon. Exploration of fresh groundwater zones and introduction of saline agriculture in saline zones may help to improve agricultural activities by growing salt tolerant crops/fruits. During the year, completed 90 electrical resistivity survey up to 100-meter, constructed rainwater harvesting ponds at village Malook Bajir, District Mithi and village Kharrio Buhh, District Umar Kot and prepared 12 hectares land for rangeland management.
- **Improved Land and Water Conservation Practices to Enhance Waste Land Productivity in Thal Desert:** The Thal desert covers mostly undulating lands having 200-500 mm erratic rainfall. However, it has huge ground resources for irrigating around 2 million acres for agriculture production. This project would introduce sustainable water management technologies to utilize this precious water, through participatory pilot sites in Thal desert. During the year, field reconnaissance surveys were conducted in Mianwali, Bhakkar and Khushab on the basis of which three farmers were identified in each district for installation of solar powered drip and sprinkler irrigation systems. Subsequently three systems were installed at Piplan, District Mianwali, Dullewala, District Bhakkar and Noorpur Thal, District Khushab.
- **Integrated Approach for Control of Water-logging and Salinity in Low Lying Areas of Sindh:** Agriculture sector in Sindh is performing 31% of its potential, mainly due to water logging and salinity. The situation is even worse at the agricultural lands due to the same. This project would demonstrate an integrated drainage and water management concept among land owners to control water table and reclaim saline lands. During the year soil investigations and topographic survey of Bugti farm, Sanghar and Qadir fruit farm, Shahdadpur were carried out on the basis of which design of surface and sub surface drainage system of the above farms along with Farid fruit farm was finalized.
- **Trans-boundary Effects on Ground and Surface Waters along the Eastern Border of Pakistan:** Indian states adjacent to Pakistan not only over pump the ground water but they also dispose of wastewater directly into drains and river bodies without any treatment, deteriorating the surface and groundwater quality. The Indus Water Treaty does not clearly articulate such environmental concerns. This project would give insight into the groundwater flow patterns and characteristics along Pakistan-India border and spatial-temporal effects of Hundiara drain on surface water, groundwater, human health and the environment in Pakistan's territory at critical locations. During the year, completed electrical resistivity survey at 197 locations, compiled data for groundwater mapping of the year and collected as well as analyzed 130 wastewater and 233 groundwater samples. Two observation wells were also installed in the project area.
- **Study on Diffusion and Adoption through Partnerships and Action of the Best Watershed Rehabilitation and Irrigation Practices and Technologies to Help Rural Farmers:** The purpose of this project is to demonstrate best water management practices to the farmers and professionals. Banana, rice and wheat were planted on beds/ridges in Sindh, KPK and Punjab provinces. Through dissemination of knowledge, this technique of water management was adopted by farmers and as a result 53 farmers in Punjab province cropped wheat on beds/ridges. Similarly, 120 farmers cropped rice in Punjab and 31 farmers planted banana in Sindh province on beds/ridges. Moreover, 3 demonstration sites of low head drip irrigation system for high value orchards in Quetta were established. Design of low head drip system for 38 sites was also finalized. In addition, 10 days field work for farmers was also organized for dissemination of knowledge.

- **Study on Evaluation of Crop Water Requirement of the Hybrid Maize:** The planting of hybrid maize is increasing in Pakistan. However, due to lack of information regarding its water requirements, farmers continue practice of lavish irrigation of maize crop resulting into depletion of groundwater resources particularly in Sahiwal and Okara districts. The results of this lysimetric study (18 lysimeters up to first three trials) revealed that 32% less water was required for maize crop as compared to farmers' practices.
- **Study on Prospects of Growing Fruit Trees in Desert Environment:** In dry lands including deserts in Pakistan, 40% of total cultivable (30 Mha) area, livelihood entirely depends on rainwater. The Cholistan desert can be made more productive by introducing drought tolerant plants, crops and grasses as many countries in the world have converted their desert lands into productive areas. These provide livelihood to the local community besides controlling desertification. Therefore, over 1200 olive, fig, grape, zyziphus jujube (desi & grafted beri), conocarpus, desi kikar (*Acacia nilotica*) and cactus plants were grown under drip irrigation system coupled with solar pumping from the collected rainwater. During the year, necessary practices such as irrigation, application of insecticide and pesticide, bowl management etc. were carried out.
- **Study on Desertification Control and Livelihood Improvement through Rainwater Harvesting, Planting of Low Delta Crops and Rangeland Management in Thar Desert:** This study was started in Thar Desert using site specific technologies like rainwater harvesting, saline agriculture and rangeland management. The aims of the study are to upscale the interventions and disseminate to the local communities for adoption on large scale. During the year, trials on wheat and barley crops (first year) with saline ground water (EC 9.15 dS m⁻¹), mixed fresh and saline water, and fresh water (EC 0.7 dS m⁻¹) were completed while study on pearl millet & sesame crops and wheat & barley crops (2nd year) are in progress.
- **Study on Rehabilitation and Sustainable Management of Karez System in Balochistan:** Karez system in Balochistan province has been facing a number of challenges for the last few decades. The rehabilitation of the system is quite difficult task as continuous land use changes, urbanization and associated infrastructure developments have taken place. However, conservation of the karez is of importance for which there is a need to set a model by undertaking rehabilitation activities for sustainability and wide scale dissemination. For this purpose, completed inventory survey of 208 karez in Kila Saifullah, Pishin and Mastung districts of Balochistan and installed one inverted well near the day light point. In addition, completed 150-meter concrete lining of existing unlined open channel of Aghbarg karez and 90 meter of Rana karez along with cleaning and capping of five access wells.
- **Study on Strategic Strengthening of Flood Warning and Management Capacity of Pakistan:** Pakistan Meteorological Department and UNESCO are developing a flood forecasting model to be used in Pakistan. PCRWR is major partner of the umbrella project. Soil physical and hydraulic properties are an important input for the proposed model. In the present study, focus is on determining soil's physical and hydraulic characteristics in Doabs and active flood plains of eastern tributaries of the Indus River, seepage within the river tributaries and their morphological characteristics, and the measurement of the river flow regimes for meeting input data requirements of Integrated Flood Analysis System (IFAS) model. PCRWR conducted field survey of 50 river sections for flow regimes, seepage rates and morphological characteristics of the rivers Chenab, Jhelum, Ravi and Sutlej. Also determined soil's physical, chemical and hydraulic characteristics such as soil texture, organic matter, soil chemical parameters, soil moisture retention characteristics and infiltration rates profiles at various depths at both the banks of the fifty river sections. Therefore, completed the analysis of data of soil's hydraulic and physical characteristics of 100 pits (300 samples) of the active flood plains. Also completed and analyzed data of flow regimes and morphological features of fifty river sections.
- **Study on Agricultural Water, Energy, and Hazard Management in the Upper Indus Basin for Improved Livelihood and Building Resilience, Gilgit-Baltistan (Phase-II):** In the Upper Indus Basin (UIB), communities have been experiencing water shortages for agricultural uses since generations. However, the problem has been accentuated due to lowering of glacier mouths due to which a number of irrigation channels have been disconnected. Some communities have abandoned their agricultural land due to irrigation water scarcity. The project has been designed to improve livelihood of UIB communities through enhancing local capacity

in understanding, managing and demonstrating state of the art climate smart water, energy and hazard management technological options at the pilot sites. During the year, installed hydra ram pump for pumping water from river to the site. Prepared land for cultivation, established tunnels with drip irrigation lines and integrated drip installed for alley cropping on 1-hectare apple orchard at Khyber village. Established 4-kilometer pipeline to fill water tanks for irrigating vegetable tunnels for the community at Borit Lake site. The vegetable tunnels were re-established with integrated drip and vegetable seedlings were planted. Constructed a 0.3 square meter water delivery to route glacier water to the plantation site. Water delivery structure was then connected to pipes conveying irrigation water. A 16 mm water line was established to irrigate the plantation at Sea buckthorn site, Passu. Operationalized a tunnel with 09 integrated Drip lines to grow vegetable nursery at Khyber site.

- **Study on Improving Groundwater Management to Enhance Agriculture and Farming Livelihood in Pakistan:** This study was initiated with the objective to develop and articulate a shared understanding of sustainable groundwater use for agriculture and the need for improved management in Balochistan, Punjab and Sindh provinces through a participatory and integrated systems approach. During the year, collected GIS data, Hydro-geological data (aquifer properties), meteorological data, soil data properties, groundwater pumping data and surface water data (rivers/canal discharges) for groundwater modeling pertaining to Punjab, Sindh and Balochistan provinces. Installed data loggers in project area of Okara and Sahiwal districts for daily groundwater monitoring pertaining to depth of water table, electrical conductivity and temperature. Conducted Participatory Rural Appraisal (PRA) activity in six villages of Lower Bari Doab Canal Command in Okara district, eight villages in Naushero feroz and Benazirabad districts and five villages in Pishin and Quetta districts.
- **Study on Developing Approaches to Enhance Farmer Water Management Skills in Balochistan, Punjab and Sindh in Pakistan:** The study has been started with the objectives to determine the successful elements of existing on-farm irrigation water management initiatives and farmer training models in Pakistan; develop and test farmer tools for on-farm soil water, nutrient-monitoring and supply chains. Installed 21 chameleon moisture sensors at 3 pilot sites in Bhawalpur district and on all project sites 27 in Sargodha, Punjab, 21 in Tandojam, Sindh and 03 in Quetta, Balochistan. Installed 14 tensiometers manufactured by PCRWR at 3 pilot sites in Bahawalpur district to determine the adaptability of simple and complex technologies. In this regard, various field days were conducted to educate the farmers about the technologies in collaboration with the project partners.



Artificial groundwater recharge system at Water Quality Laboratory, Mianwali



Installed Solar panels at a Pond in Passu, Gilgit Baltistan



Installed Hydra Ram Pump at Khyber village, Gilgit Baltistan



Local vegetables being grown using drip irrigation system installed at Bhakkar



Peanut crop grown using installed sprinkler irrigation system in Mianwali

National Institute of Electronics (NIE)

Introduction

National Institute of Electronics (NIE) is an autonomous R&D organization under the Ministry of Science & Technology, Government of Pakistan. It was established through Presidential Ordinance No. III of 1979. The aim of the Institute is to undertake design & development work in emerging areas of electronics and to acquire advanced level know-how in major disciplines of electronics.

The general administration of the affairs of the Institute and the formulation of its policies vests in the Governing Body which is headed by Director General of the Institute. Whereas, the Executive Committee is responsible for the day to day functioning of the Institute.

Functions

- To carry out design and development work in vital areas of electronics.
- To develop know-how in advanced electronic techniques and exchange of knowledge/impart advanced training in electronics.
- To establish close liaison with other organizations engaged in R&D academic and production activities.
- Undertake design and development projects on contract with user organizations
- To establish Small scale production line of specialized electronic equipment.
- To arrange seminars & conferences.

Key Expertise

- Design Research & Development
- Small Scale Production
- Consultancy/Services
- Human Resource Development

Research & Development Labs

- The Institute has well-equipped labs/facilities in the following disciplines:
- Communication Engineering
- Automation & Control Engineering
- Integrated Circuits (IC) Design
- Centre for Software Development & Training in Advance Database
- Power Electronics
- Product Testing & Certification
- Printed Circuit Boards (PCB)
- Surface Mounted Technology Production Line (Automatic)
- General Purpose/Consumer Electronics
- Automotive Electronics

Details of Activities, Achievement & Progress for FY 2017-18

Activities (R&D Projects)

i) Verification of Chip Design through Circuits Development Kit

Semiconductor chip design is a growing and advanced field of electronics. The functional verification of various chip design can be performed by using circuit development hardware kits. Circuit development kits will be used for initial research, development and for design verification.

ii) Auto Gas Switch

Auto Gas switch is a valuable shield of protection against accidents occurs due to gas leakage and gas load shedding. This switch will act as an intelligent device to shut off the gas supply in case of gas load shedding, while in case of gas leakage the device will alarm to intimate user for the leakage. Another additional feature of the device will be a pressure monitoring sensor which will be helpful in industrial point of view where gas appliances such as furnaces turbines efficiency is dependent on the gas pressure.

iii) Power Factor Improving Device

In Pakistan, most of the machinery/appliances at domestic and industrial level are not manufactured as per international standards. Materials and components used to manufacture such machinery are not of a good grade. Power factor improving device will integrate with heavy loads used at industrial and domestic level and improve energy consumption rate.

iv) Mechanical Frame Kit for CNC Machine

It will provide technical support to local industry to promote the CNC based Industrial solutions for woodwork, metal work, marbles and plastic industry.

v) Test Bed Development for Establishment of Wireless Sensor Network Laboratory

Sensors are becoming active part of our life. Wireless Sensor Network, keeps the capability of sensing remote location data and transmitting it wirelessly to remote control station. Its applications are in health care, commercial sector, defense and in underwater monitoring.

vi) Battery Regeneration System (BRS)

This project will help in reviving the old batteries. A battery regeneration system consists of battery tester, battery charger and battery de-salvation unit.

vii) Remote Terminal Unit (RTU)

RTU is an embedded control device, which could collect the data of field parameters i.e. Temperature, Voltage, Current, Power etc. and can also control devices installed in the field/industry like motors, lamps, heaters etc.

viii) Development of Fleet Management System

Fleet management system for automobiles is a function, which allows companies who really on transportation in business to remove or minimize the risk associated with vehicle investment, improving efficiency, productivity and reducing their overall transportation and staff cost. Fleet management system provides business/organizations or individuals to manage fleets with real-time visibility of vehicle location, status, vehicle health monitoring and provide emergency assistance in case of emergency. On-demand (passive) information, activity reports and exception alerts enable intelligent business decisions to be made quickly in order to run the most efficient fleet possible.

Achievements

The Institute has developed products and completed projects of commercial value and contributed significantly towards the Human Resource Development in the field of Electronics.

- Solar Charge Controller
- Solar inverter
- Panel LED Lights
- Energy Audit & Management of different organizations:
- Printed Circuit Board (PCB) design and fabrication services provided to different public & private sector organizations.
- Design and Development of Pakistan's first indigenous electronic control unit for automobiles.
- Provided internship (skill development) to engineering students from all over the country.

Activities and Targets of Preceding Financial Year:

The following projects were completed:

- Development of smooth power line conditioner
- GSM Based Energy Meter and control System
- Solar Base Controller
- Development of Indigenous CNC engraving machine

Relevant Statistics/Outcomes

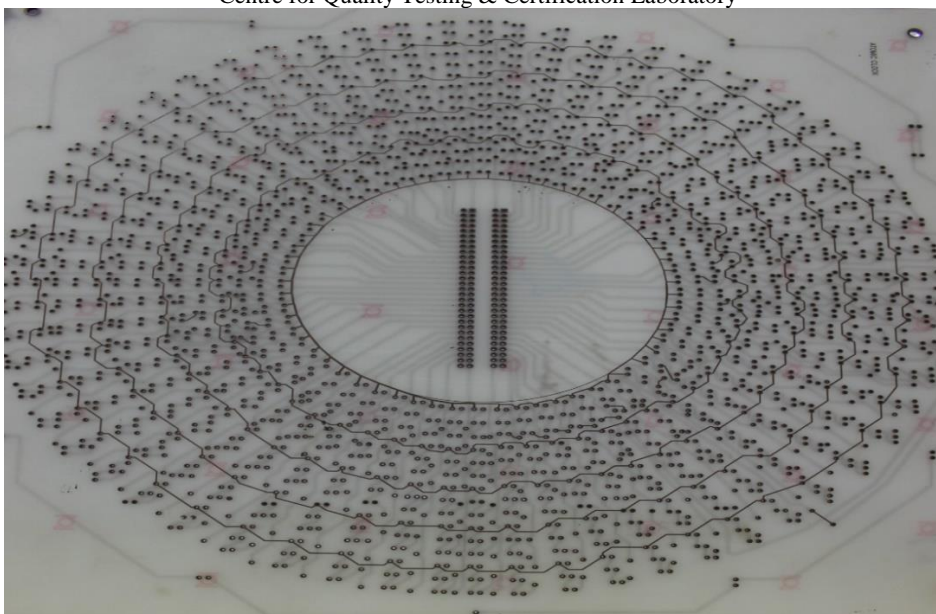
MoU's	05	Signed with Universities/Public & Private Sectors
Training/Internship Program		
Two Months Course	220 Students	Students of universities/institutions in the field of Electronics/IT
6 Months Courses (NAVTTTC sponsored)	100 Students	
Advanced Industrial Training on PLC, HMI & SCADA	06	
Advance training on IC Nanometer design	10	
Training on PCB design & fabrication	20	
National Internship Programme (NIP)	80	
6-8 Weeks internship	150	
Designed & Developed Products	02	For various Public & Private Sectors
Consultancy/Engineering Services	25	Universities/Institution, Public & Private sector



Power Electronics products



Centre for Quality Testing & Certification Laboratory



Printed Circuit Boards (PCB) for LED lights



Automation & Control Engineering Laboratory

Pakistan National Accreditation Council (PNAC)

Introduction:

Pakistan National Accreditation Council (PNAC) established in 1998 under the administrative control of Ministry of Science & Technology with a mandate to accredit laboratories (testing/calibration/medical), Inspection Bodies (IBs), Certification Bodies (CBs) and Halal Certification Bodies (HCBs) etc. PNAC got its legal status through the Act of Parliament in 2017. PNAC has established, maintained and implemented quality management system based on ISO/IEC 17011 - General requirements for accreditation bodies accrediting Conformity Assessment Bodies (CABs).

Functions:

Accreditation Services

- Testing & Calibration Laboratories (ISO/IEC 17025)
- Certification Bodies (ISO/IEC 17021)
- Inspection Bodies (ISO/IEC 17020)
- Medical Laboratories (ISO 15189)
- Halal Certification bodies (PS 4992)
- Proficiency Testing Scheme (ISO/IEC 17043)
- Product Certification bodies (ISO/IEC 17065)
- Personnel certification bodies (ISO/IEC 17024)

Trainings

PNAC is also providing trainings to conformity assessment bodies (CABs) on National and International standards.

World Acceptance of Certificates/ Testing Reports:

PNAC has achieved Mutual Recognition Arrangement (MRA) with International Laboratory Accreditation Cooperation (ILAC) and Asia Pacific Laboratory Accreditation Cooperation (APLAC) for testing and calibration laboratories since May 2009. PNAC has also achieved Multilateral Recognition Arrangements (MLA) with International Accreditation Forum (IAF) and Pacific Accreditation Cooperation (PAC) for QMS & EMS since May 2013 and for Product Certification (ISO/IEC 17065) since June 2017.

Contribution to Economic Growth:

PNAC contributes in the economic growth through accreditation. PNAC with MRA and MLA status contribute to enhance the trade of Pakistan. The certificates / tests reports issued by the accredited organizations are acceptable all over the world. Accreditation builds confidence of the exporter that whatever they export conforms to the international requirements. The regulators and Consumer Rights Associations of other countries also accept certificates and tests reports issued by Conformity Assessment Bodies (CABs) accredited by PNAC. Accreditation by PNAC facilitate to remove the technical barrier to trade with a goal of “certified once – accepted everywhere.”

Accredited Conformity Assessment Bodies (2017-18):

Activities	Achieved Target 2017-18
Testing and Calibration	115
Inspection Bodies	09
Certification Bodies	07
Medical Laboratories	08
Halal Certification Bodies	03
Proficiency Testing (New Scheme)	03

Product Certification (New Scheme)	01
Certification of Persons (New Scheme)	02
Trainings/Courses/ Seminars/workshops	12

7th International Halal Conference and Exhibition, 2018:

PNAC Participated in 7th International Halal Conference and Exhibition, held in Lahore, Pakistan from 18th till 19th April, 2018.



International Peer Evaluation:

Acceptance of an accreditation body into the ILAC MRA is dependent upon being successfully evaluated by peers from other accreditation bodies in accordance with the relevant rules and procedures contained in ILAC publications. Successful Peer Evaluation of PNAC was carried out during the month of May, 2018.



FEDERAL MINISTER FOR SCIENCE & TECHNOLOGY, RANA TANVEER HUSSAIN WITH PEER EVALUATION TEAM OF APLAC FROM CHINA AT ISLAMABAD ON MAY 9, 2018.



World Accreditation Day:

In 2008, International Accreditation Forum (IAF) and International Laboratory Accreditation Cooperation (ILAC) decided to celebrate World Accreditation Day on 9th June each year to raise awareness of importance of Accreditation.

Pakistan National Accreditation Council (PNAC) conducted a seminar to celebrate the World Accreditation Day in Islamabad Club, Islamabad. This year theme for the subject event was “Accreditation: Delivering a Safer World”.



Seminar on World Accreditation Day 2018 Dr.Baqer Raza (DG PNAC), (Sitting:Left-Right) Mr. Abdur Rasheed Khan (Ex-DG PNAC) Dr Malik Qaiser Majeed (Add. Secretary MoST),Dr.SM Junaid Zaidi (Exec. Dir. Comsats), Dr. Shahzad Alam (Chairman PCSIR)

Participation in APLC-PAC Joint Annual Meetings:

PNAC participated in Joint Annual Meetings of APLC-PAC, held in Koyoto, Japan from 1st to 9th June, 2018.



PSDP PROJECTS BY PNAC:

Currently, there are two projects under PSDP, in PNAC:

1. Halal Accreditation
2. Pakistan National Hospital and Healthcare Accreditation (PNHHA)

1. Name of the PSDP Project: Halal Accreditation

Introduction:

Halal sector is a vast market of over 1.8 billion consumers all over the world and demand for certified halal products is increasing as there is dire need for the manufacturers/producers to get their products certified from a source which has credibility. Accreditation of Halal Certifiers is the vital source that provides recognition to the Halal Certifiers at international and national level. At present Pakistan is the world leader in the field of Halal Accreditation and has the best opportunity to capture big share of Halal market.

Objectives of Halal Project:

(a) Following are some of the key objectives to be achieved by the project “Halal Accreditation”:

- Create awareness in Pakistani manufacturers, exporters and traders regarding the “Halal Accreditation” through workshops & training sessions.
- To train lead assessors, technical assessors/experts, trainers for harmonizing the Halal Accreditation system in PNAC.
- Educate Pakistani manufacturers, exporters and traders through Halal Compliance Training sessions, as per international Halal standards to fetch higher export price.
- Promotion of “Halal Accreditation” credibility in the national and international market as the symbol of best quality through participation in national and international seminars, workshops, symposium etc.

(b) Relationship with Sectoral Objectives

The Halal market is fast emerging most lucrative and influential consumer arena in the world today, covering a wide array of food and non-food products, including pharmaceuticals, cosmetics, healthcare, toiletries and other non-consumables valued at USD2.77 trillion. Halal certified goods/services chain will support local and export markets for producers of all types of foodstuffs to Muslim & non-Muslim communities in Asia, the Middle East and worldwide. The project will provide essential support for implementation of the Halal food/nod-food culture globally.

Socio-Economic Benefits:

The credibility of Halal Accreditation adds benefit to the Halal Certification Bodies.

- The Halal accreditation will help planners to promote, implement, monitor and evaluate good practice in order to ensure provision of high standards products and services.
- Quality would be an integral part of the overall national Halal policy
- Halal sector would be the driving factor of our next global economic surge
- In future, the world would see a lot more Halal Accreditation crossing borders of even non-Muslims countries – bringing prospects for economic benefits & greater access to Halal products/services.

2. Name of the PSDP Project: Pakistan National Hospital and Healthcare Accreditation (PNHHA)

Introduction:

Many international hospitals today are obtaining Joint Commission International (JCI) accreditation or any internationally recognized accreditation as a way to attract foreign patients. Standards, as a result, are rising. In Pakistan, the Hospital services which are provided to the common people are unfortunately of extremely low standard. Due to poor quality of health facilities this project will contribute to enhance the health facilities and overall socio economic activities that will uplift the living condition of a common man.

Main Objectives:

- To create awareness among the Health Administrators/professionals & consumers of Health services about the benefit of adopting quality standards in Healthcare in 8 healthcare centres/ hospitals covering two from each province.
- To encourage all stakeholders for a quality awareness campaign amongst consumers through publication of material, articles and holding of seminars/workshops etc.
- To launch a publicity campaign in print and electronic media
- To train lead assessors, technical assessors/experts & decision makers to exchange experiences for harmonizing the hospital accreditation procedures.
- To study different accreditation bodies procedures which award Hospitals accreditation.

Socio-Economic Benefits:

- The credibility of hospitals adds benefit both to the patients and the doctors & also contributes immensely towards improvement of overall healthcare delivery system.
- The Hospital accreditation will be to help planners to promote, implement, monitor and evaluate healthy practice in order to ensure that occupies a central place in the development of the healthcare system.
- Quality should be an integral part of the overall national health policy.
- It will have a significant impact on improving quality and safety in healthcare; improving health outcomes; ensure more equitable health service provision.
- Improving quality has become more relevant in the emerging global scenario that healthcare, long one of the most local of all businesses; now becoming increasingly global.
- Health will be the driving factor of our next global economic surge. Health is not only of great importance to the protection of the population, but it is definitely also important economic factor, and one with great potential.
- Application of quality health standards will have positive environmental prospects.

STEDEC Technology Commercialization Corporation of Pakistan (Private) Limited (STCC)

Introduction

STEDEC Technology Commercialization of Pakistan (Private) Limited was established in 1987 under the Companies Ordinance 1984 for the primary objective of commercializing PCSIR's products, processes and technologies. Subsequently, the scope was broadened to assist other R&D institutions, specifically those of MoST, in their commercialization efforts. The Board of Directors comprises of nominees by the Ministry of Science and Technology with Secretary MoST as the Chairman of the Board. STEDEC generates revenues through its commercial activities and no development or non-development budgetary allocations are made to STEDEC in the Federal Government budget.

Objective and Functions:

- To function as a National Technology Commercialization Organization
- To assist public sector R&D organizations towards commercialization of their indigenously researched products, processes and technologies
- To assist public sector R&D organizations in developing market-driven research programs
- To assist public sector R&D organizations for a greater commercialization efforts through market studies, investment in pilot plants, management of pilot plants, and marketing of such products
- To assist the Ministry of Science and Technology in the management of projects related to indigenously researched products, processes and technologies
- To reduce dependence on foreign technologies, enhance import substitution
- To adapt and adopt foreign technologies for enhancing industrial development
- To establish and manage a technology resource database, for effective transfer of technologies, especially oriented towards the small and medium enterprise sector

Corporate Structure:

The business of the Company is managed by a Board of Directors, which is appointed by Ministry of Science & Technology, subject to provisions of the Companies Ordinance 1984.

The Board of Directors is supported in the discharge of its functions by four Committees, namely a Nomination Committee, an Audit Committee, a Human Resource Committee and a Procurement Committee.

During FY 2017-18, two meetings of the Board of Directors were held as follows:

- 57th BoD Meeting 20-10-2017
- 58th BoD Meeting 26-01-2018

As required under Corporate Governance Rules enacted by SECP, a number of policies enacted by the Company regulate its workings, namely Human Resource Policy, Employees Code of Conduct Policy, Communication Policy, Conflict of Interest Policy, Anti-Corruption Policy, Environment, Health and Safety Policy, Sale Policy, Procurement Policy, Borrowing Policy, Related Party Transaction Policy and Whistle Blowing Policy.

Activities

a) Commercial Activities:

STEDEC is a commercial marketing organization, with its major activity to commercialize indigenous products, processes and technologies. The Company manufactures, promotes and markets indigenous as well as imported agro-chemical based pesticide, domestic insecticide and

termiticide products at economical price for the support and development of the agriculture sector of the country, in addition to serving domestic consumers in household pest management. During 2017-18 the company generated net profits after tax of Rs. 1.6 million on sales of Rs. 198 million. It is pertinent to note that the commercial activities of the Company generate the revenue and profits, which finance the Company's commercialization activities.

b) Commercialization Activities:

The commercialization activities of STEDEC are aimed towards creating a research, innovation and commercialization eco-system in which the three important stakeholders of this eco-system, namely R&D institutions, academia, and industry are being linked together. STEDEC plays a role of bridge and coordinator between these stakeholders with the purpose of overcoming barriers, facilitating communications, and ultimately resulting in a self-sustained eco-system where needs of industry will translate into ideas, technologies and products being created within R&D institutions supported by academia.

With this concept in mind, the new management of STEDEC initiated work on commercialization of MoST R&D organizations in 2015-16. In the first phase three industry sectors; namely, Water, Renewable Energy, and Agriculture were taken up, coverage to which is provided by two R&D organizations; PCRWR and PCRET. Later on a step-wise approach has been taken to ultimately lead towards commercialization of products, technologies and services of R&D organizations.

Performance & Achievements during the FY 2017-18

During the year, following activities were carried out towards the achievement of goals outlined above:

a) Commercialization Activities related to MoST R&D Organizations:

STEDEC as a public sector national corporation is the only platform in the country that offers the most direct interface between public and private stakeholders. It has been developing linkages with industry through chambers, industry associations and individual entrepreneurs. Well established industry outreach program and developed linkages with academia and industry has been effectively leveraged to enhance commercialization activities. During the year 2017-2018:

- STEDEC's commercialization team interacted with 23 chambers, R&D organizations, institutions and end-users organizations.
- Twelve marketing studies of various technologies offered by MoST R&D organizations were initiated in 2017-18. Out of which three studies namely, Gravity water filter (PCRWR). Non Antibiotic Feed additive (PCSIR) and Trencher (NUST) were completed.
- Three commercialization plans were prepared for Laboratory Equipment (PCSIR), Gravity Water Filter (PCRWR) and Non Antibiotic Feed additive (PCSIR)
- Indigenization of foreign technology like Soil moisture meter was successfully coordinated with NUST.
- STEDEC has been successful in commercialization of products/technologies having market potential that have been forwarded to it for commercialization by MoST R&D Organizations:
 - a. PCSIR developed Agro Chemicals & Food; including Phytofix (Plant Growth Regulator), Sarsabz (Nitrogen Foliar Fertilizer), NPK (Nitrogen-Phosphorus-Potassium Flood Fertilizer), Sulfokil (Sulphur based fungicide), Copxykil (Copper based fungicide), Zincole (Zinc based plant nutrient), and FAMIC (fish oil supplement).

- b. PCSIR developed Laboratory Equipment; which is marketed by STEDEC, mainly to education sector but under a new commercialization plan this coverage is being extended to other important sectors like chemicals, pharmaceuticals, and pesticides.

b) Commercialization Activities related to Other R&D Organizations:

STEDEC interacted with other public sector R&D organizations/institutes of Pakistan in order to identify areas for cooperation and commercialization. The following organizations/institutions have been visited:

- i. National Institute of Health (NIH), Islamabad: NIH has expertise in indigenously developed vaccines and intended STEDEC for its commercialization. NIH further showed interest in solar solutions and rainwater harvesting solution.
- ii. Hydrocarbon Development Institute of Pakistan (HDIP), Islamabad: HDIP showed interest in commercialization of their testing facilities by STEDEC.
- iii. Pakistan Stone Development Corporation (PASDEC): PASDEC imports mining equipment that is used in the dimension stones industry. This imported equipment is very expensive and PASDEC showed interest in its local development. The required equipment details were communicated to PCSIR for possible indigenization.
- iv. National Fertilizer Corporation Institute of Engineering & Fertilizer Research (NFC-IEFR), Faisalabad: Showed interest in marketing of their fertilizer products through STEDEC. Interactions between STEDEC marketing team and NFC are underway to detail products and terms of engagement.
- v. PARC Agrotech Company (PATCO), Islamabad: PATCO is the commercialization arm of PARC/NARC. Interactions between STEDEC and PATCO are underway to finalize the terms of engagement.
- vi. GIK Institute, Swabi: STEDEC arranged a demonstration session of Computer Numeric Control (CNC) machine developed by GIK Institute in Lahore with TEVTA, SMEDA, TUSDEC, and PITAC. Based on the positive feedback received from participants, STEDEC has discussed details of products to be taken up for commercialization as well as terms of engagement between the two entities.
- vii. Directorate of Agriculture Engineering Tarnab, KPK: During STEDEC visit to the department, DAE showed interest in the recharge well solution and data logger equipment.

c) Industry interactions / linkages:

STEDEC endeavors to develop linkages with various Chambers of Commerce & Industry and industry associations to familiarize them with capabilities and solutions of MoST R&D organizations and to solicit demand for products/technologies and capabilities. The following entities have been visited:

- i. Highway Research & Training Centre (HRTC)/National Highways Authority (NHA): STEDEC invited officials of HRTC, NHA to visit PCSIR Peshawar and Lahore to assess facilities and capabilities of PCSIR and how these could benefit NHA. The delegates visited Material Sciences and Centre (MSC) and Engineering Science Centre (ESC) at PCSIR, Peshawar and Electrical and Measurement and Test Laboratory (EMTL), Pakistan Institute Technology for Mineral Advance Engineering Material (PITMAEM), Glass and Ceramics Research Centre (GCRC) and Applied Chemistry Research Centre (ACRC) at Lahore. NHA was desirous of signing a Memorandum of Understanding.
- ii. Meeting with Laboratory Equipment Vendors Association (LEVA): STEDEC invited stakeholders from Abqari market, Lahore for a focus group meeting. Entrepreneurs and dealers related with marketing and sales of laboratory equipment for scientific, educational

and industrial sectors led by General Secretary, Abqari Market Association participated in the meeting. Issues impeding commercialization of local made laboratory equipment and deliberation on efforts required to enhance sales were discussed.

Pakistan Standards and Quality Control Authority (PSQCA)

Introduction

The PSQCA Act 1996 of the Parliament empowers Pakistan Standards & Quality Control Authority (PSQCA), to act as the sole National Standard Body of Pakistan under the administrative control of Ministry of Science & Technology. PSQCA started its operations since 1st December, 2000, as a self-financed organization. The PSQCA Act VI of 1996 and the functions performed by PSQCA fall within the ambit of Article: 143 and 70(4) Federal Legislative List entry No.03, 27,32,39,54 and 59 of Part I and entry No.6, 12 and 15 of Part II, of the Constitution of Islamic Republic of Pakistan,1973. The above, further authorizes PSQCA to perform as per International practices and Government of Pakistan's agreement with World Trade Organization (WTO) and other standards related organizations. The PSQCA, Government of Pakistan till date has published 22493 Pakistan Standards. Food Standards are aligned with Codex Alimentarius Commission and traceable with WHO. The Government of Pakistan has declared 105 products as mandatory out of which 39 are food products.

The PSQCA being member of International Standards community has committed itself to different agreements made by Government of Pakistan with the International Organization for Standardization (ISO), International Electrotechnical Commission (IEC), International Organization of Legal Metrology (OIML) and WTO etc. PSQCA is designated focal point for National Enquiry Point (NEP) (TBT) of WTO by the Federal Government, since 12.02.1998 to overcome the technical barriers to trade (TBT).

The Authority advise the Government from time to time on various standardization policies, programs and activities to enhance industrial efficiency and development, as well as for consumers' protection. Pakistan Standards set criteria, rules and parameters against products, services and process are measured or compared. The PSQCA promotes the use of standards, conformity assessment and standardization nationally and internationally. PSQCA further facilitates the development and use of recognized national and international standards and conformity assessment services to enhance Pakistan's competitiveness and social well-being. PSQCA carries out a variety of functions intended to ensure the effective and coordinated operation of standardization in Pakistan. It also represents Pakistan's interest on standard related matters at national and international forums. The main function of the Authority is to foster and promote standards and conformity assessment as a means of advancing the national economy, promoting industrial efficiency and development ensuring the health and safety of the public, protecting the consumers, facilitating domestic and international trade and furthering international co-operation relation to standards and conformity assessment.

The PSQCA was established in 1996 with the following mandate::

- Systematic development of standards relating to products & processes in consultation with stakeholders.
- Designing, measuring and testing instruments and test procedures:
- Inspection and testing of products and services for their quality, specification and characteristics, during use and for import and export purpose;
- Setting up, assisting in establishing and authorizing various inspection and testing centers and agencies at important industrial sites and towns;
- To stop manufacture, storage and sale of such products which do not conform to the Pakistan or any other country's standards recognized by the authority;
- Framing and publishing, amending, revising or withdrawal of the Pakistan Standards in relation to any article, product, process;
- Determination of Pakistan Standards for the measurement of length, weight, volume energy and materials;
- Securing recognition of the Pakistan Standards and confidence in Pakistani products abroad;

- Registration of inspection agencies;

Objectives

- Framing, publication, amending, revising or withdrawal of Pakistan Standard in relation to any article, product, process.
- Certification of mandatory of articles products and process under Certification Marks Scheme of PSQCA as per national and international standards and to stop manufacturer, storage and sale of such products do not conform to the Pakistan or any other country's standards recognized by the Authority.
- Inspection and testing of products and services for their quality specification and characteristics for manufacturing and import/export.
- Registration of inspection agencies.
- Coordination and cooperation with other national, regional and international organizations in the area of standard development, technical regulations, conformity assessment procedure, information exchange and technical assistance.
- Facilitate the trade as National Enquiry Point (NEP) to minimize or remove Technical Barrier to Trade (WTO).

PSQCA Board of Directors

PSQCA Board of Directors is the highest body of this Authority. The general direction and administration of the Authority and its affairs shall vest in the Board which may exercise all powers and do all acts and things which may be exercised, or done by, the Authority. Three Board of Directors meetings were held during the period.

Standards Development

Document approved by PSQCA, that provides, for common and repeated use, rules, guidelines or characteristics for products or related processes and production methods, with which compliance is not mandatory is called Pakistan Standards. It may also include or deal exclusively with terminology, symbols, packaging, marking or labeling requirements as they apply to a product, process or production method.

The core business of PSQCA is the development, adoption and publication of Pakistan Standards for the benefit of consumers, industries and regulators of Pakistan.

PSQCA as per Pakistan Standards Rule 2008, provides a platform for Standardization of products, services, processes and systems. All technical works of PSQCA is done by the 197 different Technical Committees (TC) which is governed by the 13 different National Standards Committees (NSC) which is notified by PSQCA. On the recommendation of NSC the Authority approves draft Pakistan Standards as Pakistan Standards. The Composition of Committee consists of government agencies, public sector, Manufacturers, Consumers associations, Technologist, Federation of Chambers and Industry etc. PSQCA establishes Pakistan Standards in the area of Food and Agriculture; Chemical and Chemical Products; Civil Engineering; Electrotechnical; Electronics; Mechanical; Automobile; Textile; Halal; Weights and Measures; Information Technology (IT/ICT); and Management Systems.

PSQCA has developed 22493 Pakistan Standards, these include:

- 6131 formulated/developed National Standards
- 9235 adopted from International Standards Organization (ISO)
- 6315 adopted from International Electrotechnical Commission (IEC)
- 12 adopted from International Organization for Metrology (OIML)
- 764 adopted from ASTM International

- 21 adopted from Codex Alimentarius Commission
- 15 adopted from FAO of United Nation

Major outcomes of Standardization work of PSQCA during 2017-18 is presented as follows:

- Upon request of NADRA, Chemical Division of PSQCA established Pakistan Standard for indelible ink to facilitate electoral process in Pakistan,
- Due to power shortage in the country, PSQCA focuses to standardize power sectors. In this context, Electrotechnical Division of PSQCA is in process to establish Pakistan Standard for Transformer,
- PSQCA always focus on food safety. Agri and Food Division of PSQCA requested to include Tomato Ketchup, Coffee and Fruit Juices& Nectars for inclusion in the mandatory list of PSQCA,
- For the safety of people, Automobile Division of PSQCA is in process to establish draft Pakistan Standard for Passenger Car. Moreover, this division is also in process to establish draft Pakistan Standard for Agriculture Tractor,
- Information Technology (IT/ICT) Division of PSQCA is in process to adopt international standards as Pakistan Standards for “Intelligent homes internal networks and Information Security (27000:2016) Standards, Cloud Computing Reference Architecture etc.
- Halal Division of PSQCA is in process to establish Pakistan Standards for Halal Cosmetic,
- PSQCA is also in process for establishment of Pakistan Standards for Compressed gaseous Fuel measuring System for Vehicle, Liquid Fertilizers, Polyethene Pipe 2- Concrete Irrigation Pipe with Rubber Gasket Joints, Disposable Diapers and Woven Carpets.

Conformity Assessment

Any procedure used, directly or indirectly, to determine that relevant requirements in technical regulations or standards are fulfilled. Conformity Assessment Procedures include, *inter alia*, procedures for sampling, testing and inspection; evaluation, verification and assurance of conformity; registration, accreditation and approval as well as their combinations.

Conformity Assessment (C.A) is a part of Standards Development Centre (formerly Pakistan Standards Institution – PSI) component of PSQCA.

The Conformity Assessment activity in PSQCA is now divided in six regions:

- CA Karachi
- CA Lahore
- CA Islamabad
- CA Peshawar
- CA Quetta
- CA Multan

Moreover, PSQCA have established following liaison offices in Faisalabad, Gujranwala, Sialkot, Hyderabad, Sukkur, Hub and Hattar to ensure quality assurance activities.

During the financial year 2017-18, Directorates of Conformity Assessment of PSQCA and its liaison offices executed following functions in accordance with Pakistan Conformity Assessment Rules 2011:

- Ensure quality of 105 mandatory items, through Certification Marks Scheme.
- Quality Assessment through inspections & collection of samples on quarterly basis.

- Testing of Randomly collected samples in unit Lab.
- Grant / Renewal / Suspension / Cancellation or Withdrawal of CM License or Certificate.
- Conduct market surveillance and collect open market samples to monitor the quality of mandatory items.
- Launch campaign against unregistered units.
- Recommend to file the cases in the court against defaulter as per PSQCA Act.
- Collection of marking fees from Licensees, on quarterly basis.
- Registration of Inspection Agencies.

Summary of sector wise mandatory item list enforces by Directorates of Conformity Assessment and its liaison offices including Directorate of Import/Export to ensure quality of products in Pakistan.

Sectoral Mandatory Items

Items	Quantity
Food Items	39
Electrical Items	16
Mechanical	12
Auto Vehicle	02
Animals Feed	02
Textile	03
Building Material / Civil	11
Washing & Cosmetic	07
Chemicals Items	13
Total	105

PROGRESS (2017-18)

Sr.#	KPI's	Technical Divisions																																				
		Agri &Food	Auto mobile			Civil			Chemical			Electrical			Electronics			Halaal			IT&IC T			Mechanical			MSS			Textile			Weights &Measur			Total		
		1	2			3			4			5			6			7			8			9			10			11			12					
1	No. of Technical Committee (TC) meetings held	13	8			13			13			17			17			8			14			18			8			9			10			148		
2	No. of National Standards Committee (NSC) meetings held	1	3			1			1			1			1			1			0			0			0			1			0			10		
3	Participation in Balloting of ISO /IEC	159	43			66			267			611			96			0			3			0			203			204			0			1652		
4	No. of Draft Pakistan Standards finalized by TC(Revised/Direct Adopted/Established)	R	A	E	R	A	E	R	A	E	R	A	E	R	A	E	R	A	E	R	A	E	R	A	E	R	A	E	R	A	E	R	A	E	R			
		5	3	0	0	3	26	21	0	18	3	0	1	13	15	1	8	28	1	0	0	0	0	26	0	3	48	0	0	7	0	14	3	0	0	6	0	67
5	No. of Draft Pakistan Standards endorsed by NSC	R	A	E	R	A	E	R	A	E	R	A	E	R	A	E	R	A	E	R	A	E	R	A	E	R	A	E	R	A	E	R	A	E	R	A	E	
		5	3	0	3	0	17	11	87	17	5	0	1	0	23	0	3	29	0	0	0	0	0	0	0	0	36	0	0	0	0	3	29	0	0	0	0	30

DIRECTORATE OF CONFORMITY ASSESSMET ANNUAL PROGRESS REPORT FROM 2017 – 18

S. No.	Description	Karachi	Lahore	Quetta	Peshawar	Islamabad	Faisalabad	Multan	Hyderabad	Sialkot	Sukkar	Hub	Hattar	VCA	Total
1	Total Applications Received	595	514	35	216	174	81	170	127	158	25	57	33	25	2210
	Application (Grant)	209	298	20	104	129	47	79	56	95	10	22	6	13	1088
	Application (Renewal)	386	216	15	112	45	34	91	71	63	15	35	27	12	1122
2	Total Licences Issued	525	336	29	149	140	52	82	76	88	6	39	0	34	1556
	Licence Issued (Grant)	142	176	13	39	86	16	30	17	49	0	9	0	27	604
	Licence Issued (Renewal)	383	160	16	110	54	36	52	59	39	6	30	0	7	952
3	Factory (Unit) Inspections	623	699	177	228	356	229	119	91	250	25	80	27	33	4063
4	Total Samples Collected	2379	1816	392	588	514	324	274	326	438	186	416	170	93	7916
	Factory Premises	1838	961	105	393	450	241	260	249	340	61	196	112	86	5292
	Open Market	242	69	181	193	64	60	14	72	78	125	169	58	8	2162
	Mobile Testing Lab.	253	0	4	0	0	0	0	0	0	0	51	0	0	308
	Consignment / Port	21	786	101	0	0	23	0	5	20	0	0	0	0	127
	Confiscated Samples	25	0	0	0	0	0	0	0	0	0	0	0	0	25
5	Test Reports	1488	1546	334	728	428	270	182	277	300	135	153	83	55	5919
	Conformity	1110	1481	265	556	392	243	162	231	234	86	116	78	49	4949
	Non-Conformity	122	65	69	172	36	27	20	46	66	49	37	5	6	714
	Conformity (MTL)	223	0	0	0	0	0		0	0	0	0	0	0	223
	Non-Conformity(MTL)	33	0	0	0	0	0		0	0	0	0	0	0	33
6	Units Seized	93	87	0	38	44	17	9	0	25	0	0	1	0	314

Major Achievements

- Certification of mega industry i.e., Lever brothers, Reckit and Bengizer, Higher Industry, PEL Electronics, ICI Ackzonobal Pakistan, Berger, Master, Brighto, Sparko, Orient Electronics, Diamond (for soaps, shampoos, creams, refrigerator, energy meter, Paint)
- Accreditation and surveillance of CA-L Inspection Body System in accordance with ISO/IEC 17020 and PNAC guidance documents.
- Revenue Increase by 26% of 2017/18 as compared to equivalent period of 2016/17.
- Mobile Testing laboratory has been made functional at Karachi. The same is also being planned to be established in all the CA Directorates for carrying out on the spot checking of different Food items.
- PSQCA has also launched “Mobile App” under the title PSQCA for instant verification of product licenses as well as getting news alerts and other related information. The App can be easily downloaded from the Play-Store.
- PSQCA till last year had been operating through two zones (North and South). Within one year it’s operations have been further decentralized and now it operates through six independent CA zones, reporting to head office
- New office opened at Hattar, Industrial Estate, Haripur to facilitate Manufacturers and Consumers on Items under Mandatory Regime of PSQCA(Approved By BoD):
 - Data finalization and its online availability with Regard to :
 - No. of valid Licensees Item wise/ region wise 2027, as at 30/6/2018
 - Standards figures (23,263)
- Started Construction of Quetta Lab/Offices in May, 2017)
- Meeting with Federation Chamber of Commerce, and Industry and other Chamber of Commerces i.e., Oversees Chamber, Hyderabad, Lahore, Peshawar, Qetta Gujranwala, Sialkot, Multan, and Faisalabad regarding PSQCA’s Standardization Activities
- Continuous Market surveillance of mandatory items all over Pakistan (high risk products on monthly basis) and seizing of sub-standards product units was performed.
- Standards development activities on Fortified Atta and Oil/Ghee for Vitamin A and D, Paint Standards (distemper and plastic emulsion), Poly urethane Foam standards and cosmetic standards
- Meeting with Industries and associations (i.e., Oil and ghee manufacturing Association, home appliances, cosmetic associations, tyre manufacturers, polyurethane foam etc.,)
- Seminars on “Adoption of Pakistan Standards as technical regulations) with Provincial Governments.
- Approval of Foreign Manufacturing License (FML) scheme by the BOD
- Increased no of new applications and New Licenses issued : 734 Nos
- Celebration of World Standards Day (October 2018)
- Established New Import/Export Offices at PSQCA Lab Complex with improved facilities for importers and automation for fast processing

Application of Software driven Model

- Import/Exports (100 % data on computerized System, Interconnectivity with other sections is expected to be linked shortly) Steps underway for connecting the Import & Export section with Customs Database (WEBOC)
- CAS (Training session conducted / System assessed for required Hardware / infrastructure)
- CAC (Training session conducted)
- QCC (Training conducted / Internal data/ parameters almost complete/ Work started on trial basis)

Controlling of 105 Mandatory Products at Import & Export Stage

PSQCA is controlling quality of 105 mandatory items at import and export stage. The progress of Directorate of Import/Export during the financial year 2017-18 is as follows:

S.#	Description	2017-18
1.	No. of Cases Processed	19,570
2.	No. of CAR issued	15,460
3.	No. of NoC / TRC Issued	2,845
4.	No. of Sample Collected	20,993

Major Achievements

- Facilitated Custom Reform & Automation Team for integration with Custom business process application named “Weboc” and National Single Window (NSW).
- Efforts to incorporate all HS-Code against PSQCA, 105 mandatory items with FBR.
- Development of Web service (test case) for custom department to retrieve release certificate in process.
- Prepared scope based data catalogue of 105 mandatory products against relevant HS / PCT Codes.

Testing of Products in PSQCA

Quality Control Centre (QCC) and Technical Services Centre (TSC) of PSQCA, undertake testing of industrial raw material, and finished products and Import Items to establish their quality, grade with respect to National as well as International Standards (i.e. ISO, IEC, BS, ASTM etc.) according to recommended guidelines in the field of Chemical, Microbiology, Physical & Engineering (Electrical, Mechanical, Gas Home Appliances), Building Material and Textile etc.

PSQCA’s Laboratories are well equipped to facilitate Government and private sector, Industrial Units and Importers / Exporters in monitoring the quality of items referred through Conformity Assessment for food and non-food products.

- Number of Laboratories:
 - 13 at QCC, Karachi
 - 05 at QCC, Lahore
 - 02 at QCC, Peshawar
 - 08 at TSC, Lahore
- Availability of international Accepted/ Accredited testing parameter:

- 36 at QCC, Karachi
- 41 at QCC, Lahore
- 36 at TSC, Lahore
- One Mobile Testing Laboratory

Functions

- Provision of quality testing services to customers to meet their technical requirements.
- To provide quality assurance services according to laid down standard methods.
- Extending Quality Control and Quality Assurance Services to the Engineering Industries.
- Providing solution(s) of technical problems being faced by the Engineering Industries in adaptation of national and international standards.
- Provide support to the Regulatory wing of PSQCA by compliance testing for Conformity Assessment of compulsory engineering items.
- Providing testing services for engineering components and products to the public and private sectors.
- Provide inputs in standardization of engineering products
- Investigations to find out the causes of failure of engineering components through failure analysis and suggesting remedial measures.
- Providing technical consultancy and imparting training through advanced training courses.
- Coordinating with the institutions both in public and private sectors for promotion of quality culture and standardization activities related to metallic and engineering industry in the Country.
- To assist the industry in implementing and adoption of national and international standards.
- Assessing quality of compulsory items such as auto vehicles, deformed bars and other mandatory engineering products for PS Certification under Conformance Marking Scheme.

Achievements (Labs. Accredited in 2017-2018)

Sr. #	Product Name	No. of Parameters	Parameters	Name of Lab.
1	Vegetable Oil and Ghee	05	Iodine Value, Peroxide Value, Saponification Value, Free Fatty Acid, Lovibond color Test.	Chemical
	Milk Powder	03	Milk Fat, Milk Protein, Total Ash.	
2	Milk Powder	02	Salmonella, Listeria Monocytogenes.	Microbiology
	Drinking Water	03	Feacal Coliform, Enterococci, Plate Count	
3	Steel bars and sheets	04	Universal Tensile Strength, Yield Strength, %age Elongation, Percentage Reduction in Area.	Physical
4	Cement	07	Compressive Strength (3 days), Compressive Strength (28 days), Water for Consistency, Soundness, Retained in 0.09mm, Mass Density, Surface Fineness	Cement
5	UPVC Pipe	01	Melt Flow Rate	UPVC Pipe
	TOTAL	25		

Major Achievements

- PSQCA's Laboratories facilitated various on-going projects of the Federal / Punjab / KPK Government with reference to accomplishment of their targets related to quality of material being used in these projects. Some of the examples are as follows:-
 - Motorway Project.
 - Lahore Orange Line METRO Train Project (Package-2).
 - Multan Metro Bus Project.
 - Development of Phase-II, New Lahore City Project.
 - Urban Rehabilitation and Infrastructure Improvement Projects.
 - WASA / LDA Development Projects.
- Technical Services Center (TSC) have achieved the accreditation certificate against 24 numbers of test parameters in Mechanical Testing Laboratory, Chemicals Testing Laboratories of TSC. Extended scope of accreditation (addition of 12 testing parameter) got approved from Pakistan National Accreditation Council (PNAC).
- TSC has been continually work together with public and private sectors by providing trainings in the fields of standardization and quality assurance of products and processes, providing internships to the students from academic institutions, participation in different technical forums as per requirement of the Authority.
- Testing of engineering parts, material and products
- Technical evaluations of the engineering components, provided material evaluation services to leading Public sector organizations like NTDC, SNGPL, SSGC, WAPDA, NESPAK, WASA, LDA, Irrigation department, NHA, PAEC, and Pakistan Army& Pakistan Railways etc.
- TSC has recently provided testing and quality assurance services to the following sector:
 - M/S Flood Emergency Reconstruction & Resilience Project Lahore.
 - NESPAK –CPEC Project.
- Quality testing of street light pole to Peshawar Sustainable Bus rapid transit project.
- Provided In-Situ Replica Metallography & failure investigation services to the leading private sector like Fertilizer Plants, Power Plants, Cement Industry, and Agriculture & Process Industry etc.
- Supporting standard development activities and provided useful inputs through the evaluation of engineering components, agricultural implements for the standardization of critical components.
- Testing of contaminants (heavy metal) in food products.
- Participation in technical committees for 2/3 wheeler auto vehicles, paint, polyurethane flexible foam, safety razor blades, disposable razor.
- TSC has been playing its role actively providing quality control, quality assurance services for the public as well as private sector including SMEs in the field of metals and material sciences. In addition, it has enhanced its testing scope. In this regard following effort are made to meet targets.
- Testing of trace metals/Elements /contaminations in food items have been incorporated by Atomic Absorption Spectrophotometer

- Testing of steel wire rod as per PS 16124
- Restoration of in-situ Metallography for petrochemical sector.
- Arsenic testing in water has been developed at ppb levels through atomic absorption spectrophotometer.
- Mercury Testing in creams has been developed on atomic absorption spectrophotometer to meet the conformity assessment requirement.
- Soap testing has been introduced in chemical testing laboratory to meet conformity assessment requirements.
- Hair-Dyes testing facility has been created for conformity assessment requirements.
- Bend Testing facility has been created at Metallurgical Engineering Division.
- QCC established Food Laboratory at Karachi and accredited international acceptable six test parameters.

International Affairs

The International Affairs and Training (IA&Tr.) has utmost important to develop relations with the counterparts National Standards Bodies (NSBs) for establishing mutual understanding at difference international/regional forums, support in capacity-building and resolving the issues in trade facilitation. The Directorate International Affairs & Training has developed and maintaining close liaison with stakeholders (i.e. Chambers/Associations, Academia, Industries and Traders) in order to promote standardization activities to meet emerging challenges in trade, whereas, the standard(s) have significant impact in trading affairs towards quality, health and safety including environment.

The Directorate IA&Tr. is playing its role in establishing cooperation/coordination with counterparts National Standards Bodies (NSBs) and several Memorandum of Understandings (MoUs) / Mutual Recognition Agreements (MRAs) have been signed and under-process in view of strengthen technical and technological development and building-capacity. Furthermore, PSQCA being member of ISO, IEC, OIML, SMIIC, SARSO-SAARC is playing crucial role in order to secure interest of the country at regional and international forums.

The Standards and Metrology Institute for the Islamic Countries (SMIIC)

- PSQCA – has successfully got Chairmanship of Standardization Management Council (SMC)
- PSQCA – is successfully re-elected as Vice Chairman for The Standards and Metrology Institute for Islamic Countries (SMIIC) Board of Directors (BoD)
- PSQCA –is the member of Eleventh SMIIC Technical Committees
- PSQCA –have two SMIIC Secretariat (TC-8, TC-9)

International Meetings Organized by PSQCA

- 2nd International Sectoral Technical Committee (STC) Meeting of SARSO / SAARC on Electrical, Electronics, Telecom & IT held from July 25th- 26th, 2017 at Karachi.
- 3rd Meeting of STC on Chemical and Chemical Products held from March 26 – 27, 2018 at Lahore.
- 8th Meeting of STC on Food and Agricultural Products from March 28-29, 2018 at Lahore.

Memorandum of Understandings with International Organizations

MoUs of PSQCA with different international organizations of 20 countries are under process.

Capacity Building

During the year 2017-18, following training programmes were organized by PSQCA for stakeholders:

- Training Programme on Social Responsibility Management Systems (ISO 26000) held on 6th July, 2017 at PSQCA, Karachi.
- Training Programme on Water Footprint Management Systems (ISO 14046) held on 29th August 2017 at PSQCA, Karachi.
- Seminar on Energy Management Systems (ISO50001) in collaboration with Sui Southern Gas Company Limited (SSGC) held on 2nd November, 2017 at Auditorium of SSGC Head Office, Karachi.
- Carbon Footprint Verification (CFV) (ISO 14064-1) held on 12th December, 2017 at PSQCA, Karachi.
- Occupational Health and Safety Management Systems (ISO45001) held on 30th January, 2018 at PSQCA, Karachi.
- Lean Six Sigma (ISO 13053-1:2011) held on 23rd February, 2018 at PSQCA, Karachi.
- IT Service Management (ISO/IEC 20000-1:2011) held on 19th March, 2018 at PSQCA, Karachi.
- Supply Chain Management Systems (ISO 28000) held on 25th April, 2018 at PSQCA, Karachi.
- Anti-bribery Management Systems (ISO 37001:2006) held on 9th May, 2018 at PSQCA, Karachi.

WTO-TBT National Enquiry Point-PSQCA

PSQCA has been designated as the WTO-TBT National Enquiry Point on Technical Barriers to Trade (TBT) of Pakistan under the TBT Agreement (Article 10.1, 10.2 and 10.3) and established WTO-TBT National Enquiry Point at PSQCA Head Office, Karachi to facilitate the exporters/traders/manufacturers in the country and also other WTO Member countries. This enquiry point is responsible to disseminate information on TBT-Notifications, deals with queries regarding Standards, Technical Regulations, Rules & Regulations and Conformity Assessment Procedures. NEP answers to all reasonable enquiries from other Member countries of WTO and interested parties, and provide the relevant document to other Member countries and interested stakeholders.

Activities / Achievements

- Collection of TBT Notifications issued by the WTO member countries through WTO Secretariat, Geneva.
- Circulation of TBT Notifications among the stakeholders for their review and comments.
- Collection of Federal/Provincial Technical Regulations.
- Coordination with Chamber of Commerce & Industry to maintain the laws, principles and practices under the WTO regime.
- Facilitate the federal/provincial chambers, trade promotion organizations, trade associations, industrialists and academia for the provision of information regarding technical regulations and sustainable trade development.

S. No.	Activities	Achievements 2017-18
1.	TBT Notification issued by Pakistan (PSQCA) to WTO-Secretariat, Geneva.	15

2.	Collection of TBT Notification issued by WTO Member countries.	1293
3.	Dissemination of TBT Notification issued by WTO Member countries, amongst the stakeholders (more than 11,130) in the country.	1293
4.	Handle enquiries (foreign/local).	40
5.	MoU's Signed with Academia.	05

Legal Department of PSQCA

Introduction

Pakistan Standards and Quality Control Authority (PSQCA) is a Federal Statutory Authority created under the PSQCA Act VI of 1996 and the Legal Directorate is sub-department of PSQCA which performs the following work for the Authority:

- To address the Legal side and safe guard the interest of the Authority.
- To deal corporate and services legal cases.
- To provide Legal advice as and when required for MoUs, agreements, and other legal matters to PSQCA.
- To prepare draft, rules and regulations and Act amendments as well as SoP's for purchase, Accounts etc.
- To ensure active presence in Courts on dates of hearing.
- To protect legal rights of PSQCA and to initiate correspondence with MoST and other concerned Authorities.
- To file cases against unscrupulous manufacturers during the campaign.
- To prepare comments and provide other legal support to PSQCA counsels for PSQCA cases.
- Scrutiny for CM Licenses and their renewals.
- Scrutiny of Registration of Inspection Bodies.
- Any Other assignment assigned by the DG, PSQCA.

Draft of Amendments Act of PSQCA 1996 has been completed from PSQCA side and it would be finalized very soon by MoST.

Achievements of Legal Department

- PSQCA has included addition of 03 mandatory items namely,
 - PS:5383 Liquid Tea whitener/Coffee whitener,
 - PS:5384 Powder Tea/ Coffee whitener,
 - PS:1600 Refined Palm Olein,
 in PSQCA list Vide SRO No. 44 (KE) /2018 dated 04-05-2018.
- PSQCA has Omitted 11 items vide SRO No. 45 (KE)/2018 dated 04-05-2018.
- Correspondence with Supreme Court and required information provided on time.

- Thirty six (36) cases were filed by manufacturers/units from time to time against PSQCA before the Lahore High Court Lahore regarding marking fee. All the cases have been reserved for Judgment.
- Seven (07) cases were filed by manufacturers/units against PSQCA from time to time before the Sindh High Court Karachi regarding marking fee. All the cases have been reserved for Judgment.

Revenue Generated 2017–18

PSQCA generated total revenue of Rs. 1,168.876 million during the year 2017-18.

Council for Works and Housing Research (CWHR)

Introduction

Council for Works and Housing Research (CWHR) was established through a Resolution in 1964 as an autonomous organization under the aegis of the Ministry of Rehabilitation and Works, Government of Pakistan. In June 1971, CWHR was transferred to the Ministry of Science and Technology. CWHR was established to create and strengthen necessary infrastructure for Research and Development (R&D) activities in the field of housing and works. Currently, CWHR is the only organization at National level involved in quality testing of Construction Materials and carries out Research & Development (R&D) and contract research for the construction sector.

Major Functions and Objectives of CWHR

- i. To conduct/sponsor/organize, co-ordinate and promote Research and Development in all fields of Civil Engineering Works, including construction of model structures and demonstration units, and to collaborate with regional, National and International Institutes/Organizations.
- ii. To arrange Seminars, Symposia, Open Houses, Exhibitions, Trainings and other extension activities to promote technology relevant to Housing and Works.
- iii. To undertake commercialization of R&D activities, including transfer of technology.

Activities of CWHR (2017-2018)

i. Quality Control and Quality Assurance:

Quality control tests for cement, sand, aggregate, concrete, cubes, blocks, steel rebars and etc. were carried out for following clients and testing fees amounting to Rs. 0.17 million was generated:

- (i) M/s. Pakistan Atomic Energy Commission
- (ii) M/s. Osmani & Company Pvt (Ltd)
- (iii) M/s. Ziauddin Ahmed & Company
- (iv) M/s. Horizon Engineering
- (v) M/s. A.T Properties Pvt.
- (vi) M/s. Free Way Properties Pvt.
- (vii) M/s. Sky Line Pvt.
- (viii) M/s. Panasian Pvt.
- (ix) M/s. D.G Khan Cement Company Ltd.
- (x) M/s. Engineering Associates Pvt.

ii. Consultancy Works and Advisory Services:

An amount of Rs. 1.048 million was generated through Non-Destructive Testing and Research Consultancy Works by providing services to the following organizations:

- (i) Non-Destructive Testing Services of Bridge No. 01 (M-9), Karachi to Hyderabad Motorway.
- (ii) Non-Destructive Testing Services of Prestressed Girder at DHA City (M-9) Karachi to Hyderabad Motorway.

- (iii) Non-Destructive Testing Services of RCC Structural Members at Al-Basit Grand, North Nazimabad, Karachi.

iii. Low Cost Ferrocement Manhole Covers Developed by CWHR, Supplied to Water and Sanitation Agency (WASA), Faisalabad:

Water & Sanitation Agency (WASA), Faisalabad Development Authority was ordered for the fabrication and supply of 400 Ferrocement Manhole Covers. Total amounting to Rs. 0.915 Million was received against the order.

iv. MoU between Council for Works and Housing Research (CWHR) and Sir Syed University of Engineering & Technology (SSUET):

An MoU was signed with Sir Syed University of Engineering & Technology (SSUET), Karachi on 09.08.2017 for Bilateral Cooperation, Collaboration and Linkages between CWHR and SSUET to meet the following targets:

- (i) Undertake market oriented R&D projects and other activities in the areas of common interest, sharing their human and material resources including instruments, services & facilities.
- (ii) Developing linkages with the construction industry with an aim to identify areas for undertaking need based/demand driven research.
- (iii) Facilitate entrepreneurship development and transfer of technologies / products / processes / facilities developed through collaborative R&D to the construction industry on competitive prices in accordance with agreed terms & conditions.

v. Pakistan Standards:

Researchers of CWHR contributed in formulation of Pakistan Standards as members of different committees of PSQCA.

vi. Internship:

Final year students of Civil Engineering Mehran University of Engineering & Technology (MUET) obtained internship at CWHR (28th May 2018 to 22nd June 2018).

vii. Visit of Secretary, MoST:

Mrs. Yasmeen Masood, Secretary Ministry of Science & Technology visited CWHR on 09th January 2018. Chairman CWHR briefed her about the activities of CWHR. After the briefing, Secretary MoST conducted visit to different laboratories of CWHR and inquired in details about the working of different laboratories.

viii. Visit of 4th Year Students of Architecture Department, Sir Syed University of Engineering & Technology, (SSUET) Karachi:

4th year students of Architecture Department, Sir Syed University of Engineering & Technology (SSUET) visited CWHR on 13.09.2017. The purpose of visit was to study R&D products developed by CWHR and their utilization in the construction sector.

National University of Sciences and Technology (NUST)

Introduction

National University of Sciences and Technology (NUST) is a premier national institution with international standing. In a relatively short span of time since it was granted the Charter in 1993, it has earned a reputation for quality education, innovation and excellence in research and learning. As a comprehensive university, NUST comprises of 18 schools/colleges/institutes (13 at Sector H-12 Campus, Islamabad, 02 at Rawalpindi, 02 at Risalpur and 01 Campus at Karachi) offering 35 undergraduate, 70 MS & 50 PhD academic programmes including Engineering, IT, Biotechnology, Biosciences, Art & Design, Management and Social Sciences. As of today the University has faculty strength of 1140 with 520 PhDs and student strength of 16062. The University has awarded 26084 Undergraduate, 7291 MS/MPhil and 253 PhD degrees. According to the latest ranking by Quacquarelli Symonds (QS), NUST is ranked 417th among universities worldwide, top 100 universities in Asia and 51st among 100 young universities under 50 years of age. The university through forward planning and consistent efforts has earned a name itself at both the national and international levels. The university is based on a multi-disciplinary concept and its colleges and institutes are located in six campuses across the country, with its Central Campus in Islamabad.

Vision

To evolve NUST into a world class Centre of Excellence among Higher Education Institutions, leading the transformation of Pakistan towards a rapidly developing Knowledge Economy to realize the national objective of a progressive and prosperous country among comity of nations.

Mission

In pursuance of NUST vision, strive to achieve following mission goals:

- Develop NUST as a Comprehensive, Academic and Research-led university with a focus on Creativity, Innovation and Entrepreneurship so as to amicably negotiate Social, Economic and Environmental challenges faced by the country.
- With foundations based on principles of Merit, Transparency and Fair Play, nurture talent by providing equal opportunity to all segments of polity.
- Empower students to develop their full potential, acquiring leadership and social skills, to act as agents of change within the society.
- Improve global visibility by enhancing mutually beneficial linkages with international organizations and partner universities.
- Strengthen NUST financially to enable the university to achieve its goals by raising awareness among local and international Pakistani diaspora including Alumni base around the world.
- Ensure conducive learning and working environment for students and staff at par with international standards.

NUST Quetta Campus – National Project for Uplift of Balochistan

NUST is establishing its campus in Quetta in order to provide quality education for youth of Balochistan in the field of Engineering & Technology, the PC-I for Rs. 1958.744 M for the subject campus has been approved by CDWP in May 2018 and the ground-breaking ceremony by Chief of Army Staff was held on May 08, 2018. At present mobilization for establishment of NUST Campus at Quetta is in progress.

Goals and Targets

Following targets were set in the NUST Strategic Development Framework (NSDF) 2013-2022 (Approved by NUST BoG in 2013), however, based on the progress, the targets were revised in 2017:

Students' Strength

	Present Status	Targets for 2022
UG	10,409	12,000
MS / MPhil	5,360	5,000
PhD	629	1,200
Total	16,398	18,200

Faculty State

	Present Status	Targets for 2022
PhD	526	1,100
MS / BS	628	300
Total	1154	1,400

Academic Programmes

	Present Status	Targets for 2022
UG	35	48
MS	70	94
PhD	50	59
Total	155	201

Ranking

a. "QS" World University Ranking

Year	Overall Ranking
2017-18	417

Year	By Subject	Ranking
2017-18	Electrical & Electronic Engineering	272
	Computer Science & Information System	320
	Mechanical and Aeronautical	371
	Physics	467

b. "QS" Asian University Ranking

Year	Overall Ranking
2017-18	91

c. "QS" Young University Ranking

Year	(Top 50 under 50) Ranking
2017-18	51

d. "QS" Engineering & Technology Ranking

Year	(By Faculty Ranking)
2017-18	279

e. “THE” World University Ranking

Year	Overall Ranking
2016-17	726

f. “THE” Asian University Ranking

Year	Overall Ranking	
2017-18	162	
Year	BRICS	150 under 50 Years
2017-18	173	179

Outcomes

Students Strength (2017-18)

Degree		Strength
UG	-	10298
MS/MPhil	-	5143
PhD	-	543
Total	-	15984

Total Students Graduated

Degree		Graduated
UG	-	26084
MS/MPhil	-	7291
PhD	-	253
Total	-	33628

Academic Programmes

	Total	Added
UG	35	2
MS/MPhil	70	5
PhD	50	4
Total	155	11

Research Projects

(a)	Research Projects Approved for Funding	118
(b)	Research Projects in Progress	82
(c)	Research Projects Completed	33

Research Papers

(a)	Research Papers Presented in Conferences	382
(b)	Research Papers Publications	730

Intellectual Property Rights

(a)	Patents filed	133
(b)	Patents Approved	13

Commercialization

(a)	Technologies Licensed to the Industry	03
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Companies Incubated / Graduated

(a)	Number of Incubatees	30
(b)	Number of Companies Graduated	6
(c)	Number of Jobs Created (Graduated Incubatees)	80

Innovation Promotion and Marketing

(a)	Industrial Problems Identified	418
(b)	Consultancy Projects Identified	30
(c)	R&D Projects Identified	14

Professional Development Centre

(a)	Number of Internal Trainings Conducted	16
(b)	Number of External Trainings Conducted	48

Corporate Advisory Council (CAC)

(a)	CAC Partner Companies	242
(b)	Board of Advisors	32
(c)	Number of CAC – NUST Partner Schools/Institutes	17
(d)	Number of Student Visits Arranged by CAC Team to Industry	133
(e)	CAC Sector Committees Member Companies	129

NUST Placement Office

(a)	Students Placed on Jobs	1462 out of 1574 graduated students
(b)	Industrial Linkages Established with top Recruiting Companies	650
(c)	Number of Recruitment Drives	77
(d)	Number of Industrial Talk Sessions Organized	35

Career Development Centre

(a)	Career Orientation Seminars	20
(b)	Resume writing & Interviewing skills technique Workshops	51
(c)	Focused Group Discussions	56
(d)	One-on-One Career Counselling's	170

Develop NUST into a Green University

(a)	Number of Trees Planted / Survived	22000 / 13000
(b)	Sewerage Water Being Recycled and Used for Horticulture (Daily)	
i.	Wetland Plant Installed / Operated by NICE, NUST (Capacity 285,000 Litres)	285,000 Litres
ii.	Membrane Bio-Reactor Plant Installed / Operated by IESE, NUST (Capacity 50,000 Litres)	25,000 Litres

Future Plans and Goals of Each Section / Wing / Attached Department

- ❖ Commissioning of pilot project of National Science and Technology Park (NSTP) leading to the Establishment of Main NSTP.
- ❖ Establishment of NUST Campus at Quetta (PC-I already approved by CDWP on 24 May 2018).
- ❖ Issuance of RFP for Establishment of NUST Teaching & Research Hospital on PPP mode.
- ❖ NUST has also planned establishment of 1 MW Solarization Project in FY 2019-20.
- ❖ NUST Development Programmes through PSDP in FY 2019-20 are as under:
Future development plans of NUST forwarded to MoST and HEC are as under:-

a. Proposed Projects through MoST

- ❖ Accreditation of NUST Laboratories in Accordance with ISO (17025 Certified) Standards – Rs. 56.615 M

- ❖ Strengthening and Upgradation of Research and Development Activities at NUST – Rs. 56.000 M
- ❖ Cloud Enabled Infrastructure for Research & Innovation – Rs. 57.000 M
- ❖ Establishment of Facility of Applied Research on Fuel Cells and Hydrogen Technologies at NUST – Rs. 437.500 M

b. Proposed Projects through HEC

- ❖ Establishment of NUST Department of Sinology (Chinese Studies) - Rs 219.431 M
- ❖ Expansion / Establishment of NUST School of Natural Sciences (SNS) - Rs. 386.93 M
- ❖ Establishment of NUST Interdisciplinary Research Cluster (NIRC) - Rs 679.818 M
- ❖ Expansion of Main Office of NUST – Rs 165.439 M
- ❖ Extension of Infrastructure of NUST Institute of Civil Engineering - Rs 249.51 M
- ❖ Extension of Department of Mechatronics Engineering - Rs 30.453 M
- ❖ Establishment of Law School at NUST - Rs 337.392 M

Students Support Programs

NUST's vision of becoming a world-class university requires the implementation of a needs-blind admission policy that would ensure that any student who gets admission does not have to withdraw due to financial constraints.

To realize this goal, a sustainable resource mobilization strategy through an endowment building program was developed and for which necessary capacity & institutional building steps were undertaken. University Advancement Office has been actively involved in the implementation of resource mobilization strategy in order to work towards financial sustainability.

(i) Students Supported in Fall 2017 and Spring 2018 Cycle:

More than 1300 students are studying on campus as beneficiaries of the need-based scholarship program. The biggest contributor to the need-based support is NUST itself while resources from individuals and organizations and government are the supporting pillars.

(ii) NUST-PPL Outreach Program (Balochistan and FATA):

Pakistan Petroleum Limited (PPL) has partnered with NUST for Outreach Program in Balochistan and FATA. The 4 weeks programme took place on 20th June 2018 to 20th July 2018, included bright high school students, from all districts of Balochistan and FATA with an aim to prepare them for university education. The PKR 16.80 million partnerships will make an impact on 320 students, 160 from each region, by offering them a greater chance to compete with the students from more developed areas of Pakistan and qualify for admission at different universities of Pakistan including NUST.

(iii) Donor Stewardship:

NUST now enjoys active support from many corporates, philanthropists and alumni who are not only supporting our students on annual fee but have also contributed to our endowment programme to help us achieve our mission of becoming self-sustained, self-reliant, need-blind institute. The endowment size saw new contributions worth PKR 164 million added to the pool through third-party generosity. Some 100 top donors were invited on campus in May 2018 and were briefed about the progress of the fund.

Employability of NUST Graduates

NUST maintains strong Academia-Industry Linkage with the focus on promoting and making NUST graduates the premium choice for the employers. NUST Placement Office acquires job opportunities / placement from industry and handles all activities to facilitate and coordinate for placement of NUST graduates. In the tenure from Aug, 2017 till July 2018, NPO gathers the employment statistics of Graduates 2016.

• Students placed on jobs	-93%
• Students unemployed	-07%
• Industrial Linkages established with top recruiting companies	-650
• Number of recruitment drives conducted	-77
• Number of Industrial Talk Sessions Organized	-35

(i) NUST Internship Program:

NUST Placement Office provides 100% internship for all 1st, 2nd & 3rd year UG students and was able to acquire 6000 internship slots in 2018 by signing MoUs with various organizations including Pakistan Red Crescent Society and Benazir Income Support Programme, Askari Bank, Allied Bank, Teach for Pakistan and Akhuwat Foundation.

a. IAESTE Program 2018:

NUST has been hosting International Association for the Exchange of Students for Technical Experience (IAESTE) students since 2013, to facilitate inbound interns as well as outbound interns to different countries. This year 14 international students from eight different countries participated in the internship program, including Austria, Jordan, Oman, Saudi Arabia, Spain, Switzerland, Thailand, and UAE.

b. NUST Internship Program for International Students (NIPIS) 2018:

This year NUST Internship Program for International Students (NIPIS) was launched, in which 9 brilliant students from Croatia, Ghana, Indonesia, Malaysia, Nigeria, Thailand and USA, joined the program as interns at different Schools of NUST.

(ii) Career Development Program:

NUST has pioneered the first dedicated office titled "Career Development Center" established in 2010 to develop and train NUST graduates' soft skills and keep them abreast of newest market trends.

Summary of Activities 2017-18:

Sr #	Activities	Number of activities held
1.	Career Orientation Seminars	20
2.	Resume writing & Interviewing skills technique Workshops	51
3.	Focused Group Discussions	56
4.	One-o-One Career Counseling	170

Research and Innovation

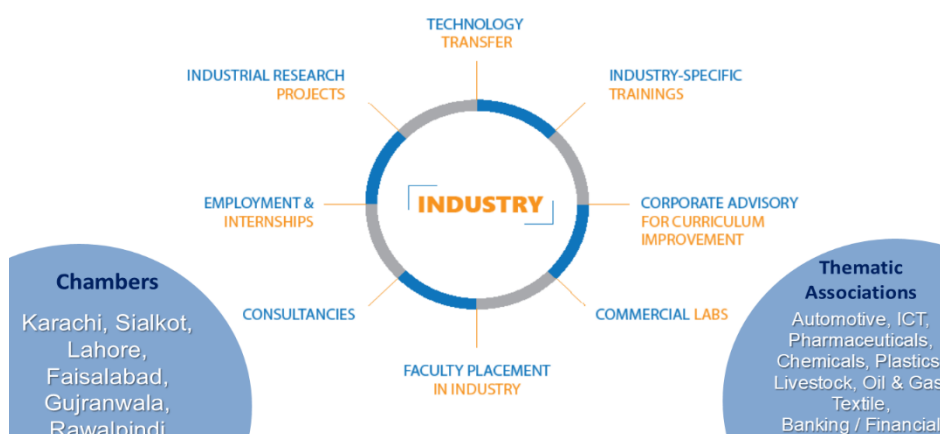
Pursuant to consistent policy of bringing significant and positive changes in the socio-economic sector of Pakistan while exploiting the abundant opportunities being offered by knowledge based applied research in collaboration with renowned institutions and industries, NUST foster an environment conducive to specialized teaching and targeted research by facilitating faculty and students to strive hard to produce solutions matching to national needs. NUST has adopted the modern trends and means by establishing Office of Research, Innovation and Commercialization to take the research related efforts to next level to produce quality product in minimum possible time to catch up with the developed world. NUST is giving high priority to Research, Innovation and Commercialization of its technologies and research output.

Research Labs

❖ Key Labs: 330+

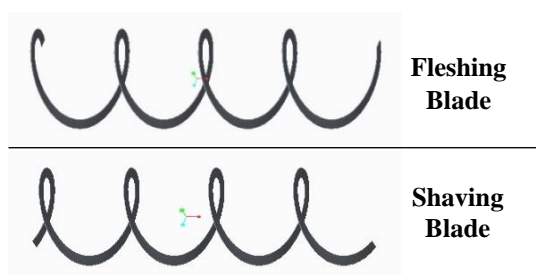
- a. **Medical Devices Development Centre (MDDC):** MDDC is the 1st ISO-3485 certified facility in Pakistan licensed by Drug Regulatory Authority of Pakistan (DRAP), for indigenous production of Cardiac Stents and PCTA Balloon Catheters. The Centre has been established at NUST, H-12 Campus in 2017, which will become a National Centre for production of Hi-Tech Cardiac and Medical Devices.
- b. **U.S. Pakistan Centre for Advanced Studies in Energy (USPCAS-E):** NUST has established U.S. Pakistan Centre for Advanced Studies in Energy (USPCAS-E) through a cooperative agreement with USAID amounting to USD 14.98 M to address some of the outstanding challenges faced by the energy sector in Pakistan and to facilitate applied research and education partnership between USA and Pakistan. The Centre was inaugurated in 2017.
- c. **Upgradation and Replacement of Lab Equipment of NUST Schools/Colleges:** The project amounting to Rs. 458.560 M has been approved in May 2018 with the aim to upgrade, strengthen and replace the technical laboratories of Colleges / Schools / Institutions of NUST in next two years, so as to meet the additional academic and research & development requirements. It will also enhance the research capacity for existing and increased number of students with induction of new academic programmes. The research projects and research papers will also increase thereby increasing the ranking of NUST as well.
- d. **2x National Centers of Excellence:**
 - i. **National Centre of Artificial Intelligence (NCAI)** was inaugurated at the NUST School of Mechanical & Manufacturing Engineering (SMME), at NUST's main campus in Islamabad, on March 16, 2018. NCAI is a consortium of 9 laboratories from 6 leading Universities of Pakistan, with NUST in the lead.
 - ii. **National Centre of Robotics & Automation (NCRA)** was inaugurated at the NUST College of Electrical & Mechanical Engineering (CEME), Rawalpindi, on May 23, 2018. The NCRA combines 11 labs from 13 Pakistani universities, with NUST in the leading role.

Industrial Linkages



- (i) **NUST Licenses out Three Intellectual Property Rights to the Industry:**
 - a. **Leather Fleshing and Shaving Blades:**

Setting a new precedent of technology transfer to industry, the National University of Sciences and Technology (NUST) has licensed three intellectual property rights (IPRs) to the industry. The first two IPRs licensed out to industry are related to fleshing and shaving blades used in Pakistani tanneries sector. The licensing agreements were signed between NUST and M/s Shafi Reso Chemical (SRC), Lahore, on April 25, 2018. In the absence of locally available quality fleshing and shaving blades, Pakistani leather manufacturers have to opt for imported ones. Under the licensed agreement, M/s SRC Lahore will now manufacture these blades locally, thus offering quality indigenous blades at significantly reduced cost, leading to substantial savings in foreign exchange.

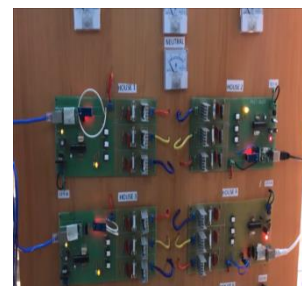
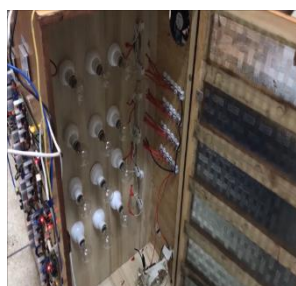


b. Three Phase Load Balancing (3PLB):

NUST licensed out the third IPR to M/s Bolts (Pvt.) Ltd. of Karachi, a well-established company offering Engineering, Design, Manufacturing and Fabrication services to the industry. 3PLB device is power electronics and deals with the issue of load unbalancing through uniform distribution of current in all three phase, hence eliminating the neutral current flow. The technology reduces 20% of the electricity bills if it is installed in a three phase fed house. The scaled version of the device could be installed to cater the industrial heavy loads. It enhances the efficiency of a transformer and prevents the creation of negative sequence voltages.

(ii) Industry Engagement Program for Faculty:

NUST is actively reaching out to the industries to enhance university industry linkages in advancing innovation and industrial research. NUST initiated the Industry Engagement Program for Faculty which is the first such program for any Pakistani university to place its selected researchers in the industry to provide faculty an opportunity to involve in innovative research, process improvement and provide technical support in a multidisciplinary environment. For the first batch, 13 faculty members were placed at NRTC, Haripur, Shafi Reso Chemicals Pvt. Ltd., Lahore, Pharmatech, Karachi and ZTBL, Islamabad.



(iii) Professional Trainings for Industry:

NUST Professional Development Centre (PDC) was established in July 2007 under an initiative of Higher Education Commission (HEC) to provide continued education and professional development services to industry so that they could acquire state of the art knowledge to maximize its productivity and efficiency. PDC believes in "Crafting Next

Generation Leadership”. PDC is imparting high quality, practical utility continuing education to NUST employees and industry professionals in the field of Management, Engineering and information Technology. PDC has conducted so far **500+** trainings and trained more than **11000** personnel and made a huge clientele of over **800** organizations.

- ❖ Internal Trainings conducted (July 2017 – June 2018) - **16**
- ❖ External trainings conducted (July 2017 – June 2018) - **48**

(iv) Promoting NUST innovations to Industry:

NUST participates in mega events where NUST technologies can get maximum promotion and helps University establish University-Industry linkages. In this regard, NUST frequently participates in expos and exhibitions to promote innovative technologies developed by students and faculty of NUST. During 2017-2018, NUST participated in Pakistan International Mega-Leather Show 2018, Pakistan International Auto Show 2018, PAKPLAS the International Plastic Expo 2018, International Rawal Expo 2018 and National Police Summit & Innovation Expo 2018.

(v) Industrial Projects:

As a result of promoting NUST technologies at different platforms NUST has established strong industrial linkages and is engaged in getting maximum number of industrial projects. A total of 301 projects were received from 64 industries and same information was disseminated with all NUST constituent Schools/Colleges.

NUST Entrepreneurial Base:

(i) Technology Incubation Centre:

The Technology Incubation Centre (TIC), established in 2005, is an initiative of the National University of Sciences and Technology (NUST) to provide a nurturing environment to the technology-based business ideas to prosper and become viable contributors to our community and economy.

The current incubatees together have over 250 full-time and part-time employees.

- ❖ Number of incubatees (July 2017 – June 2018) - **30**
- ❖ Number of companies graduated (July 2017 – June 2018) - **6**
- ❖ Employment generated (July 2017 – June 2018) - **80**

(ii) Programmes Supporting Entrepreneurship at NUST:

Technology Incubation Centre launched the NUST Global Acceleration Program in May. The pioneering program aims to accelerate Pakistan-based startups that require international market access for scaling up by connecting them with the Silicon Valley ecosystem. 12 post-revenue product-focused tech startups will be selected from all over Pakistan and immersed in the high tech clusters of Silicon Valley in order to validate their products in the US market and then seek seed/venture funding for them. The program is being sponsored by the US Department of State through the Public Affairs Section of the US Embassy in Islamabad. The first cohort comprises three startups, selected out of 58 applicants from all over Pakistan. The startups departed for San Francisco and are immersed in the Silicon Valley ecosystem for three months.

a. Ilm Ideas 2 Program, UKAID:

Ilm Ideas 2 is a four-year programme in Pakistan funded by the United Kingdom’s Department for International Development (DFID). The programme is managed by Cambridge Education, a member of the Mott MacDonald Group. Cambridge Education has awarded Ilm Ideas project to top 4 incubators of Pakistan including Technology Incubator Centre (TIC) NUST.

The grant of Ilm Ideas 2 to NUST worth a total of 27 Million Rs and aim to establish an Edtech support ecosystem with in NUST and across Islamabad. 8x Edtech startups had been selected by UKAID for support through this program. The program will be ending this year and will leave lucrative products for Education ecosystem of Pakistan.

b. Student Startup Business Centre (SSBC) at NUST:

Technology Incubation Centre - NUST along with HEC and PEP Foundation joined hands for the establishment of Student Startup Business Centre (SSBC) at NUST. The goal of this initiative is to promote talented student entrepreneurs who want to

commercialize their innovative ideas/products and enhance their practical learning experience at the university.

2 startups under SSBC were brought on board on 5th May and were incubated in the TIC facility, after winning the university wide Student Startup Business Challenge.

c. Social Innovation and Incubation Program of CSE, MoPD&R:

Centre for Social Entrepreneurship (CSE) at Planning Commission is supporting two social innovation startups at NUST through its Social Innovation and Incubation Support program. CSE has provided seed fund of PKR 0.5 Million each to 2 startups selected for incubation at Technology Incubation Centre (TIC), NUST.

(iii) National Science and Technology Park – Pilot:

NUST has established a pilot-phase of the National Science and Technology Park (NSTP) from its own resources. Pilot NSTP has an area of 110,000 sq. ft. and will house 65 to 75 Startups, Small and Medium Enterprise (SMEs) in addition to some large industrial companies. Pilot NSTP will establish an ecosystem which will bridge the gap between industry and academic researchers by bringing them under one roof.

Furthermore, NUST plans to establish a comprehensive Science & Technology Park, known as NSTP, which will have 8 towers each having area of 220,000 sq. ft. over the next 10 years.

(iv) Finding Innovative & Creative Solutions for Society (FICS) - A NUST Initiative:

In line with NUST's mission to promote innovation, entrepreneurship and commercialization, FICS was launched in the year 2013 at NUST to encourage students to get actively involved in social problem identification, and think innovatively to devise technology-based solutions. Summary of FICS is as follows:

Year	FICS 2014	FICS 2015	FICS 2016	FICS 2017	FICS 2018
Stage 1 – Idea / Synopsis Submission					
Project Synopses submitted	77	179	263	205	328
Projects shortlisted for Stage 2	56	103	183	122	155
Stage 2 – Standee, Presentation & Video					
Projects Displayed	56	79	93	122	137
Projects Shortlisted for Stage 3	38	57	61	52	54
Stage 3 – Prototype Display					
Projects Presented	29	54	57	49	47
Winners	3	5	5	4	3
Sponsorship Raised					
PKR	200,000	1,111,250	2,575,000	3,915,000	3,146,362

Other Initiatives:

(i) Establishment of Country's First Patent Wall:

NUST established Pakistan's First Patent wall on 18th Oct 2017 at NUST RIC. The objective of establishment of NUST Patent is to recognize significant contributions of the university inventors and highlight their technological achievements and motivate the budding scientists and entrepreneurs to tread upon the path of invention-led careers.



(ii) Establishment of Technology Innovation Support Center (TISC) at NUST:

NUST established TISC office at RIC on 9th Nov 2017 in collaboration with World Intellectual Property Organization (WIPO), Geneva Switzerland, Intellectual Property Organization of Pakistan (IPO), Pakistan and Higher Education Commission (HEC), Pakistan. The objective of TISC network is to promote the use of patent information among the researchers, entrepreneurs, IP managers, attorneys, Govt. officials, and policymakers by making national and international patent database accessible to them. These centers will also act as a one-stop shop for IP related services.



(iii) Exhibition NUST Female Inventor's Projects at World Intellectual Property Organization, Switzerland:

Pakistan's Mission in Geneva, Switzerland organized an exhibition whose theme was "Powering change: Women in innovation and creativity" on 23rd March 2018 at World Intellectual Property Office (WIPO) premises to coincide with our National Independence Day. The event was designed as a platform to present products of women innovators and entrepreneurs from Pakistan. Ten projects of NUST female innovators and entrepreneurs were selected and exhibited at the said event. This event projected Pakistan as producer of quality products before the delegates of over 100 countries.

(iv) NUST Conducts ORIC Orientation Programme for Newly Established ORIC Personnel:

Innovation and Commercialization Directorate in collaboration with Higher Education Commission (HEC) successfully organized a three day orientation program for newly established ORIC personnel scheduled on 02nd-04th May, 2018 at NUST Professional Development Centre, Islamabad.

The objective of this training was to brief participants on HEC policy and to showcase NUST ORIC managing activities related to entrepreneurship and commercialization as guide for best practices. HEC always recognized and acknowledged NUST's continuous humble efforts for making ORIC a success and therefore very appropriately.



National University of Sciences and Technology (NUST)
Professional Development Centre (PDC)



"HEC ORIC Orientation Programme for Newly Established ORIC Personnel"
2nd – 4th May, 2018

(v) CPEC "Harnessing the Opportunities & Addressing the Challenges":

Professional Development Center (PDC), NUST organized a three-day workshop on "CPEC-Harnessing the Opportunities and Addressing the Challenges" from 10th-12th April, 2018. The workshop was inaugurated by the Chinese Charge d' affaires, Mr. Zhao Lijian, on the 10th of April, 2018. The objectives of the workshop was to create awareness among stakeholders about challenges & opportunities posed by CPEC, provide input to policy makers for necessary initiatives/reforms to achieve CPEC objectives & present focused solutions to challenges of nine proposed special economic zones.

(vi) Training program under the project titled "Bridging the job market skill gap for general degree holder":

In order to increase the likelihood of unemployed youth to be accepted to employment opportunities, Higher Education Commission (HEC) of Pakistan announced a skill-based training program. The program complies with the Government of Pakistan's Vision 2025 and aims at empowering 5000 unemployed youth with in-demand skills. NUST PDC has won this project & is training 130 unemployed youth, since June 2018, from all over Pakistan in 5

different diploma courses. The project is approved at capital cost of 393.152 M for 3 years. The duration of the course is approx. 4 months.

(vii) NUST Signs MoU with UNIDO:

National University of Sciences and Technology (NUST) and United Nations Industrial Development

Organization (UNIDO) signed a multidisciplinary MoU at the university's main campus. Lt. Gen. Naweed Zaman, HI (M), (Retd.), Rector NUST, and Ms. Nadia Aftab, UNIDO Country

Representative, were present at the ceremony, along with NUST team

including Pro-rectors, senior department heads and associates, and representatives from UNIDO team comprising of all coordinators of projects. The purpose of the cooperation under this MoU is to complement the organization's areas of expertise in industrial development, especially Cluster Development Initiative (CDI) for Small & Medium Enterprises (SMEs).



(viii) Visit of US Embassy officials to TIC 24th Aug, 2017:

Mr. Anthony Renzulli, Deputy Economic Counselor, and Ms. Marian Pernell, Country Coordinator, U.S. Pakistan Women's Council from US Embassy visited Technology Incubation Centre, NUST. The team had a healthy exchange of ideas with Rear Admiral Dr. Nassar Ikram HI (M), Pro-Rector RIC, and Mr. Adnan Faisal, General Manager - TIC.



The highlight of the visit was the meetup with tech startups incubated at the Centre. The dignitaries appreciated the efforts of management TIC to put forth such success stories as women-led startup Orbit, Cygnus Solution.

(ix) National Engineering Robotics Contest (NERC) 2017 & 2018 at NUST College of Electrical & Mechanical Engineering (CEME):

The NERC was held at CEME from 12th to 15th July 2017 and 4th to 7th July 2018. Since 2003, the Department of Mechatronics Engineering at NUST CEME has been organizing a nation-wide Robotics competition by the name of National Engineering Robotics Contest (NERC) – it was the first, and to date the largest, Robotics contest in the country. Aimed at achieving excellence in Robotics technology, it provides a platform for integration of various mechanical/electronic designs, control/ path planning algorithms and agent architectures indigenously developed by Pakistani students. The purpose of this contest is to develop a sense of problem-solving, technical design and ingenuity in Robotics among the contestants.

(x) Conference on CPEC Consortium of Business Schools in collaboration with Higher Education of Pakistan (HEC):

While CPEC is paving way for the development of the economic sector in Pakistan, recently they have broadened their horizon and entered the arena of education as well, under the wing of 'CPEC Consortium of Business Schools'. The Consortium of Business Schools of the two

countries has been established to focus on issues of economics and management where they



will be assigned projects to assist the two governments in the development and operation of CPEC. A total of 7 Pakistani Universities made it to the consortium. Conference on China-Pakistan Economic Corridor (CPEC) Consortium of Business Schools for Economic

Cooperation was held by HEC at NUST on 28th and 29th August 2017. The two-day conference was held at NBS, which is itself a part of the consortium. The purpose of the conference was to initiate academic collaboration between Pakistan and China. Representatives from various Institutions from People's Republic of China and Pakistan along with Provincial and Federal Government officials, Reps of Chambers of Commerce and Industry from Pakistan and Reps of Chinese Industry / Officials of Chinese Embassy in Pakistan graced the occasion.

(xi) NUST at Belt and Road Forum:

NUST has recently signed a very important MoU with Beihang University, China to establish BeiDou Belt & Road School at NUST. The School will provide learning and research opportunities in Global Navigation Satellite System – GNSS enables high accuracy positioning with the help of satellite signals. Its applications include vast areas such as transportation, telecommunication, agriculture, mining, civil security and many more. This will add value to our science and Tech base and produce researchers in this area. Very soon the entire road network from China to Pakistan, under the CPEC project, will deploy this technology. So it is very important for Pakistan to produce trained and qualified human resource in GNSS. It is worth mentioning that NUST was the only academic institute to sign a MoU at the CPEC summit and this is indeed a landmark achievement for NUST.



Conclusion:

Although quest for quality keeps us focused onto the future, yet it is earnestly felt that a strong foundation has been laid for the constituent colleges and institutes to grow and develop into centers of excellence in their respective fields of specialization. For this purpose, well – considered plans and actions are in hand to ensure that the requisite facilities and supporting infrastructure are regularly upgraded to meet the challenges of the 21st century. With its mission oriented approach, suitable blend of human and material resources, and access to international data bases, the University is well poised to play a pivotal role towards National development through higher learning and indigenous Research & Development.

COMSATS University, Islamabad (CUI)

Introduction

COMSATS University, Islamabad (CUI) is the fast-growing research-based university in Pakistan, with a wide range of academic programs, ranging from basic sciences to cutting edge emerging technologies and a network of inter-disciplinary research centers making it an ideal place for higher studies leading to MS and Ph.D. degrees. Established in 1998 as COMSATS Institute of Information Technology (CIIT) and later granted status of Degree Awarding Institute (DAI) by the Federal Government of Pakistan on August 12, 2000, it has been upgraded to a Federally Chartered University in April 2018 under the COMSATS University, Islamabad Act 2018.

The CUI functions under the governance of the Senate, which is chaired by the Chancellor of the University, the President of Islamic Republic of Pakistan. Besides, Islamabad it has campuses in Lahore, Abbottabad, Wah, Attock, Sahiwal, Vehari and a Virtual campus as well.

Goals and Targets

CUI has developed and expanded its strategic Vision 2020 with specific goals and objectives outlined for the next 15 years, including quality assurance, promotion of research, industrial infrastructure, major areas of academic growth, expansion and specialization, faculty and staff development and international linkages, student service facilities and funding requirements. CUI sees itself as a self-sustaining state-of-the-art academic institute with the purpose of bringing enlightenment, empowerment and enrichment through advancement of learning, expansion of knowledge and development by its application.

Clear-Cut Performance

The CUI currently comprises of six faculties, 20 departments and 08 research centers. Presently 98 degree programs are on offer in which around 33,434 students are enrolled. CUI has become the first Higher Education Institution in Pakistan to offer hybrid teaching from its Fall 2017 semester. There are 2,900+ faculty members working in CUI with 1,120+ faculty members and academic managers have Ph.D. qualification. More than 523 faculty and staff members are undergoing advanced education leading to MS and Ph.D. degrees. The Faculty Development Academy of the Institute is also quite active in the trainings of the newly recruited faculty at CUI. Till now 122 convocations have been organized in which degrees were conferred on 53,249 graduates including 242 Ph.Ds.

CUI Rankings:

Following noteworthy achievements mark CUI among Pakistan's best 03 universities and among world's best 800 universities:

- ❖ In TIMES Higher Education (THE) world universities rankings 2018, CUI has been placed among 601-800 world best universities, and ranked 2nd in Pakistan. Earlier, it was also ranked at #301-400 in THE Engineering & Technology, #401-500 in Life Science and Physical Sciences subject rankings 2018, and improved its position to 125th in THE Asian University Rankings 2018, and was ranked among 150-200 top young universities of world in 2018. It was ranked 190th in QS Asian Universities Rankings 2018.
- ❖ While at the national level, reportedly CUI has been ranked No. 3 in General Category of universities, and No. 6 in Overall Pakistani Universities. CUI is also ranked No. 1 among top 10 Pakistani universities according to Nature Index in 2018. CUI is the only university in Pakistan, which has published more than 2000 impact factor publications in year 2017. CUI published almost 2200 impact factor journal papers in the year 2018.

Conferences/Workshops Held:

During the reporting period, CUI organized different conferences / trainings and workshops. Some of the important ones are listed below:

- ❖ 3-Days Workshop on Public Sector of Pakistan, Social Equity Imperatives and Governance Dynamics was organized by Center for Policy Studies (CPS), CUI in collaboration with Hanns Seidal Foundation, Pakistan at CUI Sahiwal Campus on August 08, 2017.
- ❖ Connected Pakistan Conference (CPC) 17 was organized by Connected Pakistan on August 13, 2017 in Main Auditorium at CUI Abbottabad Campus in collaboration with, KPIT Board, Payneer, and Code Matics.
- ❖ 9th South Asian International Conference (SAICON) was held at Serena Hotel from August 23-25, 2017. Theme of the conference was “Today’s Vision, Tomorrow’s Reality”. During the three-day conference, a total of 161 papers were presented belonging to different disciplines related including Economics, Management, Finance, Human Resource Management and Marketing.
- ❖ 2-days international Symposium on Conflict, Peace and Development Studies was organized by Department of Development Studies, CUI Abbottabad Campus on October 16-17, 2017.
- ❖ 3-days International conference on the impact of nanoscience on energy technologies (NanoSET-2017) was organized by CUI, Lahore Campus on October 25-27, 2017 to share together ideas and solutions for further development in building renewable sources of energy.
- ❖ The 6th Pak-China Business Forum was organized by PCBF secretariat of CUI on November 23-26, 2017 at Expo Center Lahore to promote University - Industry collaborations in business and economic sectors for the mutual benefit of both Pakistan and China.
- ❖ 1st International Conference on Peace, Conflict, and Violence was organized by Department of Humanities CUI, Lahore Campus on November 29-30, 2017.
- ❖ The 6th International symposium on “Biomedical Materials: Clinical Requirements and Regulatory Affairs” was organized by Interdisciplinary Research Centre in Biomedical Materials (IRCBM), CUI, Lahore Campus from December 14-16, 2017. It was organized in collaboration with University of Sheffield, UK and supported by EPSRC (Engineering and Physical Sciences Research Council), UK.
- ❖ 15th International Conference on Frontiers of Information Technology (FIT) was held from December 18-20, 2017. It was a blend of different events, including Keynote Address, Technical Sessions, and Invited Talks, Tutorials, Workshops, PhD Symposium, Best IT Innovation Award (BITA), Project Exhibition and Panel discussion. A total of 31 technical sessions were organized and were chaired by renowned academicians. A total of 30 invited talks were delivered on the latest trends in the areas of computer science and electrical engineering.
- ❖ The 2nd International Conference on “Energy Systems for Sustainable Development (ESSD-2017)” was organized by Energy Research Center (ERC), CUI, Lahore Campus in collaboration with HEC on February 21-23, 2018.

Faculty Development Academy (FDA) has been organizing series of activities for the CUI teachers along with teachers from local universities to equip them with latest knowledge, proactive instructional strategies and an active social interest to foster quality education. A brief summary of the activities conducted by the FDA during the year 2016-2017, is given below:

- i) 2nd Professional Development Training for Young Faculty was organized on July 03 – August 11, 2017.
- ii) Capacity Building Workshop for OPF Principals was organized on July 17 – 20, 2017.
- iii) 3-Day workshop on ‘Testing & Evaluation’ was organized at CUI Attock Campus on September 25 – 27, 2017.
- iv) A Workshop on Strategic Foresight of University Administrators was organized on December 11 – 12, 2017.
- v) A Workshop on ‘Blue-Chip Teaching’ at CUI Sahiwal Campus was conducted on January 16 – 18, 2018.
- vi) A Workshop on ‘Research Methodology’ at CUI Sahiwal Campus was conducted on January 18 – 19, 2018.
- vii) A Workshop on ‘Blue-Chip Teaching’ at CUI Vehari Campus was conducted on January 23 – 25, 2018.

- viii) A Workshop on 'Blue-Chip Teaching' at CUI Lahore Campus was conducted on January 29 – 31, 2018
- ix) 5th Strategic Development Workshop for HoDs at CUI Lahore Campus was conducted on January 30 – 31, 2018

Research and Commercialization:

Faculty members at CUI are actively engaged in research in their respective fields. The total number of research publications of CUI faculty in the year 2017-18 is 3,679. Further, there are around 83 registered companies at SSBC (Student Startup Business Centre), 29 Companies at Cubator 1ne and over 32 companies have graduated at Cubator 1ne. Also filed 55 patents for registration, out of which 13 (11 US, 02 Pak) are granted. During the reporting period, the Office of Research, Innovation and Commercialization (ORIC), Professional Development (PD) has conducted a series of various capacity building seminars and workshops. Detail of important ones are given below:

- i) Training Workshop on "Managing & Engaging Stakeholders in Construction & Civil Infrastructure Development Projects", August 22 - 23, 2017
- ii) Training Workshop on "Structural Equation Modeling Using AMOS", September 07, 2017
- iii) Workshop on "Data Analysis for next generation sequencing (NGS)", September 28 - 29, 2017
- iv) Workshop on "Principles and Applications of Magnetic Resonance Imaging (MRI)", November 1 - 2, 2017
- v) International Workshop on "Techno Parks: Opportunity to seize a Lever of Competitiveness", January 30 to February 01, 2018
- vi) Workshop on "Structural Equation Modeling using Smart PLS", February 8 - 9, 2018
- vii) Workshop on "Technical Requirements of ISO 17025", March 27 - 28, 2018.
- viii) Workshop on "Drug Discovery & Development", April 25 - 27, 2018.
- ix) Workshop on "Working with Microdata using Stata", May 15, 2018

Visits:

CUI encouraged more than 142 foreign delegates from different international organizations to visit CUI. Similarly, it also facilitated 86 CUI officials and faculty to visit abroad under the umbrella of exchange of faculty and officials between CUI and foreign universities.

Alignment of outcomes with the medium term budget estimate for service delivery

Development Activities

The COMSATS University, Islamabad (CUI) until June 2018 has completed 35 PSDP funded projects having total cost of Rs. 4,475.689 million. During the FY 2017-18, the Government of Pakistan allocated Rs. 611.269 million in PSDP for one ongoing and two new projects. The released amount via PSDP allocation stood at Rs. 211.269 million for one ongoing project.

Human Resource Development

During the preceding fourteen (14) years, the CUI has invested generously in HRD through awarding MS and Ph.D. level scholarships to its meritorious faculty/staff. Three hundred and sixty four (364) fully funded scholarships were awarded to the faculty/staff till June 30, 2018 to pursue higher studies at some of the best universities in the world. 159 MS and 176 Ph.D. scholars have returned back after successful completion of their studies and 29 scholars are abroad for pursuing studies on CUI funding.

Performance of Each Section Keeping in View Key Performance Indicators

The performance of each section are being measured, keeping in view the goals, objectives, vision and mission of the University.

Linkages with Budget to Better Reflect Performance

CUI's resources, activities and outputs are aligned with the Governments' objectives in order to achieve desired outcomes and for the maintenance of its aggregate fiscal discipline.

Future Plans and Goals

- ❖ Keeping in view the Government of Pakistan's Vision 2025 which envisages a “Developed, Industrialized, Just and Prosperous Pakistan through rapid and sustainable development in a resource constrained economy by empowering knowledge inputs”. CUI has crafted its targets and objectives for its outlook 2019-20 in line with the various policy documents of the Government of Pakistan, which have been disseminated to each section for its implementation.
- ❖ CUI aspires to achieve to be among 500 world best universities in the Times Higher Education (THE), 2020.
- ❖ CUI has proposed 8 various developmental projects for funding from PSDP 2019-20 with an aggregate cost of Rs. 15,160.846 (Millions).

National Institute of Oceanography (NIO)

Introduction

NIO is the only pivotal research organization in Pakistan for multidisciplinary oceanographic research with experienced and well qualified team of scientists, technicians and supporting staff; more than 30% scientists hold Ph.Ds. from national and international universities. Almost 95% of the scientific team has received specialized training from well reputed international institutions. Since the establishment of NIO, the efforts are being made to enhance the R&D capabilities in the field of oceanography and a number of projects of national and international level have been undertaken. In this regard laboratories were equipped with the state-of-the-art instruments/equipment and software. NIO has grown up at international level for pursuing oceanographic research and surveys. The R&D activities being undertaken by NIO to meet the objectives of the Institute include Marine Geological & Geophysical surveys and studies in the deltaic, coastal and deep sea; Bathymetric Surveys and Mapping of the sea floor, Water Mass studies; Evaluation of living and non-living resources; Biogeochemical studies in the Arabian Sea, impact of global warming and Sea Level Rise; Impact assessment of El-Nino and Upwelling phenomena in the open sea; Acoustic characterization of water column and subsurface strata.

Objectives & Functions of the Institute

- To undertake mission oriented multi-disciplinary research in Physical, Chemical, Biological and Geological Oceanography in Pakistan's maritime zones;
- To undertake oceanographic surveys at the national, international, regional and sub-regional levels;
- To undertake training programmes in various fields of oceanography for the development of indigenous manpower and expertise;
- To establish a National Oceanographic Data Centre (NODC), to serve as a national repository for all oceanographic data/information concerning Pakistan's maritime areas;
- To provide necessary advice to and collaborate with Government and other national agencies engaged in maritime activities;
- To coordinate and maintain liaison with international organizations/ institutes for arranging training/experts services; procurement of specialized instruments and equipment; transfer of marine technology and development of cooperative research programmes;
- To hold Seminars/Workshops/Symposia at national, international, regional and sub-regional levels;

Budgetary Allocations

Statement Showing the Details of the Budget Allocations during Past Two Years (NON-DEVELOPMENT)

(Rs. In Million)					
S. No.	Year	Allocation/ Approved Budget	Supplementary Grant (+)	Surrendered Amount (-)	Released Amount
(i)	2016-2017	113.564	26.6	--	140.164
(ii)	2017-2018	135.024	28.386	0.800	162.61

(DEVELOPMENT)

(Rs. In Million)			
S. No.	Year	Allocation/ Approved Budget	Released Amount
(i)	2016-2017	10.0	10.0
(ii)	2017-2018	10.0	10.0

During the year 2017-18, NIO continued to progress as per its main objectives and functions assigned under NIO Act of 2007.

Research Activities/Achievements during Financial Year 2017-2018

Fourth Preparatory Committee Meeting for Development of an International Legally Binding Instrument under the UN Convention on the Law of the Sea on Conservation and Sustainable use of Maritime Biological Diversity of Areas beyond National Jurisdiction - New York, 10-21 July 2017.

Fourth and the last Preparatory Committee Meeting on the development of an international legally binding instrument under the UN convention on the law of the sea on conservation and sustainable use of maritime biological diversity of areas beyond national jurisdiction took place in New York, 10-21 July, 2017. Dr. Hina Baig, Senior Research Officer of NIO attended the third preparatory committee meeting. Considering the subject knowledge and understanding that has been developed, recognizing her active participation and her individual contribution, Pakistan Mission in UN has nominated her for the fourth and the last preparatory meeting.

All states are obliged to undertake actions for the effective implementation of United Nations Sustainable Development Goals (SDG). It has direct relation with NIO being the sole organization working in Ocean Sector and having the responsibilities as a member of two committees established by Prime Minister for sustainable utilization of living and non-living marine resources in the maritime zones of Pakistan. This instrument is being developed for the areas beyond national territorial water.

Legal and Technical Commission, International Seabed Authority Meeting

The Legal and Technical Commission (LTC) is an organ of the Council of the International Seabed Authority and currently consists of 30 members who are elected by the Council for a period of 5 years based on personal qualifications relevant to the exploration, exploitation and processing of mineral resources, oceanography, economic and/or legal matters relating to ocean mining and related fields.

Mr. Khalid Mehmood Awan, is elected as a member for the period 2017 to 2021 from Pakistan. He attended the second Legal and Technical Commission meeting held in Kingston, Jamaica from 31 July to 09 August 2017. The commission has since its inception developed the Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area, the Regulations on Prospecting and Exploration for Polymetallic Sulphides and Cobalt-Rich Ferromanganese Crusts in the Area.

Foreign Trainings of NIO Scientists

Ms. Aneela Shaheen, Research Officer, NIO participated in training titled “Molecular Taxonomy Training Based on Single DNA Barcoding and Meta-barcoding from 25 September 2017 to 6 October 2017, Jakarta, Indonesia.

Local Training of NIO Scientists

Three NIO scientists participated in training on “Earth Remote Sensing with Synthetic Aperture Radar” from 10-18 July, 2017 at Institute of Space Technology (IST), Islamabad. The training included the basics of various radar technologies, focusing on Synthetic Aperture Radar (SAR), its uses, advantages and limitations, the variety of software packages used for image processing, relevant online portals and help forums. The training also consists of hands on lab practice of the relevant software and tools, processing and interpretation of images, and how to effectively utilize the online resources and forums.



NIO officers successfully completed "2017 Summer School on Remote Sensing & GIS", organized by National Center for Remote Sensing & Geo-Informatics, Institute of Space Technology, Karachi, on August 1-10, 2017, at National Center for Remote Sensing and Geo-Informatics, SUPARCO HQs., Karachi. During the training, participants had hands-on training on remote sensing softwares and its application.

Two NIO scientists from Chemical section participated in Training workshop SDG organized by Pakistan Council of Research in Water Resources (PCRWR) from 9-10 April 2018.

Two NIO scientists participated in the training "2018 Spring School on Remote Sensing & GIS from 2-11 May 2018". The training was organized by the Department of RS & GIS, Institute of Space Technology, (NCRG-Karachi), National Centre for Remote Sensing and Geo-Informatics SUPARCO HQs, Karachi, Pakistan.

One NIO scientist participated in the "Workshop on Lithostratigraphic logging and facies analysis at Federal Urdu University from 30 April to 5th May 2018". One NIO scientist participated in the training on "Planning and Development of Gwadar Port of Pakistan from 26 June to 18 July 2018".

Meeting for Revitalizing Pakistan Fisheries Sector to Reduce Poverty and Shared Prosperity with World Bank, Agence Francaise de Development and UNIDO Committee Technical Assistance on 20th July 2017

A Consultative meeting of Poseidon experts (Mr. Shaukat Hussain, Mr. Tim Huntington, Mr. Graham Haylor) under AFD Project and Mr. Mike Pillau of UNIDO with NIO scientists was held on 20 July 2017 at NIO Head office for technical diagnostics for Pakistan Fisheries Sector. DG, NIO briefed about NIO objectives and focused on the whole fishery sector and role of NIO in Fisheries and said that Climate change department wants NIO for study of fishery. Though the water quality is good, coastal aquaculture is not yet developed in Pakistan, but NIO has experts in hatchery development of shrimps and crabs.

Inter-Ministerial Meeting of the Technical Evaluation Committee (TEC) on Continental Shelf Extension Programme of Pakistan

A meeting of the Inter-Ministerial Technical Evaluation Committee (TEC) responsible to oversee implementation of Pakistan Continental Shelf Extension Programme and matters associated with this, was held under the Additional Secretary, Ministry of Science and Technology on 26 July 2017. The main agenda of the meeting was to deliberate upon: i) modalities of sharing the seismic data of the Pakistan Extended Continental Shelf with Ministry of Petroleum and Natural Resources (MoP&NR), ii) update on the recent Note verbal by Oman submitted to the UN- Commission, and iii) the proposed tripartite deep-sea gas pipeline.

DG, NIO explained that only 17 offshore Oil & Gas exploratory well could be drilled in the past. He further added that the areas offshore adjacent to Pakistan's maritime area boundary with India have very productive oil fields whereas Pakistan has not yet explored this area for oil & gas. The TEC was

of the view that reasons for failure of exploratory wells needs to be documented by the concerned agencies and this matter be discussed on the agenda of next technical meeting at the next technical meeting at the Ministry of Petroleum and Natural Resources. Seismic Data is available in NIO for resource potential assessment in the Indus Basin collected during Continental shelf extension project. DG NIO offered Oil and Gas industries and other R&D organization to work together. The issue of up gradation of software and hardware was also discussed to process this seismic data. The graphic points indicating the outer limits lines of the continental shelf, Pakistan in August 2016, have submitted to the Secretary General United Nations and to the International Seabed Authority respectively. Oman's latest note Verbale submitted in December 2016 was considered seriously in the meeting and regretted that Mo Foreign Affairs apparently not apprehending the matter on contrary referring the Inter-Ministerial TEC meeting held at MoST on 20th February 2017 where Mr. Imran Khan, Director UN and informed that "Pakistan's Mission has already held a meeting with Oman's representative and the matter has been resolved but it is still on UN's Website showing that matter has not yet been resolved. Ministry of Foreign Affairs has not yet issued any clearance on this matter. The issue of Iran, India and Oman Gas pipeline may pass through Pakistan's maritime area was also discussed in the meeting.



International Coastal Cleanup Day, 16–22 SEPTEMBER 2017

The international cleanup day was established by the ocean conservancy and organizations that work to help and protect the ocean from the challenges it faces every year. They serve as a voice for the ocean, speaking about the issues that are not often represented by social networking.

This year the beach cleaning activity was organized in collaboration with Sindh Government, Wildlife Fund for Nature – WWF – Pakistan, United Nations Environment Programme, Engro, some local NGOs and corporate giants at the Karachi sea view and Clifton beach.

NIO participated in Clifton/Sea View Beach cleaning during 16 - 22 September 2017 with other organizations. NIO also arranged a one-day seminar for the awareness of the general public and press media.



Minister of State for Science & Technology Visits NIO

Honorable Minister of State for Science and Technology Mr. Mir Dostain Khan Domki, visited the National Institute of Oceanography on 13th October, 2017. Dr. Asif Inam, Director General, NIO briefed him about the overall scientific progress on the various ongoing programmes of the Institute which were related to ocean resource development. DG, NIO also briefed about the successful execution of Continental Shelf.



Visit of DG-NIO to PCSIR Karachi Laboratories Complex, Karachi to Meet Secretary, MoST

DG-NIO visited PCSIR Laboratory Complex, Karachi to meet the Secretary, MoST. He presented the brief about the National Institute of Oceanography and its R & D activities on 27-10-2017. He also explained about the PSDP projects conducted and in progress. He also explained the findings and benefits of the projects. Secretary, MoST appreciated the progress of NIO and emphasized for maximum outreach to various stake holders.



NIO Scientists under Chinese Ph.D. Programme

Under Pak-China Executive Agreements signed with SIO/SOA, ECNU SKLEC, four NIO scientists are enrolled in different Chinese universities for Ph.D degree. One of the four NIO scientists Mr. Noor Ahmed Kalhoro has successfully defended PhD Thesis evaluation in the field of “Coastal Engineering” at Zhejiang University Hangzhou, China and has been awarded degree of PhD (Year 2013-17).

Ms. Sanober Kahkashan has successfully defended Ph.D. Thesis evaluation in the field of “Geochemical Indication of Biomarkers in the Sediments from the Northern Arabian Sea” on 19 May 2018 at College of the Environment and Ecology, Xiamen University, China.

Bathymetric Survey to Assess Dredging Volume of Fish Landing Jetty at Pishukan (West Bay) Gwadar

On a request of Gwadar Development Authority (GDA), the National Institute of Oceanography (NIO) carried out detailed bathymetric survey of the Pishukan Fish Landing Jetty. The jetty is facing problem of siltation therefore to make it useful for small and large fishing boats, the Gwadar Development



Authority decided to dredge the silt deposited within the jetty area. As a pre-requisite of a dredging, two bathymetric surveys were required to be conducted to determine the volume of silt that need to be dredged to make the jetty operational again. NIO conducted the surveys and provided the required information to the concerned department.

Visit of Officers of Pakistan Navy to NIO

A one-day training course for Pakistan Navy officers undertaking “CAT ‘B’ Hydrographic course of Pakistan Navy officers of navigation & hydrography school, PNS Bahadur, Karachi was conducted on 1st December, 2017 at NIO Conference Room. Different lectures related to ocean science were delivered to them by NIO scientists. They also visited different laboratories of the Institute and were briefed about the latest analytical techniques and instruments.

First Joint China-Pakistan Expedition to Study Marine Geology of the Makran Margin, North Indian Ocean, Pakistan

The First Joint China-Pakistan Expedition to Study Marine Geology of the Makran Margin, North Indian Ocean, Pakistan was carried out during 13 January to 3 February 2018 on board the R/V Shiyan-3 organized by South China Institute of Oceanology (SCIO) and National Institute of Oceanography, Pakistan. Seven NIO scientists participated in the cruise. Water Sampling Parameters included nutrient, suspended load, Total alkalinity and Dissolve Inorganic Carbon (DIC). Multichannel System (MCS), Multibeam Survey, Gravity survey, Magnetic survey were conducted. Box corer and Gravity corer were used for sediment samplings. Ocean Bottom Seismometer (OBS) were deployed at the bottom for collecting data to record the observation related to earthquake, in addition CTD, ADCP were also used for current, temperature, conductivity and depth observations.



Chinese Delegation at the National Institute of Oceanography, Pakistan

A five member delegation from Second Institute of Oceanography (SIO) visited NIO from the 25-27 June 2018. The main purpose of the visit of SIO delegation was with reference to the installation of the sediment trap in the offshore area and marine seismometer in the coastal area of Pakistan for oceanographic, environmental and coastal hazard monitoring. The data acquired through the network of the mooring and marine seismometer would be extremely beneficial for NIO in its study of monitoring coastal erosion and seawater intrusion along the coastline.



Visit of Rear Admiral® Shahid Saeed to NIO

Rear Admiral (R) Shahid Saeed HI (M), Pro Rector, Bharia University and DG, Islamabad Campus visited NIO on 8th January 2018 to discuss areas where NIO scientists could provide training to the students and faculty of Bharia University and also how could the marine sector be transformed into revenue generating sector by capitalizing CPEC related activities. It was further decided that a regular and meaningful collaboration between NIO and Bharia University be strengthened so that the students of Bharia University could contribute in NIO's project to earn invaluable working experience.



Side Scan Sonar Survey to Assist KPT in Search of Submerged Containers

A CONTAINER VESSEL "Tolten" carrying transit-containers collided with a stationary vessel in the South Asia Pakistan Terminal (SAPT) berth NO. 4, on Monday 19th March 2018. As a result of the incident, around 19 containers on board the ship fall into the sea. Immediately after the incident, the containers started floating towards the approach channel due to the pervading wind posing danger to the movement of the ships entering the channel. NIO was requested by the KPT Authorities for assistance in surveying the channel and assessing the area affected by the sunken containers. NIO team comprising of three persons carried out side scan survey and helped KPT in locating the submerge containers near the KPT Jetty. Ten Containers were identified during this survey.

Consultative Session on Marine Litter Status and Issue

On the request of DG, Climate Change, a Consultative Meeting of Stakeholders was convened at NIO in April 2018. The meeting was attended by Mr. Fayyaz Rasool, Manager, Marine Pollution, Karachi Port Trust (KPT), Ministry of Maritime Affairs and Mr. M. Muhammad Moazzam Khan, Technical Advisor, WWF, Dr. Nuzhat Khan, Principal Scientific Officer (NIO), S. H. Niaz Rizvi, Ex-Director General (NIO), Cdr. Ali Abbas, Director, National Center for Maritime Policy and Research (NCMPR), Naghmana Zafar, NCMPR, Iqbal Nafeez Khan, Director General, Sindh Coastal Development Authority, Lt. Col. Zulfiqar Abbasi, Defence Housing Authority, Karachi, Cdr. Ghazi Sulahuddin, Pakistan Maritime Security Agency, S. M. Zafar Imam, Marine Fisheries Department, Waris Ali Gabol, Deputy Director, Sindh Environment Protection Agency, Syed Ali Raza, Director, Sindh Solid Waste Management, Mumtaz Haider Khan and Naveed Ali Soomro (IUCN). The stakeholders contributed in the preparation of a Report on Marine Litter.



Oceanographic Studies for Selection of Suitable Site for Desalination Plant at Gwadar, Balochistan

The Gwadar Development Authority/Public Health Engineering, Gwadar requested NIO to assist them in selection of suitable site for their desalination plant. NIO has initiated a detailed survey and sampling plan. NIO has an oceanographic substation at Gwadar and maintains local staff at the facility, during the survey one of the objectives was to provide on the job, hands on training to the NIO Gwadar staff in the field and laboratory. The Gwadar staff was involved with the Karachi based NIO team to operate all the instruments and gear on the offshore sampling. Rapid Ecological Survey techniques were explained to the staff and data recording was demonstrated. Detailed oceanographic observations are underway.

Goals and Targets

Post Continental Shelf Extension Scenario

After the extension of the Continental Shelf of Pakistan, the Ministry of Science & Technology submitted a working document to the PM Secretariat and presented broad assessment of the living and non-living resource potential of Pakistan's maritime area, and proposals for its exploration and exploitation, identifying roles and responsibilities as well as the stakeholders required to be engaged. It was proposed that an inter-ministerial Committee may be constituted under the Chairmanship of Secretary, Petroleum and Natural Resources to chalk out strategy for the assessment, exploration and exploitation of Hydro-Carbon Resources / gas hydrates as well as other minerals found in our continental shelf. It was also proposed that an inter-ministerial Committee may be constituted under the Chairmanship of DG, NIO for assessing the potential of fisheries and other living marine resources in the limits of our continental shelf and propose modalities for its exploitation.

NIO has developed an overview of the biological production of the continental shelf through its various programs, but these need to be updated in the light of climatic variability and alterations in the inter-annual monsoonal patterns. This will contribute towards the assessment of the living resource potential of the Pakistan Maritime area along with answering many new questions that have arisen in the last decades. NIO has prepared a comprehensive report on the assessment of the status of the living resource in the maritime area of Pakistan. The Report is presently being technically vetted at the Centre of Excellence in Marine Biology, University of Karachi.

One of the biggest contributions of NIO during the reporting financial year is the acquisition of high-quality seismic reflection and seismic refraction data along with the multibeam bathymetry of a portion of Makran Shelf. NIO scientists are now working on the samples and data collected by the Chinese Research Vessel Shiyan3.

In the first week of May 2018, NIO received an email from Prof Gong of China Geological Survey (CGS) informing that the CNS had a meeting with the senior officials of CGS and accordingly a delegation of CGS was planning to visit NIO in August/September 2018 for detailed discussion regarding a plan to undertake extensive marine geological work in the Makran offshore area.

Considering the experience of CGS in successful exploration and exploitation of Gas Hydrates from South China Sea, NIO anticipates that the target-oriented research for the exploration and exploitation of Makran Gas hydrates can substantially contribute to the economic development of Pakistan.

NIO has several collaborative research initiatives, with P.R China under its Bilateral Agreements with Chinese institutions. The First Steering Committee meeting of the China Pakistan Joint Commission on Ocean Research that were to be convened in December 2017 will be rescheduled in the 1st quarter of 2018, several joint research projects are under consideration, joint proposals will be reviewed and approved. The South China Sea Institute of Oceanology (SCSIO), Chinese Academy of Sciences recently carried out a first joint cruise in the Makran margin and post cruise activities are expected. NIO scientists will visit SCSIO for analysis. The agreement between NIO and State Key Laboratory of Estuarine and Coastal Research (SKLEC), East China Normal University will continue. NIO scientist will visit SKLEC for advanced sample analysis. Joint submissions are also in the planning. The NIO side of the implementation of collaborations is supported through the R&D of NIO. New funding sources will be explored.

First China and Pakistan Joint Expedition to Makran Margin in North Arabian Sea was held in Jan - Feb 18 onboard Chinese Research Vessel SHIYAN-3. The joint oceanographic and seismic research activity was a result of research cooperation between National Institute of Oceanography (NIO), Ministry of Science and Technology (MoST), Pakistan and South China Sea Institute of Oceanology (SCSIO), Chinese Academy of Sciences (CAS). The Joint Expedition conducted multidisciplinary surveys in the offshore area of Pakistan with focus on Makran Subduction Zone. The joint research activity was undertaken in the Exclusive Economic Zone (EEZ) of Pakistan upon invitation of Ministry of Science and Technology (MoST). The expedition focus was to understand geological, seismic, sedimentation processes in the area. The two main areas of this expedition were focused on improving understanding regarding the seismicity of the Arabian Sea and the assessment of gas hydrate potential along the Makran Coast and how these two main aspects of the expedition would be beneficial to the people of Pakistan, help towards mitigation plans for disaster management and socio-economic development of Pakistan.

Status of PSDP Projects

- Capacity Building for Tapping Marine Living Resource Potential of Pakistan, through Biological Oceanography, Phase 1, NIO (CPEC Related Project) at a total cost of Rs. 54.36 million (ongoing 2018-19).
- Monitoring Sea Level Rise, Sea Water Intrusion and Land Subsidence in Indus Deltaic Creek System with Special Reference to Sindh Coastal Cities Flooding at a total cost of Rs. 411.05 million (under consideration with CDWP).
- Acquisition of Oceanographic Research Vessel at a total cost of Rs. 5800 million (submitted).

Pakistan Council for Science and Technology (PCST)

Introduction

Pakistan Council for Science and Technology (PCST) is one of the oldest institutions of Ministry of Science and Technology; established in 1961 to provide advice to the government on science and technology policy issues. PCST is also the designated secretariat of the National Commission for Science and Technology (NCST) - the highest S&T Policy forum headed by the Prime Minister. PCST prepares agenda for the meetings of NCST and its Executive Committee (ECNCST) in consultation with federal ministries, provincial departments and all other major stakeholders of S&T.

PCST also oversees the overall development of S&T in the country. To achieve this objective, it evaluates research of scientists, carries out analytical studies on important S&T issues and publishes the results in the form of S&T indicators, reports and articles. Besides this, for seeking expert opinion and advice regarding development and application of science and technology in different S&T areas, the Council constitutes “Think Tanks” and “Expert Committees” as and when needed.

Objectives & Functions

- Advises the Federal Government on all matters relating to the development of science and technology in Pakistan.
- Undertakes policy research, organize study groups or task forces, formulate policy proposals, monitoring and evaluation of science, technology and innovation policy for achieving targets for the overall development of science and technology in the country.
- Identifies priority areas for research and development keeping in view futuristic developments of science and technology.
- Constitutes expert committees in various disciplines for preparation of reports on policies and issues of national importance in respect of science and technology.
- Collects, updates statistics and maintains database on science and technology potentials of the country.
- Takes measures for effective collaboration among academia, research and development organizations and industry for development of indigenous products or technologies.
- Promotes quality research and facilitates development of research culture in the country, through evaluation of national research and development activities including output of individuals and institutions and granting awards or incentives thereof.
- Promotes collaboration among national and international organizations for promotion and capacity-building in science and technology and to enter into memoranda of understanding, contracts etc., in accordance with the Rules of Business, 1973.
- Participates in national science and technology planning and development activities and providing advice on selection of projects.
- Promotes or implements projects of national importance.
- Acts as the Secretariat of the National Commission for Science and Technology (NCST).

Achievements against Performance Indicators

i. Agenda and Working Paper for the 4th Meeting of National Commission for Science & Technology:

The National Commission for Science & Technology (NCST) was established on 31st March 1984 with the main objective to provide leadership and guidance in the development of a strong and well-integrated system of Science & Technology (S&T) directed towards welfare of the people through socio-economic development, and enhancing security of the country. Ensuring proper linkages of S&T efforts with the production sector and development plans, is one of the key functions of NCST. Prime Minister of Pakistan is head of the Commission which is composed of 26 members including Federal Ministers, representatives of four Provinces and prominent scientists and industrialists.

Executive Committee of NCST (ECNCST) was established on 5th April 1989 to coordinate, oversee and review the S&T policies and implementation of the policy decisions taken by the NCST.

Pakistan Council for Science and Technology (PCST) is the designated Secretariat of the NCST and ECNCST which prepares agenda for the meetings of NCST and ECNCST, in consultation with all major stakeholders.

PCST organized 6th meeting of ECNCST on 09th March 2016; recommendations of which formed basis of the Agenda for the 4th meeting of NCST which has been submitted to the Prime Minister's office for suitable date and time for the meeting for final approval of the agenda. Following agenda items are included in the Agenda of NCST's meeting.

- Agenda Item#1:** National Research Priorities (National Research Agenda)
- Agenda Item#2:** National Science, Technology and Innovation Strategy and Action Plan
- Agenda Item#3:** Promotion of R&D and Innovation in Industry
- Agenda Item#4:** Increase in National R&D Spending up to 1% of GDP by the year 2020 and up to 2% by 2025
- Agenda Item#5:** Uniform Salary Structure for S&T Organizations
- Agenda Item#6:** Changes in the Composition of the National Commission for Science and Technology (NCST) & Its Executive Committee (ECNCST)

ii. National Research Agenda:

Pakistan Vision 2025 envisions Pakistan as the next Asian Tiger. To realize this vision, five enablers and seven pillars have been identified. Under the seven pillars, 25 goals have been set which would be accomplished by the year 2025. The Vision envisages that Pakistan could become one of the top 25 economies of the world by 2025. Innovation, through focused research and development, is one of the major thrust areas of the Vision 2025. Science & technology and research & development can play an important role to realize almost all the goals and targets of the Vision 2025, while some of the goals require direct interventions of science and technology. The National Research Agenda has been prepared with the aim to align the national R&D and innovation activities with the Vision 2025 and to provide a direction to the national R&D efforts so that they adequately support achievement of the goals set in the Vision 2025.

The main features of the National Research Agenda include problem statement, present state of development, relevance with the Vision 2025, focus areas of research, recommendations for overall development of the area and potential socio-economic impact. In the National Research Agenda, priority areas have been identified which have been deemed important for achievement of goals and targets of the Vision. The priority areas include, i) Agriculture & Food Security, ii) Water, iii) Energy & Fuel Cell Technology, iv) Health & Pharmaceuticals, v) Climate Change & Environment, vi) Biotechnology, vii) Information & Communication Technologies (ICTs), viii) Mineral Resources, ix) Nanotechnology, x) Housing, xi) Electronics, xii) Space Technology, xiii) Marine Resources, xiv) Automotive, and xv) Robotics. It is hoped that the document of National Research Agenda will provide basis of initiation of well-directed, long-term & sustained R&D efforts to successfully achieve the Pakistan Vision 2025.

iii. National Science, Technology and Innovation Strategy and Action Plan:

The role of Science, Technology and Innovation (STI) in the economic transformation of countries is well recognized. However, it can play this role only if scientific advancement and technological development is governed by well-thought-out properly-defined and smartly-planned guidelines in the form of STI Strategies. The National STI Strategy 2014-18 of Pakistan was prepared by PCST. However, a need was felt to make it more focused with clear time bound targets and harmonize it with the Pakistan Vision 2025 and in-line with economic development agenda. Hence, a detailed review of the National STI Strategy 2014-18 was undertaken and as a result the draft of the revised National Science, Technology and Innovation (STI) Strategy and Action Plan was prepared.

The main features of the revised STI Strategy and Action Plan include clearly defined timelines, estimation of costs, identification of implementing agencies, major stakeholders, milestones, deliverables and key outcomes for each proposed Action. The Strategy and Action Plan has been categorized into important areas viz (i) Promotion of Science in Society, (ii) STI Policy and Management Infrastructure, (iii) Science Education and Learning, (iv) Enhancing Industrial Competitiveness through STI, (v) Strengthening of Metrology, Standards, Testing and Quality (MSTQ) System, (vi) Exploitation of Marine Resources, (vii) Climate Change and Environment, (viii) Improving Health and Pharmaceutical sector, (ix) Focusing Emerging Technologies, (x) Strengthening Metals and Metallurgy sector, and (xi) Space Science and Technology Development.

iv. Improving National Innovation System for Socio-Economic Development of Pakistan:

A project concept proposal “Improving National Innovation System for Socio-Economic Development of Pakistan” for receiving policy consultancy along with funding from South Korea was prepared. The proposal was recommended and approved by MoST and forwarded by the Ministry of Finance, Revenue and Economic Affairs of Pakistan to the Embassy of Republic of Korea in Pakistan.

The main objectives of the proposed cooperation are as follow:

- To learn from Korean experience for the establishment of national innovation system directed towards social and economic development of the country.
- To receive consultancy from Korean experts for improving and gearing up the National Innovation System (NIS) of Pakistan for enhanced industrial competitiveness and economic development of the country.
- To identify gaps and pinpoint shortcomings / weaknesses within the innovation system of Pakistan.
- To propose practicable policy measures to fill gaps and remove weaknesses of NIS.
- To build capacity of STI policy professionals from the Pakistan Council for Science and Technology (PCST) and the Ministry of Science and Technology (MoST) for analyzing and managing NIS .
- To train stakeholders of the national innovation system through training workshops at federal and provincial levels.
- To establish linkages between science, technology and innovation policy professionals and experts from Pakistan and Korea.

v. Research Productivity Award (RPA) & Directory of Productive Scientists of Pakistan (PSP):

Research Productivity Award (RPA):

Considering the fact that the Universities, as well as the R&D organizations are experiencing problems of retaining high quality S&T manpower, NCST, in its 2nd meeting, decided, inter-alia, that the salaries of highly qualified Scientists and Technologists should be brought at par with those prevailing in Industry, so as to attract the brightest students to opt for careers in various Scientific and Technological fields. The Ministry of Science and Technology, in consultation with PCST, decided to grant Research Productivity Allowance to active scientists on the basis of their publications in international Journals and their performance, as evaluated empirically by Journal Impact Factors, Citations and Peer Review. The following key achievements in respect of RPA were made:

- In order to facilitate the applicants, an online application submission system was developed for RPA as per revised criteria.
- The criteria of RPA was reviewed and revised through high level RPA Review Committee. With the perspective to improve the quality of review process and in

line with the recommendation of review committee, independent sub-committees were introduced for the first time to peer review the Books (Published / Edited) and Applied Research Output (Medical and Engineering) as part of RPA evaluation process.

- RPA exercises are carried on annual basis. For the year 2017-18, 250 applicants were awarded RPA in 12 subjects in four different categories from A to D.

Directory of Productive Scientists of Pakistan (PSP):

Regular qualitative and quantitative evaluation of publicly funded scientific endeavor is desirable throughout the world in order to gauge the efficacy of exploitation of the public funds. Pakistan Council for Science and Technology conducts regular studies which provide information about the productive scientists of Pakistan based on research related parameters including authorship of books, PhD research supervision, cumulative impact factor and citations for the papers published in impact factor journals, patents granted, awards won and winning of competitive grants. Additional parameters under applied research output i.e. Crop Varieties / Engineering Process / Medical Devices etc. are also taken into account for scientists and engineers involved in the applied research.

Applications were invited through national press under improved criteria in 2017. The 9th edition of the Directory of Productive Scientists of Pakistan (PSP – 2017) was completed, printed and distributed among stakeholders.

vi. Revision of RPA/PSP Criteria:

Meeting of the Sub-Committees to Review Criteria and Development of Draft Performa/Guidelines for “Innovation/Applied Research Output” for RPA/ PSP

A meeting of the sub-committees to revisit and review the innovation/applied research output component of the Research Productivity Award (RPA) and Directory of Productive Scientists of Pakistan (PSP) and to develop a draft performa / guidelines for this purpose was held on Aug 15, 2017 under the chairmanship of Prof. Dr. Anwar-ul-Hassan Gilani, Chairman PCST. The sub-committees comprised eminent scientists with representation both from public/private sector academia and R&D organizations as well as from the Ministry of Science & Technology (MoST), Higher Education Commission (HEC), Ministry of Planning, Development and Reform, Federal Seed Certification & Registration Department, Pakistan Engineering Council (PEC) and from Armed Forces . The Chair explained that it is the need of time to focus on the translation of scientific knowledge into products, processes and services for the socioeconomic development of country. PCST fully appreciates this and through RPA/PSP schemes is contributing in promoting applied research output and innovation to bolster economic growth and to solve and find solutions to everyday, practical problems. For this purpose 10% weightage was allocated to this component. The sub-committees discussed separately in three categories namely Engineering, Medical/Biomedical and Agriculture and developed comprehensive criteria for evaluation. It was unanimously agreed by all sub-committees that to attract more scientists towards innovation and applied research, the criteria needs to be relaxed and its evaluation should not be on "all or none" basis.

Meeting of the National Committee to Peer Review Criteria for RPA/ PSP

A meeting of the Research Productivity Award (RPA) and Productive Scientists of Pakistan (PSP) National Review Committee was held on Sep 7, 2017 at Pakistan Council for Science and Technology (PCST), under the headship of Prof. Dr. Anwar ul Hassan Gilani, Chairman PCST. The committee comprised eminent scientists and heads of organizations with representation both from public/private sector, academia and R&D organizations as well as from the Ministry of Science & Technology (MoST), Higher Education Commission (HEC), Pakistan Engineering Council (PEC) and Pakistan Medical and Dental Council (PMDC). The Chair explained that revision of RPA/PSP schemes is an annual exercise based on the feedback received from the scientific community. It was apprised in the meeting that PCST received positive feedback on the existing criteria of PSP/RPA from the scientific community with growing ownership, reflective from the highest number of participants/registrations i.e. more than 3000 in 2016-17 compared to 2257 in 2015-16. The major decisions of the

committee included subject-wise categorization in RPA to address cross discipline variations and rationalization of benchmarks using the mean of the highest scores in each subject for both RPA and PSP. The committee also decided to add citations per article to the existing criteria and reduce the weightage of impact factor from 30 % to 20%, keeping in consideration the growing trend globally of giving more importance to citations. Detailed criteria and minutes of the meeting are available at <http://pcst.org.pk/rpa.php>.

vii. Technology Foresight Exercise:

Technology Foresight (TF) is a systematic approach for the national planning of science and technology that focuses on the future of science and technology, both as a driver of change and as a response to the needs of society. It is a collective thinking and wisdom to look into the longer-term future of science and technology and its potential impact on society i.e. national capacity to think ahead. During the year 2017, PCST conducted Technology Foresight Exercise (TFE) in three different sectors namely Mineral Sector, Automotive Sector and Robotics.

Mineral Sector:

The Expert Panel on Mineral Sector was headed by Prof. Dr. Muhammad Qasim Jan, President, Pakistan Academy of Sciences. Other members included distinguished geologists, mining engineers, academicians and industrialists from across the country. The Panel carried out several meetings and brainstorming sessions to identify the priority areas, key issues, strengths and areas of technological intervention, focused areas of research and policy recommendations. 1st Technology Foresight Expert Panel meeting on Mineral Sector was held on January 9, 2017 while the 2nd meeting was held on May 25, 2017. Both the meetings were held at PCST under the chairmanship of Prof. Qasim Jan. Two Sub Committee meetings of the Technology Foresight on Mineral Sector were also held with the meeting on July 4, 2017 at PCST under the chairmanship of Engr. Khalid Parvez, President, Mines Owner of Pakistan and the second meeting on July 18-20, 2017 in University of Karachi. The report is being finalized and will be published shortly.

Automotive Sector:

The Technology Foresight on Automotive Sector has also been carried out by PCST during the year 2017. The Panel was constituted having representation of top level experts from academia, R&D organizations, industry and private sector. The Panel was headed by Mr. Suhail P. Ahmed, Chairman, Pak-Japan Business Forum. Three Technology Foresight Expert Panel Meetings on Automotive Sector were held, respectively on Apr 5, May 16 and Sep 12, 2017 at PCST under the Chairmanship of Mr. Suhail P Ahmed. After several meetings and brainstorming sessions, the panel finalized the report having a detailed overview of automotive sector, key issues, strengths, areas of technological intervention, policy guidelines, focused areas of research and recommendations. The report is being finalized and will be published shortly.

Robotics:

PCST also initiated Technology Foresight studies on Robotics by constituting an Expert Panel having representation of top level experts from around the country. The First Panel meeting in this regard was held on Aug 17, 2017. Dr. Abdul Ghafoor, Dean/ Principal, SMME, NUST, Islamabad was unanimously selected by all members of the Panel as Panel Chair whereas, Dr. Yasir Ayaz, NUST was selected as Dy. Chair. While 2nd Panel meeting was held at PCST on 11th April, 2018 to discuss the draft report prepared by experts of the panel.

Housing:

The expert panel formation on Housing Sector has been completed. A letter has been sent to the potential members for their inputs/recommendations on housing sector and the way forward for the panel activities.

viii. Science, Technology and Development (Quarterly Journal):

Pakistan Council for Science and Technology (PCST) has been publishing a quarterly journal; Science, Technology and Development since 1982 on a regular basis as a part of its mandate. The aim of publishing this journal is to make available policy analysis in all disciplines of science including science education. As a result of efforts of the past and present management, the journal has been recognized by HEC and is placed in category “Z”.

PCST has successfully developed & launched an online Content Management System (CMS) for improvement of Journal “Science, Technology & Development”, which include:

- Online submission, publishing, editing and modification of content
- Improving Visibility/Circulation of the Journal
- Indexing/Abstracting of the Journal (focusing HEC recognized Indexing/Abstracting services)
- Handling unethical withdrawal of the manuscript during or after review process, identification of potential reviewers and speeding up review process etc.

ix. PCST’s Quarterly Newsletter – STI Voice:

PCST has been working for the cause of Science & Technology since 1961 with huge mandate and outstanding achievements particularly in earlier years. But these achievements or contributions of past legendary Chairmen have not been projected to the community systematically. It has been realized that a sound system of communication is the need of the time. On the advice of the Chairman PCST, a quarterly newsletter has been launched with the vision that PCST Newsletter (STI Voice) should be different from traditional newsletter and covers history of PCST, contributions of legendary leaders and famous Muslim Scientists of the past, a regular column on young scientists, Nobel Laureate, important discoveries along with announcements for funding and career opportunities for young scientists. The idea has been materialized and PCST has launched its first ever issue of newsletter namely Science Technology Innovation Voice (STI Voice) in the year 2015. Mr. Fazal Abbas Maken, Federal Secretary, MoST inaugurated the subject newsletter (STI Voice). Since then STI Voice is being published regularly.

x. Conferences/Workshops Organized:

3rd National Workshop on Organic Food and Health: Avenues of Innovation and Entrepreneurship, Peshawar, November 30, 2017

The 3rd National Workshop of the Series on ‘Organic Food and Health: Avenues of Innovation and Entrepreneurship’ was organized by Pakistan Council for Science & Technology (PCST) on November 30, 2017 at University of Engineering and Technology (UET), Peshawar as part of 3rd Invention to Innovation Summit KP-2017. Prof. Dr. Zahoor Ahmed Swati, Vice Chancellor, The University of Agriculture, Peshawar was the Chief Guest during the Inaugural Session. Mr. Muhammad Israr, Secretary, Agriculture Department, Government of Khyber Pakhtunkhwa graced the occasion as Chief Guest, during the closing session. The workshop attracted a large participation from province-wide considering the importance of the subject.

4th National Workshop on Organic Food and Health: Avenues of Innovation and Entrepreneurship, Karachi, December 21, 2017

The 4th National Workshop of the Series on ‘Organic Food and Health: Avenues of Innovation and Entrepreneurship’ was organized by PCST on December 21, 2017 at University of Karachi, Karachi as part of 2nd Invention to Innovation Summit Sindh-2017. Prof. Dr. Memon Mujeeb-u-ddin Sahrai Vice Chancellor, Sindh Agriculture University, Tandojam was the Chief Guest during the Inaugural Session. In view of importance of the subject the workshop attracted a province-wide participations from major higher education institutions, S&T/R&D Organization as well as other walks of life.

Collaborative Activities of PCST

- PCST in collaboration with Air University, Islamabad jointly organized “1st International Conference on Mathematics and Physics from 14-16 February, 2017 at Air University, Islamabad.
- PCST, in collaboration with University of Veterinary & Animal Sciences, Lahore jointly organized “6th International Symposium and Expo-2017” from 8-9 February, 2017 at University of Veterinary and Animal Sciences, Lahore.
- PCST, in collaboration with University of Balochistan (UoB), Quetta jointly organized mega event “2nd Invention to Innovation Summit -2017 Balochistan” from 25th-26th April, 2017 at University of Balochistan, Quetta
- International Conference on Mining and Fuel Industries (CMFI-2017), Federal Urdu University of Arts, Science and Technology, Karachi, together with the Department of Geology, Department of Mining Engineering, Dumlupinar University, Kutahya, Turkey, Society of Economic Geologists and Mineral Technologists (SEGMITE), Inspectorate of Mines, Department of Mines and Mineral Development, Sindh (Oct 19-21, 2017)..

xi. Funding for PSDP Projects

PCST initiated following two projects that were approved by the Government of Pakistan under PSDP for Productivity, Quality and Innovation (PQI) Program:

S. No.	Project (s)	Cost in Rs. Million	Duration (Months)	Objectives
1	First National Industrial Innovation Survey	45.041 (Million)	24	<ul style="list-style-type: none"> • To conduct a national survey of manufacturing sector for gaining insights into the industrial innovation process and gauging extent & nature of its innovation activities. • To identify the factors hampering the innovation activities at the firm-level. • To find out the motivational factors for firms for undertaking innovation activities. • To suggest policy measures/ framework for promoting innovation in manufacturing sector for enhancing its competitiveness in the national and international markets.

S. No.	Project (s)	Cost in Rs. Million	Duration (Months)	Objectives
2	Need Assessment of S&T Human Resources for Driving Innovation and Achieving Vision 2025	20.372 (Million)	18	<ul style="list-style-type: none"> • To review and update current status of highly qualified S&T human resources i.e PhDs and M.Phil /MS (minimum 18 years of education), working in public/private sector universities, R&D organizations and industry. • Tracking of PhDs produced in different disciplines during the last five years to gauge their gainful employment/unemployment status. • To carry out future need assessment of human resources to pace with Vision 2025.

xii. Others

- Prepared and submit proposal titled “Pakistan-Jordan collaboration in S&T Policy and Planning” to MoST for onwards forwarding to quarter concerned.
- A proposal titled “Role of Science, Technology & Innovation in Achieving Sustainable Development Goals (SDG’s) with total estimated cost of \$23,390 US dollar, submitted to MoST for onwards forwarding to UNESCO office in Pakistan under Programme of participation in the activities of member states for the biennium 2018-19.
- A proposal titled “Study of S&T Policy Formulation, Monitoring and Implementation System in Pakistan and Tajikistan” was prepared and submitted to MoST
- Prepared and submitted a Proposal to UNIDO on Global Cleantech Innovation Programme (GCIP) for SMEs and Startups in Pakistan.
- Prepared and submit a proposal for cooperation with Russia in the field of S&T to MoST.
- As desired by MoST, PCST submitted proposal for Agreement between the Governments of the States-Members of the Shanghai cooperation organization on Scientific and Technical Cooperation.
- A draft proposal from PCST on the establishment ‘China-Pakistan Centre for Science Technology and Innovation at Chengdu Hi-Tech Zone (CDHT)’, China was prepared and submitted to MoST.
- Forwarded draft proposal from PCST to MoST, regarding tentative training needs /demands for discussion during the visit of delegation of CSTECH (China Science &Technology Exchange Center) from 8th to 11th July, 2018 and

training needs/demands of MoST for implementation of the action plans for Belt & Road Science ,Technology and Innovation.

- On the directions of MoST, prepared and submitted a draft proposal for the “Establishment of D-8 Joint Research & Development Center” for onward consideration in the annual general meeting of D-8.
- Submitted input/comments to MoST regarding the Belt and Road Initiative (BRI) on the two-day Trade and Business Summit titled “Building Partnerships for Trade Transformation” to be organized by The South Asian Stability Institute (SASSI) University in Cairo, Egypt along with draft proposal to address the challenges for Pakistan & Egypt in the digital economy through STI.

Pakistan Council of Renewable Energy Technologies (PCRET)

Introduction

Pakistan Council of Renewable Energy Technologies (PCRET) was established in 2001 by merging the National Institute of Silicon Technology (NIST) and Pakistan Council for Appropriate Technology (PCAT). PCRET is the prime institution in the country for coordinating R&D and promotional activities in different renewable energy technologies. PCRET is involved in indigenous production, system design, implementation and quality control of RE products/technologies. PCRET also collaborate at National/ International level for development and application of Renewable Energy Technologies.

PCRET is committed to Research, Develop, Promote and Disseminate to create Renewable Energy Culture with the following objectives:

- To Act as National Focal Point in the Field of RE Technologies
- R &D, Indigenous Production, System Design and Implementation
- HRD for Capacity building, Awareness, Promotion and Dissemination
- Collaboration at National/ International Level for Development and Application of RE Technologies
- Testing, Qualification & Quality Control of RE Products

PCRET is working in the following fields of Renewable Energy Technologies:

- Photovoltaics (*Silicon Solar Cells / Modules and Thin film solar materials*)
- Solar Thermal
- Micro/Small Hydro Power
- Biogas/Biomass
- Wind Energy

PCRET having indigenous design and development capability, installed various Renewable Energy projects i.e. Solar, MHP, Biogas and Wind in remote/far flung areas for provision of electricity and fuel.

Goals and Targets

- R&D in the field of Third and Fourth generation solar cell materials such as; perovskite, quantum dot etc.
- Establishment of National Testing Laboratory for PV and allied equipment as per International Standards.
- Establishment of R&D Center on Key Technologies of Small Hydel Power for Rural Electrification.
- Solarization of PCRET buildings.
- To establish MHP testing and manufacturing facility.
- Development of improved version of Solar Thermal Products as per user requirements.
- Design, development and installation of Solar power systems.

Clear-cut performance outcomes in 2017-18

R&D in the field of Third and Fourth generation solar cell materials such as; perovskite, quantum dot etc.

- Up gradation of Advance PV lab and induction of lab equipment such as Gloves Box, Filtration system, fume hood and materials.
- Efficiency of 4-5% achieved in new solar cell materials such as perovskite, quantum dot etc. achieved.
- R&D for development of high efficiency single crystal silicon solar cell. Achieved 11-12% efficiency in single crystal silicon solar cell.
- Research collaboration with Academia. Supervised research work of 1 PhD and 9 MS students.

- Research papers in 2 Impact factor journals.

Establishment of National Testing Laboratory for PV and allied equipment as per International Standards

- Project proposal for “Establishment of PAK-KOREA Testing Laboratory for PV Modules & Allied Equipment” prepared in collaboration with KOICA-Korea. Project proposal submitted and approved by KOICA-Korea.
- PC-1 prepared and submitted to MoST for PSDP funding for local share of the project.
- Pre-feasibility study for project objectives, selection of equipment, trainings, and implementation.
- Site survey conducted in Karachi and Islamabad for establishment of the proposed lab.
- Finalized the location/land i.e. at Islamabad, for establishment of the said lab.

Design, development and installation of Solar power systems

- Designed, developed and installed 3 kW Solar PV systems at PCRET Regional Centers Lahore, Karachi and Quetta.
- Installed 2 x 2.4 kW solar arrays with solar tracker.
- Designed, developed and installed solar power garden/street lights and drip irrigation systems.
- Designed 200 kVA (160 kW) grid connected solar PV system for MoST building, Islamabad.
- Up gradation of existing 15 kW system installed at PCRET HQ Islamabad up to 20 kW system.
- Designed and developed 2 x Solar Rickshaw for promotion and awareness of Solar PV technology.

Establishment of R&D Center on Key Technologies of Small Hydel Power for Rural Electrification

- Project proposal finalized and approved by full name (HRC)-China.
- MoU/RoD prepared and submitted to HRC and MoST for approval
- Project kick-off meeting held in NRIRE/HRC Head quarter China in November, 2017.

MHP testing and manufacturing facility:

- Renovated and up graded MHP support workshop, at Peshawar.
- The following equipment/machinery were repaired and installed:
 - Penstock pipe fabrication machine.
 - Balancing machine
 - Hydraulic Press Machine
 - Sheet Cutter machine.
- Installation of Overhead crane.

Development of Solar Thermal Products as per user requirements:

- Designed and developed following Solar Cookers:
 - Panel/Foldable
 - Parabolic Dish Type Solar Cooker with Glass Reflecting Material
- Designed and developed Solar Oven (Wooden Type for Indoor Cooking),
- Designed and developed Solar Desalinators and Solar Dryers.
- Upgraded Solar Thermal product development workshop at PCRET, HQ Islamabad.

Alignment of outcomes and outputs with the medium term budget estimate for service delivery

Promotion of Standards and Quality Assurance

- Testing services provided and issued test certificates to Twenty (20) different Public/Private sector organizations/companies for Solar Cells, PV Modules, Charge Controllers, LED Lights and Batteries etc.
- Coordination with NRIRE/HRC China for formulation and development of Pakistan standards for Small/Micro Hydro technology/projects as per International IEC standards.

- The project for “Establishment of National Testing Laboratory for PV and allied equipment” as per International Standards i.e. IEC 61215, IEC 61730, was approved by KOICA-Korea. The signing of RoD between PCRET and KOICA is in progress. The project will help in Implementation of International safety & quality standards, availability of quality and certified solar products in the country, awareness of quality/ safety standards among masses, Transfer of technology for capacity building etc.
- Renovated/upgraded the Testing/QC Lab at PCRET HQ, Islamabad.

Promotion of Alternate Energy and Water Quality

PCRET organized and participated in following conferences/ workshops/ exhibitions:

- International Science Policy Conference for Climate Change in collaboration with Global Change Impact Studies Center (GCISC).
- National Consultative Workshop on Environmentally Sound Technologies.
- One day training on Net-metering in collaboration with REAP at PCRET HQ.

Research and Development for Socio Economic Development

- Research on thin films, perovskite and organic cell materials carried out by PhD and Master’s students and published two impact factor journal publications.
- Established Renewable Energy Technology Park at PCRET Headquarter Islamabad for operational demonstration, promotion and training. The park includes; 2.4 kW Solar Arrays with Sun Tracker, Solar Water Pumping System for Drip Irrigation / Storage, Solar Model House, Solar Cookers, Solar Garden and Street Lights, Biogas Plant for burning fuel (2m3), Micro Hydel Plant (Prototype Model).
- Prepared the chapter on “Development and Transfer of Environmentally Sound Technologies (ESTs)” as part of Pakistan’s Second National Communication for Climate Change under UNFCCC.
- The following Three Patents completely filed in 2018:
 - Geothermal based cooling systems
 - Animal driven based electricity generation system
 - Enhancement of existing Solar tube wells using floating PV Panels
- The following products were designed and developed by PCRET:
 - Solar Powered Vehicle/Rickshaw
 - Panel/Foldable Solar Cooker
 - Solar Water Pump System for Drip Irrigation
 - Solar Tracker based PV Array System
 - RE based Model House for demo/training

Liaison with International Organizations for the Development of Science and Technology

Sr#	Project Title	Collaborating Entity	Project Cost	Status
1.	Establishment of PAK-KOREA Testing Laboratory for PV Modules & Allied Equipment	KOICA-Korea	Rs. 1385.429 Million <ul style="list-style-type: none"> • KOICA Share: USD 8 M • GoP Share: Rs 74.429 M • Cost of Land: Rs. 239 M 	Approved
2.	China-Pakistan Joint R&D Center on Key Technologies of Small Hydel Power and Rural Electrification	NRIRE/HRC China	7.6 Million CYN	Approved
3.	Green Climate Fund: Adaptation of Photovoltaic, Biogas Technologies and Establishment of Renewable Energy Labs in Pakistan for Climate Change Mitigation	GCF	USD 40 M	Submitted and in process of Approval

4.	“Joint Venture for Establishment of Solar PV Module Fabrication Facility” to enhance the PV module production capacity from 100 KW to 10 MW per year.	CENER Spain, M/s SMS (Pvt.) Ltd	USD 40 M	Submitted and in process of Approval
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Performance of each section/attached department in view of key performance indicators.

Solar PV Department

- **R&D of low cost, high efficiency Polycrystalline silicon Solar Panel**
Cost-effective and high efficient PV modules produced. (Cost: Rs 70/watt, efficiency 16.5%).
- **R & D of low cost, high efficiency Mono-crystalline silicon Solar Panel**
Cost-effective and high efficient PV modules produced (Cost: Rs 100/watt, efficiency 18.0%).
- **R&D facility for 3rd and 4th generation solar cell materials**
Efficiency of 4-5% achieved
- **Impact factors and journal publications**
Published two impact factor journal publications
- **Research collaboration established with Academia**
1 PhD and 9 MS students supervised
- **Solarization of Buildings**
 - Designed, developed and installed 3 kW Solar PV systems at PCRET Regional Centers Lahore, Karachi and Quetta.
 - Installed 2 x 2.4 kW solar arrays with solar tracker.
 - Designed, developed and installed solar power garden/street lights and drip irrigation systems.
 - Designed 200 kVA (160 kW) grid connected solar PV system for MoST building, Islamabad.
 - Up gradation of existing 15 kW system installed at PCRET HQ Islamabad up to 20 kW system.

Solar Testing/QC Lab

- **Testing of locally developed and imported PV modules, solar cells and allied equipment**
Testing services provided and issued test certificates to Twenty (20) different Public/Private sector organizations/companies for Solar Cells, PV Modules, Charge Controllers, LED Lights and Batteries etc.

Biogas/Biomass Department

- **Design and development of prototypes of biogas/biomass products**
 - Designed, developed and installed Biogas plants of capacity 2m³ at PCRET HQ Islamabad and PCRET regional centers Karachi and Quetta.
 - Repaired biogas plants installed at PCRET Regional Centers Lahore and Karachi.

Micro Hydro Power Section

- **Collaboration with HRC, China for Establishment of Research Centre on Key Technologies of Small Hydropower and Rural Electrification**
Proposal finalized and approved by HRC-China
- **Design and development of prototypes of MHP products**
Designed, developed and installed prototype model of Micro Hydro Power at PCRET HQ, Islamabad.
- **Enhancement/upgradation of MHP facility/workshop at Peshawar**
 - Renovated and up graded MHP support workshop, Peshawar
 - The following equipment/machinery were repaired and installed:
 - Penstock pipe fabrication machine.
 - Balancing machine

- Hydraulic Press Machine
- Sheet Cutter machine.
- Installation of Overhead crane.

Wind Energy Section

- **Establishment of Wind Energy research group.**
Established Wind Energy research group.
- **Design and development of prototypes of Wind Energy products**
 - Installation of wind energy data logger at PCRET HQ, Islamabad.
 - Analysis and optimization of Wind energy farms and topologies.
 - Gathered data and generated report from the installed Wind energy data logger at PCRET HQ Islamabad.

Solar Thermal Section:

- **Upgradation of Solar Thermal product development workshop.**
Upgraded Solar Thermal product development workshop at PCRET HQ Islamabad.
- **Design and development of prototypes of Solar Thermal products**
 - Designed and developed following Solar Cookers:
 - Panel/Foldable
 - Parabolic Dish Type Solar Cooker with Glass Reflecting Material
 - Designed and developed Solar Oven (Wooden Type for Indoor Cooking),
 - Designed and developed Solar Desalinators and Solar Dryers.
 - Upgraded Solar Thermal product development workshop at PCRET HQ Islamabad.

Linkages with budget to better reflect performance.

Total budget allocated to PCRET for the year 2017-18 for R&D/Non-development activities was Rs. 16 Million. The budget was planned and utilized against the following projects/activities:

- R&D in the field of Third and Fourth generation solar cell materials such as; perovskite, quantum dot etc.
- R & D of low cost, high efficiency Polysilicon Solar Panels
- Solarization of PCRET buildings.
- Establishment of MHP testing and manufacturing facility.
- Development of improved version of Solar Thermal Products as per user requirements.
- Design, development and installation of Solar power systems.
- Upgradation of R&D facilities.
- R&M for keeping the equipment operational.
- Development of RE products.

Future plans and goals of each section department

Indigenization of Cutting Edge Technologies in Renewable Energy Field

Solar PV Technology

- Research and Development in 3rd and 4th generation solar materials such as perovskite, quantum-dot, organic PV and thin-films, to produce high efficient and economical solar cells and modules.
- Production of high efficient and economical Silicon Solar modules to meet country's requirements. The current country requirement of PV modules is almost 1500 MW (which is increasing rapidly) and 90% modules are being imported to meet the country requirements. The existing 80 kW PV module fabrication facility will be upgraded to produce 5-10 MW per annum.
- Existing R&D setup of PV technology will be upgraded to absorb latest technological advancement.
- Establishment of Quality Control and Testing laboratory of International Standards to stop the induction of sub-standard PV modules and allied equipment.

- Development of 3600 Auto-Tracking and Auto-Cleaning System for Solar Panels to improve the efficiency

Solar Thermal Technology

- Development and application of Solar Thermal appliances such as Solar Water Desalination (for provision of clean water), Solar Dryer (for controlled drying of vegetable and fruit to increase the yield), solar water heater (for provision of hot/warm water and room heating) and latest models of solar cookers (for provision of fuel for cooking in remote areas and to curtail deforestation).
- Existing R&D setup of Solar thermal technology will be upgraded to absorb latest technological advancement

Micro Hydro Technology

- Indigenous development of MHP equipment e.g. penstock pipe, turbine and generator. Installation of MHP plants ranging from 2kW to 200kW in KPK, GB and AJK for provision of electricity to houses and cottage industry.
- Development of Small Hydro power (SHP) plants on canals/river basin for rural electrification and training of manpower.
- Existing R&D setup of MHP technology will be upgraded to absorb latest technological advancement.

Biogas/Biomass Technology

- Indigenous design and development of latest Biogas/Biomass plants of different capacities for provision of fuel and power in remote areas.
- Existing R&D setup of Biogas/biomass technology will be upgraded to absorb latest technological advancement

Wind Energy Technology

- Assessment/Analysis of Wind Energy data for establishment of optimized wind energy farms. Establishment of testing/QC facility for wind energy products such as wind turbines, wind-water seer (production of drinking water from atmosphere) and wind mill (for underground water lifting) etc.
- Development of domestic wind turbines prototype (2kW-5kW)
- Existing R&D setup of wind energy technology will be upgraded to absorb latest technological advancement

Commercialization of Solar Modules and Allied Products:

PCRET mandate is Research and Development to promote, disseminate and create renewable energy culture to contribute in the socio-economic development of the country. After approval, the developed products will be commercialized to generate revenue. Following RE products are ready for commercialization:

- Silicon Solar Panels (Monocrystalline)
Models: SSP-M01/ 60W, SSP-M02/ 100W, SSP-M03/ 150W, SSP-M04/250W
- Silicon Solar Panels (Polycrystalline)
Model No:SSP-P01/ 250W
- Solar Mobile Charger
Model No:SMC-01/4V
- Home PV Solution (150W, DC System)
Model No: PV-H/150 DC
- Solar Lantern
Model No:SL-01/6V
- Solar Cooker (Parabolic Dish Type Solar Cooker With Glass Reflecting Material),
Model No:SC-CT01
- Solar Cooker (Parabolic Dish Type Solar Cooker with Aluminum Foil)
Model No: SC-CT02
- Solar Oven (Wooden Type)
Model No:SO-BT01
- Solar Oven (Fiber Glass Type)
Model No:SO-BT02
- Green House Solar Tunnel Dryer (200-1000 Kg)

Model No:SD-GH-01

- Solar Desalination Systems for production of drinkable water
- Solar Powered Vehicle
- Solar Water Pump for irrigation/agriculture
- Portable Biogas plant (2m3-5m3) for provision of fuel and electricity

Collaboration/ JV with National and International Organizations

- To upgrade the existing research infrastructure and enhance capability, collaboration and joint ventures with national and international organizations will be started. As per Govt. policy the innovations will be transformed into product development and commercialization in collaboration with local industry. This will help to meet country's requirement and enhance the revenue generation. Efforts have already been started for collaboration and joint venture with internationally reputed organizations under Public Private Partnership (PPP) mode.
- A proposal of JV with SMS/CENERSpain to enhance limited production facility to production unit is already submitted to MoST. The proposal is a "Joint Venture for Establishment of Solar PV Module Fabrication Facility" and has the following objectives:
 - To enhance the PV module production capacity from 100 KW to 10 MW per year.
 - To acquire latest technology in the field of PV module manufacturing and Renewable Energy Technologies.
 - To train the local manpower with the advance technology.
 - Development/production of PV module as per international standard i.e. IEC-61215.

According to the proposal USD 40 Million will be invested by SMS/CENER Group to achieve the above objectives. The proposal is being processed for approval in MoST.

Solarization of Govt. Office Buildings

Solar power systems (Grid connected or hybrid) will be designed/developed for use in various Govt. offices for provision of power.

Tapping of Foreign Funding:

The world is transforming from conventional sources of energy to clean and sustainable energy for domestic and industrial use. There are many international donor agencies financing the renewable energy projects worldwide such as UNDP, UNFCCC, UNIDO, GEF, GCF, JICA, GIZ, NRIRE and KOICA etc.

PCRET has submitted various proposals for collaboration and funding of RE projects to the international donor agencies through MoST and Economic Affairs Division (EAD). The following two projects have been approved in principle and will be executed next year:

- China-Pakistan Joint R&D Center on Key Technologies of Small Hydel Power and Rural Electrification, Project Cost: 7.6 million RMB (1.15 M USD).
- Establishment of PAK-KOREA Testing Laboratory for Solar & Allied Equipment, Project Cost: USD 8.664 M.

Collaboration with National and International Academia:

Collaboration with National and International academia will be enhanced to conduct research in latest RETs. MoUs for collaboration with different academic institutes have been signed so far.

Human Resource Development

Promotional seminars, trainings and workshops will be organized for development of human resources in RE and relevant technologies to overcome the shortage of trained manpower. Research programs in collaboration with academia will be planned to carry out innovative research and training of researchers.

Sustainability of the Organization

As per Govt. policy, efforts will be focused-on to achieve sustainable and revenue generating department. This will be achieved through capacity building, indigenization, commercialization of RE products and tapping of foreign grants.

National Funded Projects in 2017-2018

Sr. No.	Project	Funding/Grant	Status
1.	MoST in collaboration with MoCC assigned PCRET a team lead for thematic working group on Development and Transfer of Environmentally Sound Technologies for Pakistan's Second National Communication under UNFCCC	10,000 USD	Project completed by PCRET and submitted to MoCC for approval by Steering Committee

International Funded Project in 2017-2018

Sr. No.	Project	Funding/Grant	Status
1.	Pak-China Research Center on Key Technologies of Small Hydro Power	7.6 M RBM	Project execution started in 2018
2.	Establishment of PAK-KOICA Testing Laboratory for PV Modules and Allied Equipment	8 Million USD	Approved by Korea International Cooperation Agency (KOICA) and project activities have been initiated.
3.	Green Climate Fund (GCF): Adaptation of Photovoltaic, Biogas Technologies and Establishment of Renewable Energy Labs in Pakistan for Climate Change Mitigation	USD 40 M	Project Concept Paper accepted by Pakistan's GCF Board and submitted for evaluation by International GCF Board
4.	Establishment of Pilot-Scale Wind Turbines Fabrication Facility with R&D setup	USD 12 M	Project Concept Paper submitted to KOICA through MoST in 2018. This project is being considered by KOICA for year 2021.
5.	Establishment of Solar PV Modules Fabrication Facility up to 10MWs per Annum	USD 12.5 M	Project Concept Paper submitted to KOICA through MoST in 2018. This project is being considered by KOICA for year 2021.

Role in National Development

The overall role of PCRET in national development is dissemination and awareness of latest technologies and products in the field of Renewable Energy. PCRET has been involved in research, development, dissemination, design & deployment of RE technologies such as PV, solar thermal, MHP, Biogas and Wind energy as per its mandate. Sustainable and clean sources of RE projects were installed and disseminated at far flung rural areas of the country for provision of electricity and fuel.

Pakistan Science Foundation (PSF)

Introduction

Pakistan Science Foundation was established in 1973 through an Act of Parliament to promote and finance scientific research activities having a bearing on the socio-economic needs of the country. It is an autonomous organization under the umbrella of the Ministry of Science and Technology.

Budgetary allocation of PSF for the year 2017-18 was Rs. 282.407 million for Non-Development side whereas; it was Rs. 9.841 million for the Development projects. The expenditure on Administrative side was Rs. 175.186 million which is 62% of the total Non-development budget of PSF. Rs. 107.221 million were spent on Statutory Functions which is equivalent to 38% of the total budget. Despite the rise in the salaries of employees by the Government, the ratio of Administrative versus Statutory Functions was maintained at 62:38. Development funds amounting to Rs. 9.841 million but during the year Rs. 5.986 were received for the projects, which were utilized accordingly and balance amount of Rs. 3.855 were surrendered.

Objectives and Functions

Pakistan Science Foundation is the apex body for promotion and funding of scientific and technological activities in the country. The Foundation functions as an agency for:

- The promotion of basic and fundamental research in the universities and other institutions on scientific problems relevant to the socio-economic development of the country
- The establishment of comprehensive scientific and technological information and dissemination centres
- The utilization of results of scientific and technological research including pilot plant studies to assess the technical and economic feasibility of processes found to be promising on a laboratory scale
- Popularization of Science in Pakistan
- Establishment of science centers, clubs, museums, herbaria and planetarium
- Promotion of scientific societies, associations and academies engaged in spreading the cause of scientific knowledge in general or in the pursuit of a specific scientific discipline or technology in particular in country
- The organization of science conferences, symposia and seminars, periodically
- Exchange of visits of scientists and technologists with other countries
- The grant of awards, prizes and fellowships to individuals engaged in developing processes, products and inventions of consequence to the economy of the country
- Special scientific surveys, not undertaken by any other organization, and collection of scientific statistics related to the scientific efforts in the country
- Establishment of Museum of Science and Technology at National Level of International stature
- Extensive international cooperation and interaction with counterpart organizations in foreign countries
- The Foundation has also started assistance in applications for Patents under PSF funded projects

The activities of the Foundation revolve around the above objectives, some of which are performed by the Science Wing of PSF, while others are undertaken through Pakistan Museum of Natural History (PMNH) and Pakistan Scientific and Technological Information Center (PASTIC), the two subsidiary organizations of PSF.

Promotion of S&T Research

Goals and Targets

- Pakistan Science Foundation has been striving since its inception to facilitate scientists and researchers by funding research projects for the socio-economic development of the country.
- The main programmes of the Foundation are; Research Funding, R&D- Industry Program, International Matching grants and Popularization of Science.
- PSF is actively working to bring together researchers, end-users and the funding institutions at one platform to create an environment of a unified approach to identify and solve industrial problems through applied research and technology transfer mechanism.

Performance Outcomes

Research Funding

- **Research Support and R&D Industry programmes:** 286 research projects/concept papers in 10 scientific fields namely Agricultural Sciences, Biological Sciences, Biotechnology & Genetic Engineering, Chemistry, Computer Sciences/Maths, Earth Sciences, Engineering Sciences, Health Sciences, Environmental Sciences and Physics and R&D-Industry Programme remained under active consideration.
- Among these, 66 were under process, of which, 07 projects costing Rs.20.94 million were approved and an amount of Rs.13.87 million was released to 14 new projects on account of 1st installments including already approved projects.
- Total 72 projects were on-going and an amount of Rs.10.51 million was released on account of due installments and evaluation fee of these projects.
- Based upon the results of 24 completed projects, 39 research papers were published in national/international journals and 05 patents were registered under these completed projects.
- In addition, 04 Ph.D. and 35 M.Phil. /M. Sc. (Hons) students secured their respective degrees while working as Research Associates in these completed projects.
- **Natural Sciences Linkage Programme (NSLP):** 120 research projects/concept papers in the fields of natural sciences were received for processing. All were passed by PSF Screening Committee in 04 meetings and 13 concept papers were shortlisted for further processing.
- A total of 13 project proposals costing Rs.36.62 million were approved and amount of Rs.15.48 million was released to these new projects on account of 1st installment. During the year, 72 projects were on-going and an amount of Rs.23.80 million was released on account of due installments and evaluation fee of these on-going projects.
- Based upon the results of 17 completed projects, 55 research papers were published in national/international journals. In addition, 22 Ph.D. and 63 M.Phil/M.Sc. (Hons) students secured their respective degrees while working as research associates in these projects.

Other Science Promotion Activities

- 31 conferences, seminars and workshops on scientific topics were financially supported at different universities and R&D organizations across the country and amount of Rs. 5.3 million was released for the same.
- 04 “Invention to Innovation Summits” were organized at University of the Punjab, Lahore, University of Engineering & Technology, Peshawar, University of Karachi, Karachi and the University of Balochistan, Quetta, wherein, hundreds of indigenous technologies, varieties of products, processes, posters presentations and documentaries etc. were presented.

- Under the Invention to Innovation Programme, one financial grant of Rs. 0.15 million was provided to 02 proposal of inventions & innovations to the Team Hammer Head from GIK Institute of Technology, Topi, District Swabi.

Future Plans and Goals

- Enhancement in Research Capabilities of Researchers
- Execution of Competitive Research Grants
- Capacity building of Research Institutions
- Generation of New Knowledge, publication of Research Papers and registration of Patents for PSF funded projects
- Development of Processes, Technologies and Products
- Human Resource Development through employment as Research Associates
- Enhancement of Creativity and Innovation among students
- Motivation of Scientists for quality research through incentives like Gold Medal award, etc.

Planning and Development

Goals and targets specified against which the performance can be measured:

There are thirty two (32) Scientific Societies which are registered under Societies Act as well as with PSF. However, after the lapse of seven years between approval of Phase-I and Phase-II, most of the societies became inactive. It was estimated that twenty (20) societies will be funded under the project in FY 2017-18.

Clear Cut Performance

- Fourteen (14) Scientific Societies were financially supported in order to enable them to perform their scientific activities regularly.
- One (01) new society was registered with PSF and supported.
- Twenty Three (23) issues of eight (08) Scientific Journals were published by the societies.
- Maintained liaison with four (04) International Scientific Societies / Organizations.

Alignment of outcomes for service delivery

The targets set for the support of Scientific Societies are same as in the Medium Term Budget Estimates i.e. financial support to twenty (20) societies.

Performance of each section (Key Performance Indicators)

- New PC-I entitled “Competitive Research Programme” of worth Rs. 1964.50 Million was approved
- Implementation and processing of three ongoing Development projects was undertaken as per KPIs assigned to the P&D section.

Linkages with budget to better reflect performance

An amount of Rs. 5.687 Million was utilized out of the total allocation of Rs. 9.841 Million.

Future plans

It is estimated that fifteen (15) scientific societies will be strengthened in FY 2018-19.



Ms. Yasmin Masood, Federal Secretary, MoST on occasion of world Science day for peace and Development



Popular Science Lectures



Pakistani Students Shine in the Belt & Road Teenager Maker Camp Teachers Workshop at Beijing, China



Inter Universities Quiz Competition at COMSTECH, Islamabad

Development Project
Science Talent Farming Scheme (STFS) for Young Students
Phase – I (Component-I) (Revised)

Introduction

The development project “Science Talent Farming Scheme (STFS) for Young Students, Phase-I, Component-I (Revised)” was conceived by Pakistan Science Foundation (PSF) and approved by CDWP on June 9, 2015 with recommendation to establish a “National Science School” in vicinity of federal capital. The revised PC-I was approved for a period of 5 years at a total cost of Rs.1, 285.361 million.

Primarily, the project is meant to achieve knowledge-based economy through capacity building of the youth, having aptitude towards Science. It is an endeavor to sow a crop of young talented students who will be groomed to turn into a full lot of productive scientists through additional interventions likely to be carried out, in addition to their formal education.

Goals and Targets

- Selection of 300 students each year, through evaluation by an external specialized testing agency by conducting Scientific Aptitude Test, Paper Based IQ Test and Interview / Presentation on innovative ideas
- Research projects from 1st year under supervision of university teachers
- Summer camps, Visits to universities and S&T organizations at national/international levels
- Science lectures, Presentations, Film/ Planetarium Shows and Hands on activities through Mobile Science Labs
- Scholarships @Rs.10,000/- per month to each student
- Tuition fee @Rs.10,000/- per year and hostel fee @Rs.10,000/- per year (where applicable)

Achievements

- Selection of 300 students for STFS 3rd batch, making 900 in total for 3 batches. Detail of 3rd batch is given below;

Batch	Open Merit / BISE Quota	Punjab including Federal	Sindh	KPK	Baloch -istan	GB / FATA	AJK	Total
	(51)	(135)	(51)	(31)	(16)	(11)	(5)	(300)
Batch-III 2017-18	50	135	51	31	16	11	5	299

- Scholarships to 2nd and 3rd batches
- Fabrication of 9 STFS-Mobile Labs completed
- One summer camp/study for 300 students of STFS Batch-II organized in July, 2017
- Laptop distribution ceremony was organized for 1st batch in June 2018.
- International study visit for 25 students to London, UK (batch-II)
- Research projects by 1st batch students, 72 posters on research topics completed by STFS students under mentorship of universities teachers
- Grant to 8 universities @ 1.00 million each
- Laptops distributed among 2 STFS batches completed
- Two meetings of STFS Inter Ministerial Steering Committee convened

Future Plans

- Continuation of all above project activities
- National Science School (Land and construction), subject to availability of free of cost land.

- Conversion of STFS towards non-development side making it a permanent component of PSF activities through academic and logistic support of 300-500 less privileged but deserving Matric passed students each year as per Federal Govt. quota system.



Group photo of STFS students with Pakistani High Commissioner to UK at London during international study visit



Distribution of STFS students by Ex-Caretaker Federal Minister for S&T



Group photo of STFS students during summer camp at Islamabad



STFS Mobile lab

Pakistan Museum of Natural History (PMNH)

Pakistan Museum of Natural History, the only natural history museum of Pakistan, was established in 1979 under Pakistan Science Foundation, Ministry of Science & Technology, (Government of Pakistan). Pakistan Museum of Natural History (PMNH) has four principal divisions namely Earth Sciences Division, Botanical Sciences Division, Zoological Sciences Division and Public Services Division. First three scientific divisions are engaged in the collection, identification and research activities pertaining to plants, animals, fossils and mineral resources of Pakistan, while the fourth one is responsible for mass education and popularization of natural history through various displays, exhibits and dioramas.

Researchers of PMNH carried out extensive field works from the Coast of Arabian Sea to the Alpine regions, roamed through barren areas for the collection of Flora & Fauna, Rocks, Fossils and minerals not only for research work but also for the purpose of education because education is also one of the main objectives of PMNH.

PMNH regularly organized trainings, workshops, seminars, symposiums and other educational interactive activities related to natural history, environment and Biodiversity of Pakistan. International days also been observed. PMNH has formed many national and international liaisons with other research institutes in the country and from abroad. Due to these collective efforts of scientific and technical staff of PMNH and relations with other research institutions, PMNH has 1,042,711 natural history specimens in its repositories. Research outcome of these field works and National and International projects are published in the form of research papers in reputed national and international journals. PMNH is not only conducting research on the natural resources of Pakistan which exists in the form of Flora & Fauna, Rocks, Fossils and Minerals but also educating the students of Pakistan along with the common people with the help of informative, interactive, educative 3-dimensional dioramas and exhibits. Students of schools, colleges and universities from all over the Pakistan visit PMNH as a part of their educational tours. Scientific and Technical staff of PMNH also facilitate the students and researchers from the other universities and institutes by providing help in the research in the form of information, technical assistance, specimens as a loan and guidance in their research work.

Objectives and Functions:

- To collect, identify and catalogue the natural history specimens through field studies for developing a national repository of plants, animals, rocks, minerals and fossils for further scientific studies.
- To carry out research on biological and geological resources of Pakistan.
- To establish liaison with similar institution both within and outside Pakistan for sharing of knowledge and expertise.
- To provide research facilities and incentives to scientists from within and outside the country to work at the Museum.
- To document and display specimens in the form of attractive exhibits/films/ documentaries to educate the masses about the natural wealth of Pakistan.
- To interpret our natural resources and environment in light of the past and plan for future course of action.
- To advice the government on all issues related to biodiversity, conservation, environment, wildlife and ecology.
- To publish natural history books, research articles, field guides, monographs, popular literature, technical reports, bulletins, brochures, pamphlets etc. for the promotion scientific research and public awareness.

- To provide training facilities in natural history research, education, conservation, collection, preservation, identification, curation and exhibit designing including taxidermy, modeling and casting to interested individuals and groups.
- To arrange expeditions for the study and collection of natural history specimens.

Regular Activities specifically and separately:

Training Courses held:

- PMNH organized World Pangolin Day on 17th February, 2018 with collaboration of PMAS-Arid Agriculture University Rawalpindi and AJK Wildlife & Fisheries Department.
- PMNH and Snow Leopard Foundation jointly organized “National workshop for exchange of information on Snow leopard population in Pakistan” on April 24, 2018.
- PMNH and University of Haripur jointly organized three days training on the Taxidermy in Department of Forestry and Wildlife, University of Haripur on 14-16 May, 2018.
- PMNH jointly organized a seminar and exhibition on Threatened Wildlife Species with Ministry of Planning, Development and Reforms with collaborations of UNDP on 27 December, 2017 at PMNH Audio-Video Hall.

Research Outcomes

- **Field Works:** Researchers of Botanical Sciences Division (BSD), Earth Sciences Division (ESD) and Zoological Sciences Division (ZSD) conducted numerous field works in Gilgit-Baltistan, Chitral, Kaghan, Mansehra, Chakwal, Dera Ghazi Khan, Chashma, Taunsa, Guddu and Sukkur Barrage, Khunjab, Kirthar Range and Laki Range in Sindh, Zhob, Baluchistan and coastal areas from Karachi to Gawadar etc. for collection of Plants, Animals, insects, rocks, fossils and minerals specimens for the purpose of research and public education.
- **Collection, Cataloguing, Digitization of Natural History Specimens:** In the results of these extensive field works, 53,676 natural history specimens have been collected, catalogued and preserved in the PMNH repositories as a reference material in 2017-18. Meanwhile 1.042711 million natural history specimens present in the PMNH repositories.
- **Research Publications:** Scientists of PMNH remain engaged in the research on specimens of plants, animals, rocks, fossils and minerals. Outcome of this research published in the national and international journal in the form of research papers & articles, natural history books, monographs, technical reports and popular magazine articles etc. In 2017-18, a total of 13 research papers, 25 research articles on Botany, Geology, Paleontology and Zoology have been published in National & International Journals. 13 Technical Reports have also been submitted under Sustainable Forest Management (SFM) Program, in collaboration with Ministry of Climate Change, Government of Pakistan.
- **Collaboration/MoUs:** PMNH established liaison with similar institutions both within and outside Pakistan for sharing of knowledge and expertise such as;
 - Ozone Cell, Ministry of Climate Change, Government of Pakistan
 - National Institute of Folk & Traditional Heritage (LokVirsa)
 - University of Sindh, Jamshoro
 - University of Haripur, Hazara
 - National Museum of Natural History, Paris, France
 - Beijing Museum of Natural History, Beijing China
 - PMNH is also member of International Council of Museum (ICOM) as an Institutional Member. ICOM has a network of 20,000 museums, 30,000 experts in various fields and 171 active National Committees around the world.

- **Research Projects (National & International):** 08 research projects have been in progress with collaboration of different National & International R&D organization.
- **Services to Other Organizations:** In 2017-18, services provided to the students of M. Phil. and Ph.D. belonging to the various universities of Pakistan in their Research and thesis work and also supervise their research activities during their M.Phil. & Ph.D. Students from University of Haripur, Quaid-e-Azam University, Bahria University and University of Peshawar were facilitated and Co-supervised in their research work. Brief of some services rendered to other organization is as follows;
 - Process a loan of 43 Reduviidae specimens for a Ph.D Scholar of China Agriculture University, West Campus, Beijing-100193, China
 - 110 Students of Geology, University of Haripur completed their internship at ESD, PMNH during 2017-18.
- **Public Visits:** PMNH has more than 130 state of art displays, exhibits, diorama for public awareness about the biodiversity and natural resources of Pakistan. In 2017-18, new diorama “Bird of Pakistan” has been added and opened for the general public. Another diorama “Forests Types of Pakistan Diorama” is under preparation. In 2017-18, two animated Dinosaurs added to the display galleries. PMNH also facilitate visitors, National and International delegations and groups of students of schools, colleges and universities during their visit to the PMNH display galleries by providing guided tours. In 2017-18, 2,16,781 people visited museum including 48,225 students, 99,109 general public, 486 foreigners, and 68,961 children below 5 years of age.

Future Plans and Goals

- Completion of PMNH Building
- Digitization of the Scientific Data
- Creation of Endowment fund / generation of funds
- Live Exhibits (Aquariums, Terrarium, Aviary, Butterfly Gardens, Botanical Garden, Mushroom Garden)
- Up-gradation of Audio-Visual Equipment
- Preparation of Documentaries
- Establishment of molecular laboratory
- Specimen quarantine facility in museum
- Installation of advanced/mechanized preservation cabinet system
- Faunal, floral and geological exploration of unexplored areas of Pakistan
- Establishment of Data center for Biodiversity
- Establishment of Ocean Diorama
- Strengthening of National/International Collaborations
- Strengthening of GIS Lab
- Development of PINS(Pakistan Institute of Natural Sciences)
- Establishment of field Museums
- Establishment of Museum subunits at provincial level

Seminars/Symposia/Presentations

- PMNH has jointly organized one day National workshop on “Exchange of Information on Snow Leopard Population in Pakistan” in association with Snow Leopard Foundation, Pakistan (SLF) on April 24, 2018. Representatives from Ministry of Climate Change, Wildlife Department Officials from KPK and AJ&K, representatives of NGOs and students attended the workshop.
- Pakistan Museum of Natural History (PMNH) celebrated International Museum day in collaboration with LokVirsa Museum on 18th May, 2018 in its premises. PMNH also set stall at LokVirsa Museum entrance for general public. Along with Valuable Gemstones collections from Gilgit-Baltistan, Rocks, Fossils and Minerals, staffed specimens of animals and plants were also exhibited on stall which were became center of attraction for the people and students.

Miscellaneous

- Secretary, MoST visited PMNH display galleries on 23-11-2017
- VC, GCU Lahore visited PMNH Display galleries on 28.12.2017
- A delegation of ECO Science Foundation visited PMNH display galleries on 12-04-2018.
- Joint Secretary, MoST, Mr. Hassan Baig visited display galleries on 24-02-2018.
- Member Finance, PSF, Mr. Tafakhar Ali Asdi visited PMNH display galleries on 27-03-2018.



Researchers of Earth Sciences Division conducting field with their foreign collaborators under the project of "Zhob Dinosaurs Track Way Reconstruction"



Prof. Dr. Muhammad Ashraf, Chairman conducting meeting with Mr. Nicholas Allan, Researcher from Factum Foundation for Zhob Dinosaurs Track Way Reconstruction Project



Mr. Ahmad Fadel Yacoub, Ambassador of Egypt in Pakistan visited Pakistan Museum of Natural History, Islamabad on 15th February 2018



A delegation of 70 participants of 7th South Asian Conference on Sanitation (SACOSAN-II) along-with officials of Ministry of Climate Change visited PMNH display galleries



PMNH celebrated international Museum on 18th of May, 2018 in association with LokVirsa



Two animated T-Rex Models added to the PMNH Display Galleries

Pakistan Scientific & Technological Information Centre (PASTIC)

Pakistan Scientific and Technological Information Centre (PASTIC), an affiliate of Pakistan Science Foundation is a national S&T information dissemination agency serving as a gateway for access to and delivery of S&T information and catering to the information needs of the scientists & engineers, researchers, academicians, entrepreneurs and the industry. PASTIC National Center is housed in its own building at Quaid-i-Azam University Campus, Islamabad with a comprehensive collection of information resources in science and technology. PASTIC has sub-centers in Karachi, Lahore, Peshawar, Quetta, Faisalabad and Muzaffarabad. Its sanctioned strength is 164 including Technical and Administrative Staff. The non-development budget of PASTIC for the year 2017-18 was Rs. 148.521 million.

Objectives

- Develop a National S&T/R&D Information Repository of indigenous S&T information resources (databases).
- Disseminate S&T/R&D information through contemporary information services & tools.
- Strengthen National Science Reference Library through resource sharing and Inter-library collaborations (consortium) and empowerment of information professionals.
- Promotion of R&D based industrial development.
- Develop collaborations with national and international information networks.
- Facilitate printing of S&T/R&D Publications.
- Capacity/skill development of researchers & entrepreneurs.

Mission

To cater to S&T Information needs of R&D and Industrial sector through Anticipatory and Responsive Information Services.

Vision

To be known as a leading national organization of Scientific & Technological information resources for promoting & supporting Research & Development for sustainable socio-economic development.

Regular Activities

Document Supply & Bibliographic Information / Literature Search Service: Under the Document Supply Service, reprints of research articles, conference papers and reports, etc. (full text) is supplied on demand either from local sources or from abroad. Under the Bibliographic information service, free literature search is carried out for students, scientists, researchers, etc., according to their research topics, on request through online national and International databases. During 2017-18, 7213 Bibliographic searches were made and 84080 S&T documents were supplied to 6741 R&D workers on demand.

National Science Reference Library Service: During the period 2017-18, PASTIC library received 197 issues of National and International Journals along with 49 miscellaneous documents, which were processed and shelved for use. 12615 users visited PASTIC Library for reference purpose, reading & photocopying services and internet browsing. 12 issues of fresh arrivals of PASTIC Library were brought out. PASTIC Science Reference Library was renovated for improving and enhancing the library services and environment.

Technology Information Service: TIS Section undertakes the activities like collection of data for technology databases, supports and promotes local industry through university – industry partnerships, seminars, exhibitions, etc.

During 2017-18 the following activities were undertaken:-

Data was collected and databases developed on:-

- Database of Industries of Pakistan = 5261
- Database of Foreign Industries = 78
- Database of Universities/Institutes of Pakistan = 186 records entered
- Database of Industry Academia Linkages = 56
- Database of Pakistani Industrial Problems and Proposed Solutions = 43
- Database of Pakistani Commercialize-able Products/ Indigenous Innovations = 711
- Database of Local & International Industrial Linkages = 114
- Content was prepared for Technology Innovation Support Centre (TISC) and uploaded on PASTIC website for awareness and searching of patents and other Intellectual Property Rights (IPR) issues.
- 6 issues of Trade & Technology news bulletin entitled “Technology Roundup” were published online.

Reprographic Service:

PASTIC has a Reprographic Section (Printing Unit) at its National Centre in Islamabad, established to meet printing requirements of PASTIC. Besides it also facilitates other R&D organizations for their printing requirement. During 2017-18, the press disposed off 169 printing jobs.

Publicity Activities and Collaboration Development:

PASTIC organized 28 Services awareness Stalls on different occasions and locations at Islamabad, Karachi, Lahore, Peshawar, Quetta, Faisalabad and Azad Jammu & Kashmir to enhance and publicize PASTIC activities / services. Besides, PASTIC also organized 14 Services Awareness Seminars at different cities.

International Liaison:

- PASTIC is currently executing a project approved by SAARC Development Fund (SDF), entitled “Networking of Women Entrepreneurs (SMEs) from SAARC Countries”.
- Proposal was prepared for cooperation in information science strategies in a digital environment between Pakistan and Thailand and is under consideration by the GoP.
- Proposal was prepared for UNESCO regarding Information for All Program (IFAP). PASTIC has been declared the coordinating body for IFAP in Pakistan.

Publications

Pakistan Science Abstracts (PSA): PASTIC compiles “Pakistan Science Abstracts” in ten different scientific disciplines as secondary source of information on regular basis. During this period, Up-gradation of PSA application was carried out by IT team. PDF extractor application is developed for optimization of the data processing. Total 14091 records were entered into the database.

Pakistan Journal of Computer Sciences & Information System: Volume 1 issue 2 and Volume 2 issue 1 were published.

Abstract book/Conference Proceeding: PASTIC collaborates with S&T /R&D institutions by publishing Abstract Book/Proceeding of Conferences organized. During current period Abstract Book of Conference on Computational Biology and Genomics organized by Centre for Human Genetics, Hazara University, Mansehra (September 27-29, 2017) was published.

Seminars/Symposiums/Workshops/Trainings Organized: PASTIC has taken initiative to uplift the skills of the researchers belonging to academia, R&D organizations, Industries, social development and service sector organizations by imparting trainings on modern ICT tools and techniques toward quality research for socio economic development of the country.

PASTIC organized 12 seminars and 27 workshops on various themes such as PASTIC Information Services, Searching Techniques, Library Management, , Strengthening Innovative Library Leaders, Plagiarism, Easy Way of Library Automation & Digitalization, KOHA, Intellectual Property Rights, Research Tools and Techniques (SPSS, Endnote, Mendeley, etc.), use of emerging technologies in research, Writing of research proposal for getting funds, Lab animal handling ethics, Writing of a good synopsis, Thesis writing skills, Use of information resources.

Other Activities

- PASTIC coordinated in bringing out PSF monthly Newsletter.
- 1620 new members were added to PASTIC Services Users Membership Database.

Following databases were strengthened:

- Data Collection & Data entry of R&D Projects of Pakistan = 1280
- Data Collection & Data entry of Scientists of Pakistan = 1862

Equipment/Software Purchased/Commissioned

- IT Hardware & Software:-
 - 50 computers, with state of the art fast scanners, were purchased for training and digital archives development.
 - PASTIC Internet bandwidth has been shifted to fiber media to upgrade the infra structure towards fast excess of electronic research content. Facility has been extended to all scientific community and free on-line access available with PASTIC Library.
- PASTIC has launched beta version of National Science Search Engine to optimize its online search facility. Initially application will cover research published in Pakistani Scientific Journals (Pakistan Science Abstracts).

On-going Projects completed or under execution during 2017-18:

- PASTIC is currently executing a project approved by SAARC Development Fund (SDF), entitled “Networking of Women Entrepreneurs (SMEs) from SAARC Countries”.
- PASTIC is also executing PASTIC Development Project entitled, “Modernization of PASTIC National Science Reference Library for effective Resource Sharing among S&T Libraries in Pakistan”.

Program(s) initiated during 2017-2018:

Development of Indigenous Databases:

Following new databases are being developed:-

- Union OPAC (Books of 11 libraries) (346941 records entered)
- Energy Publications related to Pakistan. (432 records entered)
- Climate Change Publications related to Pakistan. (357 records entered)
- Scientific Books Published by Pakistani Authors. (2,654 records entered)

TIS Databases and their records entered:

- Database of Chambers of Commerce of Pakistan = 46
- Database of Industrial Associations of Pakistan = 92
- Database of Offices of Research, Innovation and Commercialization (ORIC) of Pakistani Universities = 67
- Database of Overseas Investors of Industry and Commerce in Pakistan = 150
- Database of Industries of Pakistan = 5261
- Database of Foreign Industries = 78
- Database of Universities/Institutes of Pakistan = 186 records entered
- Database of Industry Academia Linkages = 56
- Database of Pakistani Industrial Problems and Proposed Solutions = 43
- Database of Pakistani Commercialize able Products/ Indigenous Innovations = 711
- Database of Local & International Industrial Linkages = 114

Pakistan Council of Scientific & Industrial Research (PCSIR)

Introduction

The Government of Pakistan established Pakistan Council of Scientific and Industrial Research (PCSIR) in 1953 as an autonomous body to build a strong scientific and technological base for the economic progress of the country with mandate to undertake, promote and guide scientific and technological research related to problems connected with the establishment and development of Pakistani industries, and disseminate the results of research to various sectors of the economic development community in the best possible manner.

PCSIR is the premier public sector R&D organization of the country with a network of 17 research laboratories/ units including 06 training institutes located all over the country. PCSIR supports industrial sector in various sectors for providing cost-effective technology solutions to improve their economic performance. PCSIR provides services in almost all sectors of the economy including energy, food, advance and composite material, leather, textile, food safety and value addition, herbal medicines and products. The council laboratories are providing testing and certification services to almost entire industrial sector and most of the exportable products are being tested/ certified by its ISO-17025 accredited labs.

The activities undertaken during the year 2017-2018 are as below:

Science Wing

Research & Development

Progress & Performance (Outcome) of PCSIR in Key Performance Indicators (KPIs)

S. No.	Key Performance Indicators (KPIs)		Targets	Achieved
			2017-18	2017-18
1.	Process Developed		160	179
2.	Process Leased out		50	56
3.	Patents Filed		40	52
4.	Patents Obtained		15	02
5.	Students Supervised		800	990
6.	Consultancies Provided		250	471
7.	Technical / Feasibility Reports		150	206
8.	Paper Published (International)		170	191
9.	Paper Published (National)		50	68
10.	Analytical Equipment Developed		140	125
11.	Exhibition / Conference / Seminars Organized		80	62
12.	Workshop/ Training Organized		130	112
13.	MoUs Signed		40	38
14.	Interaction with Industries (Visits)		900	1391
15.	No. of Need Based Projects		55	52
16.	No. of Services Provided		--	40594
17.	No. of Clients Served		--	15330
18.	Revenue Generated	Technologies / Products / Processes / Royalties etc.	450.00	11.302
		Analytical Testing / Calibration		264.229
		Consultancies / Collaborations		138.881

		Trainings / HR / Funded Projects		
		DAP		-
		ECP (Not regular Activity)		112.863
		Total		527.275

Major Initiatives

South Asia Technology Transfer Center (CSTTC) Inaugurated at PCSIR:

CSTTC-Sub Center Pakistan was jointly inaugurated at PCSIR Head Office, Islamabad on July 8th, 2017 by H.E Wang Gang, Minister of Science and Technology China and H.E Rana Tanveer Hussain, Federal Minister for Science and Technology Pakistan. The CSTTC-Sub Centre is established with aim to promote S&T cooperation and technology transfer between China and Pakistan. Successful transfer and development of the technology would not only promote the research institution and its commercial partners but it would strengthen the local industry of Pakistan and help to boost the country's economy.

MoST Sponsored Projects

In the financial year 2017-18 Ministry of Science and Technology has funded Rs.9.756 million to PCSIR to execute nine (9) R&D projects. Out of nine projects, six are being carried out at PCSIR Labs, Lahore, whereas one project at PCSIR Labs Karachi and two projects are being executed at PCSIR Labs Peshawar. These projects listed below are designed to meet the requirement of the industries and also to benefit the people of Pakistan:

S. No.	Project Title	Objective	Status
1.	Replacement of table sugar with clarified rice syrup in beverages Duration: 1 Year	<ul style="list-style-type: none"> • Replacement of white sugar with natural clarified rice syrup. • Development of various products (beverages) by using rice syrup. • Study of various physicochemical parameters, sensory and shelf life evaluation of developed product. 	On going
2.	Studies to minimize the aflatoxin contamination in rice Duration: 1 Year	<ul style="list-style-type: none"> • To produce good quality aflatoxin free rice for local and export purpose. • Minimize the contamination of aflatoxin in rice during storage. • Providing awareness among the industrialist, exporters and health department regarding aflatoxin contamination during storage. 	On going

S. No.	Project Title	Objective	Status
3.	Designing, Development and Fabrication of High Temperature Ramping Control Furnace 1600°C Duration: 1 year	Designing, Development and Fabrication of High Temperature Ramping Control Furnace 1600°C.	On going
4.	Designing, Manufacturing & Testing of Electronic Load Controller and Governor For Micro/Mini Hydro power station Duration: 1 Year	<ul style="list-style-type: none"> • To develop an Electronic Load Controller (ELC) and Governor for Micro/Mini Hydro Power units. • To establish the economic viability for manufacturing the ELC and governor locally. • To optimize the parameters of ELC and Governor for controlling the speed of Turbine in order to stabilize the frequency and output voltage for the consumer use. • Provision of stable low cost, locally managed and environment friendly power. 	On going
5.	Development of herbal medicine for Urinary Tract Infection (UTI) Duration: 1 year	To develop herbal based product for the treatment of UTI using wildy grown indigenous <i>Opuntia</i> plant.	On going
6.	Development of Eamectin Benzoate - A Potential Cotton Pest Herbicide Duration: 1 Year	<ul style="list-style-type: none"> • Study of different production/ synthetic routes of emamectin benzoate • Synthesis of emamectin benzoate at laboratory scale • Optimization of reaction conditions • Physicochemical characterization • Finalization of the most suitable route 	On going
7.	Synthesis of Novel Alkyd Resin Binder for Protective Coatings (Paints). Duration: 1 Year	Development of laboratory scale formulation of alkyd resin for protective coatings in paints.	On going

S. No.	Project Title	Objective	Status
8.	Hydroponics: future of agriculture farming and healthy eating system. Duration: 1 Year	<ul style="list-style-type: none"> To develop a hydroponics system neither requires costly facilities nor intensive care and can be easily operated by farmers in Pakistan. To develop protocols for evaluating selected vegetables, and to determine factors affecting their adaptation to sustainable hydroponic culture under controlled/natural environment agriculture system. To evaluate the effect of different aggregate media on growth, yield and marketable quality of selected vegetables. 	On going
9.	To develop technology for production of Nano Crystalline Cellulose (NCC) from Karka (wild grass) Duration: 1 Year	To develop indigenous technology for manufacturing of Nano Crystalline Cellulose (NCC) and Techno-economic feasibility report preparation.	On going

Need Based R&D Program

PCSIR has initiated a program to support industry by funding demand oriented, technology based R&D projects to promote the scientific culture and to boost the knowledge based national economy. The list of need based R&D projects being executed at various units of PCSIR is as under:

S. No.	Project Title	Objectives	Status
1.	Culture of microalgae, Spirulina for Nutraceutical and Aquaculture products	<ul style="list-style-type: none"> To culture both indigenous and exotic species of <i>Spirulina</i>. To optimize culture media and physical parameters To process the algae into a fine powder for making tablets and other products for its use as a food supplement in treatment of diseases caused by malnutrition and to enhance the immune system. Studies on quality aspects of <i>Spirulina</i>. 	On going

S. No.	Project Title	Objectives	Status
2.	Design and Development of Low Cost “Smart Flame Photometer”	To design, develop and fabricate a low cost Smart Flame Photometer, in order to fulfill the demand of local market and provide import substitute to save foreign exchange.	On going
3.	Development of Color Matching/ color Assessment Cabinet (Digital). (Five Light Sources: D65, TL84, CWF, UV and F/A)	To develop digital Color Matching / Color Assessment cabinet for textile, paint, leather and ink industry	Completed
4.	Synthesis of Pharmaceutical Grade Preservative, Chlorobutanol.	To develop method for synthesis of Chlorobutanol from lab and upgrade to pilot scale.	On going
5.	Designing & Development of Blood Tube Sealer.	Development of Blood Tube Sealer.	On going
6.	Development of Biodegradable Coating Material for Slow Release, Eco Friendly & Economical (SEFE) Urea Fertilizer.	<ul style="list-style-type: none"> • To develop suitable coating material for SEFE urea fertilizer. • To study time of degradation of the coating material in natural environment. • To determine the efficacy of coating material and time of release of urea in alkaline soils. • To provide green alternatives for Urea application and save our environment. 	On going
7.	Development of PCR-based Rapid Methods for the Detection of Food Borne Pathogens <i>Listeria</i> Species (<i>Listeria monocytogenes</i>)	<ul style="list-style-type: none"> • Designing and synthesis of PCR primers for <i>Listeria</i> species. • Optimization of PCR for <i>Listeria</i> spp. with artificially contaminated samples. • Detection of <i>L. monocytogenes</i> by conventional method in artificially contaminated sample • Detection of <i>L. monocytogenes</i> by PCR in artificially contaminated sample • Optimization of PCR in artificially contaminated sample for inoculum size and incubation time • Detection of <i>Listeria</i> spp. in naturally contaminated sample 	On going
8.	Development of “Universal Centrifuge Control System”.	<ul style="list-style-type: none"> • To upgrade / retrofit the existing faulty centrifuges having electronic problems. • To utilize the locally available spare parts and raw material in the development and fabrication of centrifuge control system. 	On going

S. No.	Project Title	Objectives	Status
		<ul style="list-style-type: none"> • Elimination of reliance on imported spare parts i.e. import substitution and export promotion. 	
9.	Synthesis of Zeolite based Nano-fertilizer for slow release of nutrients in soil.	To develop slow release nano-fertilizers by increasing nutrient availability in the plant-soil system.	Completed
10.	Phytoremediation: A green technology for industrial waste water treatment.	Environment friendly treatment of waste water according to National Environment Quality Standards for its recycling.	Completed
11.	Production of micronutrients (Ferrous Sulphate, Copper Sulphate, Manganese Sulphate and Zinc Sulphate for poultry feed on semi-pilot scale (from scarp and indigenous sources).	Development of important micronutrients for poultry feed in terms of Semi Pilot Plant Production like Ferrous Sulphate, Copper Sulphate, Manganese Sulphate and Zinc Sulphate.	On going
12.	Design and Fabrication of Waste Paper Pulper Unit.	To develop a noble process for the handling of Shaheed Holy papers and to develop a product which is re-useable in the printing of Holy Quran.	On going
13.	Development of Nitrocellulose Lacquer	To fulfill the local demand of industries.	On going
14.	Development of Spontaneous and Quantitative Method for Fluoride Estimation in Water	<ul style="list-style-type: none"> • To develop quantitative, rapid and easy to run method for fluoride detection in water • To develop analytical kit for the quantitative measurement of fluoride in water 	On going
15.	Nano-materials based Coatings for Multifunctional impacts on Glass Substrate	<p>To develop nano coatings on glass substrate for various applications like;</p> <ul style="list-style-type: none"> - Strong hydrophobicity - Excellent self-clean performance on contamination - Antimicrobial - Invisible to the human eye (coating thickness: 100-150 nm) - Permanent (UV-stable, enormous abrasion-resistance) - Thermochromatic - Photochromatic - Chemical-resistant 	On going

S. No.	Project Title	Objectives	Status
16.	Evaluation & enhancement of Energy Efficiency of Electrical Motors.	<ul style="list-style-type: none"> Review the power consumption spectrum of small rating induction motors based on local market survey /surveillance. Evaluate the energy efficiency of randomly selected samples of motors with respect to relevant minimum energy performance standards / specifications. Estimation of energy saving potential with due consideration of performance optimization including quality of critical components used for manufacturing of motors. 	On going
17.	Development of Biopesticide from Plant Waste to Control Pest	<ul style="list-style-type: none"> To develop economically cheap biopesticide formulation by using selected plants such as Eucalyptus, Syzgium and Nicotiana etc in the form of extract from leaves/seeds. To develop an eco-friendly product that poses less threat to the environment and human health. 	On going
18.	Development and Storage Stability of Carbonated Sugarcane Juice	<ul style="list-style-type: none"> To develop a process of carbonated sugarcane beverage with maximum shelf life. To achieve the maximum preservation of raw sugar cane juice by different techniques. 	On going
19.	Development of Herbal Product for Hypertension Normalization	<ul style="list-style-type: none"> Exploitation and utilization of available indigenous plants for the preparation of herbal product Development of an effective product (plant-based) for the therapy of hypertension. Quality control profile and stability studies of finished products Documentation of work in the form of patents/papers/reports 	On going
20.	Development of Process for Commercial production of Lactulose	<ul style="list-style-type: none"> To provide an economically feasible improved process for the manufacturing of lactulose locally Development of food supplements and pharmaceutical formulations for commercialization purpose. 	On going
21.	Preparation of Sodium Tripolyphosphate from Commercial Grade Chemicals	<ul style="list-style-type: none"> Development of process for the preparation of Sodium Tripolyphosphate. To meet the increasing demand of Sodium Tripolyphosphate in the country. 	On going

S. No.	Project Title	Objectives	Status
		<ul style="list-style-type: none"> To cut down the import of Sodium Tripolyphosphate and thus saving the valuable foreign exchange. 	
22.	Value Addition of Marble slurry waste from marble industry.	<ul style="list-style-type: none"> To promote and popularize marble waste powder for commercialization through value –addition To introduce marble powder based materials in different industries for better consumer acceptability with enhanced value 	On going
23.	Designing, Fabrication of an energy efficient (dual system) water Heater.	<ul style="list-style-type: none"> To develop an efficient water geyser working on dual system i.e working in day time on solar energy and in night on natural gas in order to save considerable amount of fuel i.e. natural gas To produce the fuel economy geyser in the market 	On going
24.	Development of Hybrid Fuel – A clean coal technology for alternate energy.	<ul style="list-style-type: none"> To formulate hybrid fuel from Balochistan coal and charcoal required to meet the specification of fuel for small industries. Exploitation of Balochistan coals as a smokeless fuel for household stoves. To lower the probability of corrosion in the boiler in industries To propose a fuel, which follow the rules of EPA with the reduction in the level of toxic emission of NOx and SOx gases in environment. 	Completed
25.	Easy Maintainable Leather with Up-graded properties through advance Nano materials.	<ul style="list-style-type: none"> To prepare the nano/micro size materials which have antimicrobial, oleophobic, hydro-phobic and stain resisting properties. To develop appropriate leather processing technology for the application of above smart materials in leather making. To achieve cost effective maintainable leather for new generation leather goods, to be used in rain, seals, oil places, sports, working areas etc. 	Completed
26.	Nano Colorants for Leather Dyeing Synthesis and Commercial Applications.	<ul style="list-style-type: none"> Studying a very effective and stable coloring system with integrated merits and to convert the process by implementing nanotechnology. 	On Going

S. No.	Project Title	Objectives	Status
		<ul style="list-style-type: none"> The complex traditional dyes system will be transformed by synthesizing and applying silica (based) nano colorant for dyeing Chromium (III)-tanned leather. To develop the texture, appearance and other aesthetics. To fill up unfilled and unfastened areas in the leather surface. 	
27.	Developing Clean Technology in Leather Tanning Finishing Process.	<ul style="list-style-type: none"> Altering manufacturing processes and technology Replacing the nature of process inputs Changing the final product or developing alternative products On-site reuse of wastes and by-products. 	On Going
28.	To Study the Effect of Photo-Catalysts on the Efficiency of Water Desalination by Solar Energy.	To enhance the efficiency of solar desalination by using Photo Catalysts	On Going
29.	Production of Herbal Products from <i>Nepta Praetervisa boiss</i> , <i>Polycharia sp.</i> and <i>Scriphedium quettensis</i> of Balochistan.	<ul style="list-style-type: none"> To explore the herbs of Balochistan for value-added products. Phytochemical studies of <i>Nepta pratervisaboiss</i>, <i>Ploycharia sp.</i> and <i>Scriphedium quettensis</i> after extraction to evaluate the herbal products. To develop the low cost product by utilization of indigenous herbs of Balochistan for pharmaceutical and food industry usage. 	On going
30.	Production of antimony trioxide from antimony ore.	<ul style="list-style-type: none"> To explore the mineral of Balochistan for value added products To develop cost effective processes for synthesis of antimony trioxide on industrial scale. To provide antimony trioxide to end users on cheaper rate. 	On going
31.	Processing of Seabuckthorn and its value addition for industrial feasible food products and Cultivation/propagation of Seabuckthorn plant at farm field to overcome the dependency on wild produce.	<ul style="list-style-type: none"> To develop different value added product of Seabuckthorn fruit. To cultivate and propagate the best species of Seabuckthorn to overcome the dependency on the wild produce. To develop technology for commercial Seabuckthorn production and value added products in Gilgit-Baltistan. 	On going

S. No.	Project Title	Objectives	Status
32.	Buckwheat based gluten free product development for gluten sensitive/allergic people.	<ul style="list-style-type: none"> To develop value-added products for gluten sensitive/allergic patients. To develop baby food products. 	On going

Technology Wing

Development Activities

New Approved PSDP Projects 2017-18:

S. No.	Title of Project	Approved by	Total Cost
1.	Establishment of Technical Training Centre for Precision. Mechanics and Instrument Technology PSTC Gwadar Balochistan (1st Revision)	CDWP 29.03.2018	852.342
2.	Up gradation of Medicinal Botanic Centre as National Centre for Herbal Medicine, PCSIR Labs. Complex, Peshawar	CDWP 08.05.2018 24 months	110.36

Ongoing PSDP Projects 2017-18:

S. No.	Title of Project
1.	Establishment of Technical Training Centre for Precision. Mechanics and Instrument Technology PSTC Gwadar Balochistan
2.	Up gradation of Food Processing & Analytical Laboratory and Establishment of Gems Cutting and Polishing Centre at PCSIR Skardu, Gilgit-Baltistan.
3.	Up gradation of Medicinal Botanic Centre as National Centre for Herbal Medicine, PCSIR Labs. Complex, Peshawar

Human Resource Development (HRD) Programs

For the development of human resource there are seven (7) technical training centers located in different provinces. The detail of these training centers is given below:

Sr. #	Technical Training Centre	Courses	Progress 2017-18	
			Enrolled	Passed Out
1	IIEE, Karachi	B. Engg.	50	35
2	PSTC, Karachi	DAE	172	110
		Short Courses	31	31
3	PSTC, Lahore	DAE	102	130
4	PSTC, Quetta	DAE	20	0
		Short Courses	100	100
5	CM & FT, Daska	DAE	30	24
		Short Courses	102	59
6	PSTC, Peshawar	DAE	76	31
		DIT (1 year)	60	23
		Short courses	FATA DA	160
			NAVTTC	0
			General	0
			Total	101

Sr. #	Technical Training Centre	Courses	Progress 2017-18	
			Enrolled	Passed Out
7	Dimension Stone Centre Peshawar	Stone Mosaic / Marble Cutting and Polishing	31	29

Medium Term Performance Targets/ Plans/ Goals

- To execute demand driven R&D projects with financial support of MoST and relevant industry.
- Infrastructure and manpower for research in new fields e.g. nanotechnology, biotechnology, biosensors, etc. shall be developed.
- To extend the scope of accredited parameters for cement, halal foods, food grade packaging materials, rapid testing of SPS organisms, calibration, etc
- To strengthen and establish linkages with academia and industry to facilitate the clients.
- To establish technology parks in PCSIR Labs Lahore, Karachi and Peshawar.
- To strengthen marketing cell for commercializing processes, products and technologies.
- Institutional strengthening and establishment of new R&D disciplines which may include the following:
 - Establishment of halal lab in Karachi.
 - Pharmaceutical and toxicology studies of herbal medicines.
 - Proficiency testing provider in the areas of chemical, fuel, pesticides, heavy metals and textiles.
 - Design and fabrication of scientific equipment.
 - Strengthening of PCSIR's technical education institutes i.e. PSTCs, CM&FT and IIEE.
 - Establishment of Technical Training Centre for Precision. Mechanics and Instrument Technology PSTC Gwadar Baluchistan
 - Up gradation of Food Processing & Analytical Laboratory and Establishment of Gems Cutting and Polishing Centre at PCSIR Skardu, Gilgit-Baltistan.
 - Up gradation of Medicinal Botanic Centre as National Centre for Herbal Medicine, PCSIR Labs. Complex, Peshawar

Pakistan Engineering Council (PEC)

Introduction

Pakistan Engineering Council (PEC) is a statutory regulatory body established under PEC Act-1976 enacted by the Parliament. Its main statutory functions include registration of engineers, consulting engineers, constructors/operators and accreditation of engineering programmes offered by universities/institutions, ensuring and managing of continuing professional development, assisting the Federal Government as Think Tank, establishing standards for engineering products and services besides safeguarding the interest of its members. The council shall encourage, facilitate and regulate working of professional engineering bodies for creativity and as custodians of engineering under the umbrella of the Council.

PEC is financially self-sustaining institution, meets its expenses from the accrual of registration fees from engineers, constructors, operator and consulting firms and having no dependency on government or any other outside agency.

PEC interacts with the Government, both at the Federal and Provincial level by participating in Commissions, Committees and Advisory Bodies. PEC is a fully representative body of the engineering community in the country. PEC has also been providing support to the Government in conducting technical enquiries and recommending remedial measures on the subjects referred. Over the years, PEC has become an influential voice, which speaks for the engineering profession as a whole in the country. It forms an effective bridge between Government, industry and academia.

In the last decade, PEC has achieved numerous national and international achievements and has become part of the top internationally recognized engineering bodies. The major achievements include excellence in the quality of engineering education, transformation of regulations in line with international standards and best practices.

PEC maintains a very lean secretariat at its Head Quarter, regional and branch offices in various cities. The main administrative control of the Council rests with its Governing Body (GB) which is composed of sixty-six professional engineers including Chairman registered with the Council, having more than 20 years of professional standing and are elected for term of three years.

Outcomes/Achievements/International Collaboration

Accreditation of Engineering Programs

By virtue of its Act, PEC is the apex body for accreditation and licensing/registration within its jurisdiction. The Council is carrying out process of accreditation for the 1st cycle (undergraduate level) of engineering education so far. As of June 2018, total number of engineering programs being offered in the country in public and private sectors are more than 364 in 122 HEIs as a four years Bachelor program after 12 years of schooling/education.

The accreditation process has been practiced in-line with international best practices as per the Washington Accord/IEA guidelines through the Accreditation Manual 2014 (Outcome Based Education and Assessment System of Accreditation OBE/OBA).

The Engineering Accreditation Department of PEC has been involved in execution of the accreditation related policies and procedures in accordance with the PEC Regulations for Engineering Education and the Accreditation Manual.

Contribution for National Development

Progress on Establishment of National Engineering Academy

The idea of establishment of National Engineering Academy was endorsed by UNESCO during January 9-10, 2015. PEC has worked on this idea and taken up at the highest forums through submission of detailed proposal to the Govt. of Pakistan. The President of Pakistan also endorsed the idea, while chairing the 1st PEC Deans Conference held in Feb 2018 in Islamabad. The Academy will certainly cater for the growing needs of imparting CPD, middle to advance levels training courses to

engineering professional, including faculty, promotional trainings as per service structure, research and policy review, curriculum review, promoting academia-industry linkages and many other relating professional activities which will certainly prove to pave the way for development of the country and the profession. The proposal was placed by EAD for approval of the 32nd Governing Body, which was principally approved for further detailed working.

Curriculum Development/Revision as per WA of IEA guidelines

The National Curriculum Review Committee (NCRC) of HEC has composition with 50% nomination from PEC comprising relevant experts/PEVs. The curriculum revision is ensured after three years. PEC has prioritized curriculum development/revision jointly with Higher Education Commission (HEC) focusing the Outcome Based Education in the country in-line with the Washington Accord guidelines through benchmarking with the signatory countries. So far, 10 engineering disciplines have been worked out and the remaining are being considered.

Meanwhile, PEC approached HEC to develop/review Engineering Curricula by PEC in support of PEC Act and Bye-Laws being the Regulatory Body. The Engineering Curriculum Revision and Development Committee (ECRDC) has been formulated to work further on the revision of curricula as per international best practices in-line with Outcome based Education System approach.

Capacity Building of Faculty from HEIs and the Program Evaluators (PEVs)

PEC has been continuously striving to achieve and maintain the highest standards in engineering education to be implemented in the country. In order to train the faculty and Quality Directors from HEIs and the PEC Program Evaluators, a comprehensive training program has been running where training workshops and sessions are conducted by PEC master trainers at various regions of the country in accordance with Outcome Based Education and Assessment System of Accreditation (OBE/OBA). The training workshops, mock accreditation sessions and other related training activities are meant for capacity building of the concerned persons involved in implementation of the OBE system as per the Washington Accord guidelines and the signatories' best practices. All the HEIs offering engineering programs have been involved in the process. During July 2017 to June 2018, about 700 faculty members, including 65 Program Evaluator were trained through 13 workshops/trainings throughout the country.

1st PEC Deans' International Conference of Engineering Institutions

1st PEC Deans' International Conference of Engineering Institutions on "Engineering Education Standardization, Challenges and Solutions: Post Washington Accord Scenario" was organized on February 13-14, 2018.

This was one of the series of activities conducted by PEC, being full Signatory of the Washington Accord (WA) of International Engineering Alliance (IEA), for standardization and benchmarking of our engineering education and accreditation systems in-line with the prevailing international market trends in consonance with the international best practices. The conference was participated by local and international participants including Deans, VCs, regulatory/standard bodies, leaders in academia, government and industry for sharing their experiences and ideas in solving real world complex issues in engineering profession.

This activity was in harmony with PEC progress towards standardization and international recognition of engineering education standards, its accreditation and professional system. Following recommendations were chalked-out in five themes followed by panel discussion and Policy-round table, suggested for further processing and implementation after detailed deliberation:

- Engineers academy need to be established
- Certified PEVs should be trained/Prepared
- Induction of multidisciplinary professionals in PEC Governing Body
- Curriculum benchmarking in-line with international best practices
- Curriculum development by PEC in collaboration with HEC
- University based science & technology parks

- Engineers Service Structure
- Techno- entrepreneurship activities should be encouraged at University level

International Collaboration, Linkages and Achievements

PEC has been actively working on establishing international linkages and collaborations thereby resulting in membership and recognition by relevant professional bodies. A dedicated wing has been established at the Engineering Accreditation Department to deal with international collaborations and linkages.

The EAD also keeps close liaison with contemporary regulatory professional bodies worldwide like BEM Malaysia, IES Singapore, CAST China, ABET USA, Engineers Canada, EC UK, SCE Saudi Arabia, Engineers Australia, Engineering New Zealand, JABEE Japan, ABEEK Korea and many other professional bodies.

The international wing of EAD is also involved in organizing and conducting training of the faculty and quality directors from HEIs, the Program Evaluators (PEVs) through international as well as local Resource Persons; the international wing also assists in formulation and review of various accreditation documentation including the Accreditation Manual in-line with the IEA/WA standards and international best practices.

Following are the major achievements of EAD during July 2017- June 2018 regarding benchmarking and International recognition of engineering qualifications offered in Pakistan:

- Pakistan's Authorized Membership of International Provisional Engineers Agreement (IPEA) Of International Engineering Alliance (IEA)
- Review/Verification visit to Myanmar towards recognition under FEIAP Accreditation System
- FEIIC Engineering Qualification, Accreditation & Professionals Systems (EQAPS) Project

Pakistan's Authorized Membership of IPEA

Pakistan, represented by PEC, has been accepted as authorized member of the International Provisional Engineers Agreement (IPEA) under the umbrella of International Engineering Alliance (IEA) during the annual meeting (IEAM-2018) held during June 24-29, 2018 at London, UK.

The IPEA is a multi-national agreement between engineering organizations in the member jurisdictions which creates the framework for the establishment of an international standard of competence for professional engineering, and then empowers each member organization to establish a section of the International Professional Engineers Register.

UNESCO-FEIAP-ECOSF, Engineering Regional Workshop 21st- 22nd December 2017, Jakarta, Indonesia

The workshop was held in Jakarta, Indonesia 21 - 22 December 2017. A two-member delegation from PEC, being member of the FEIAP, participated and contributed to this workshop. The aim of this regional workshop was to develop the roadmap between UNESCO, ECO-SF and the Federation of Engineering Institutions of Asia and the Pacific (FEIAP) with partners to enhance engineering qualification, standardization and south-south cooperation; moreover review engineering, technology, Industry and innovation linkage to create strong sustainable development of engineering in Asia and Pacific region.

FEIIC EQAPS Project

Pakistan, represented by PEC, is one of the founding members of the Federation of Engineering Institutions of Islamic Countries (FEIIC). The FEIIC 31st Council Meeting and 5th International Conference on Engineering Education & Research (FICEER2017) was held in Madinah Al Munawwarah during 16 – 18 December 2017. The Chairman PEC was elected as Deputy President FEIIC for next tenure of 2018-2019. Engr. Dr Nasir M Khan, Head EAD has been selected as Deputy Chair of the FEIIC Engineering Qualification, Accreditation & Professionals Systems (EQAPS)

Project. Pakistan and Malaysia have been nominated by the FEIIC to take lead and mentor the member countries to develop and standardize their accreditation, quality education system (Outcome Based Education System) and professional system.

Accredited Engineering Programs up to 86th EA&QEC/EAB (till 30th June 2018)

The total numbers of programs accredited by PEC since 1976 after the establishment of PEC under the Act of Parliament are 364 out of total programs 482 offered by 134 HEIs in the country. However, 64 programs are accredited under the OBA-accreditation process for Level-II system as per Accreditation Manual-2014 (to be covered under WA for substantial equivalence) so far since its official implementation from March 2014. However, as the reaccreditation of more and more programs are becoming due after their expiry as per previous accreditation guidelines, coupled with matured understanding and implementation of OBE concept. It is expected that further 50+ programs would be qualifying to be accredited under Level-II by the end of 2018.

As per Second Schedule (accredited engineering programs outside Pakistan) of PEC Act, the accredited engineering programs by respective signatories of the Washington Accord (WA) and other professional bodies are considered as substantially equivalent for mutual recognition.

Sr.#	Status of Programs	No. of Programs
i.	Accredited Engineering Programs till date	364
ii.	Under Process Engineering Programs	118
iii.	Accredited Engineering Programs as per OBE Manual 2014	64
iv.	Engineering Universities/HEIs	122
v.	Engineering Disciplines accredited so far	29

Registration of Engineers

PEC registration is mandatory to practice engineering profession in the country. A person possessing an accredited engineering qualification is eligible to be registered with the Council as Registered Engineer (RE), however, he/she may apply for the title of Professional Engineer (PE) after five years of experience along with requisite CPD points and passing Engineering Practice Examination (EPE). Council is in process to open a register for International Professional Engineer (Int.PE) as authorized by International Professional Engineers Agreement (IPEA) in June 2018. From 1st July 2017 to 30th June 2018, PEC registered 25,891 engineers of accredited engineering programs of different universities whereas 55,255 subscriptions/ memberships of engineers were renewed, accordingly.

Major Reforms and Achievements

In recent years, PEC has transformed registration system by initiating following reforms to facilitate the engineering community:-

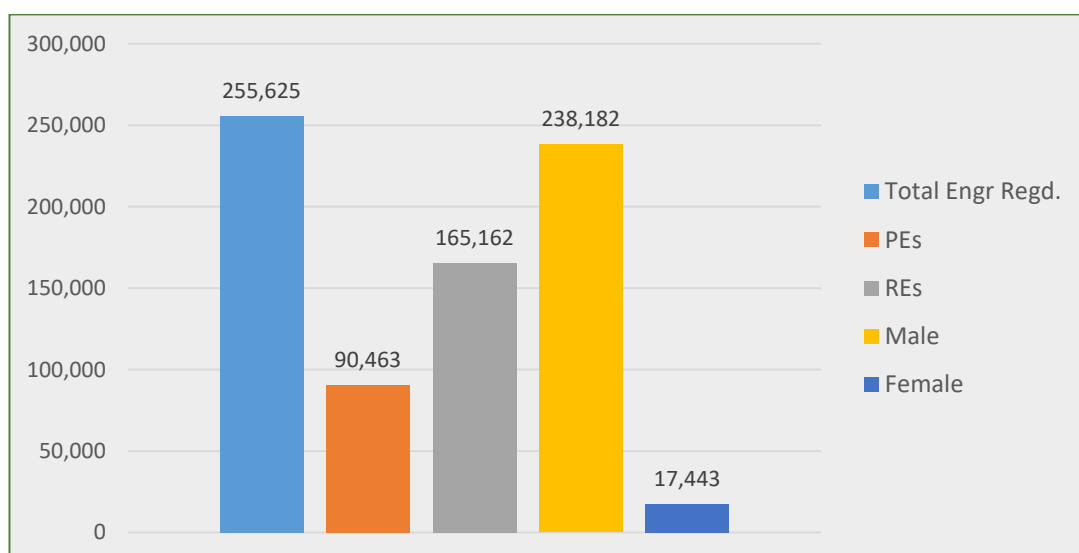
- Online Registration (New/Renewal) as per international standards and best practices.
- Complimentary Registration for fresh engineering graduates of 2017 and 2018 only
- Biometric verification of engineers for updation of their profile.
- Archiving of engineers data.
- Discount offer to engineers having valid registration by more than 100 brands
- Issuance of Supervisory Certificates to fresh engineers.
- Registration of International Professional Engineer (Int.P.Eng.)

Incentive Scheme

PEC has introduced following incentive scheme for the engineers for new registration, renewal and endorsement of higher qualification. The incentive scheme is valid up to December 31, 2018:

Incentive Schemes	Graduates of 2018	Graduates of 2017	Graduates of 2016 & Previous Years
New Registration (Graduates from Pakistani HEIs)	Complimentary registration for one year	Complimentary registration for one year	Rs 1000/- (Lifetime subscription + with Arrears)
New Registration (Foreign Degree Holders)	Complimentary registration For one year	Complimentary registration For one year	1000/- (Lifetime subscription + with Arrears)
Renewal of Registration (Life Subscription)	Rs. 1,000/- (with Arrears)	Rs. 1,000/- (with Arrears)	Rs. 1,000/- (with Arrears)
Endorsement of Higher Qualification (Master & PhD)	Complimentary	Complimentary	Complimentary

Statistics of Professional Engineers (PEs) and Registered Engineers (REs) up to 30th June, 2018



Registration of Constructors, Operators & Consultants

Constructor/Operator Department is responsible for registration of Construction, Operation and Consulting Engineering firms. From 1st July 2017 to 30th June 2018, PEC newly registered 4,277 constructors/operator and 38 consulting firms whereas renewed 4,293 constructor/operator and 112 consulting firms [local firms]. During the said period 6 new foreign constructor/operator and 7 foreign consulting firms were registered whereas 4 foreign constructor/operator and 10 foreign consulting firms got renewed.

Reforms

Over the period of time, the Constructor/Operator Department went through a lot of reforms to make the registration process easier, transparent, and efficient. The reforms are as under:

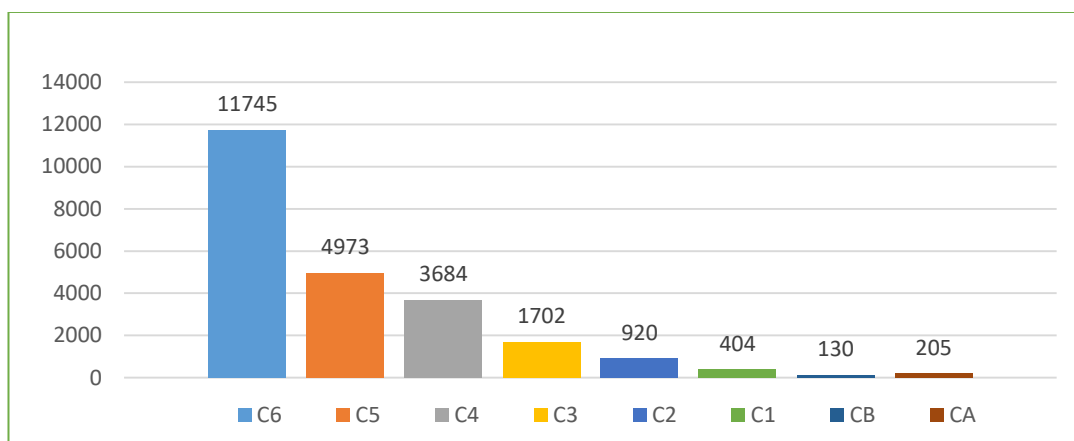
- Biometric verification of Engineers to eliminate fake / forged employment,

- Minimum 70% mandatory employment of local engineers in foreign firms working in Pakistan. This condition resulted in increase of local engineers employment in foreign companies, from 13 engineers per annum to approx. 600 engineers per year,
- Introduction of clarity in identification of foreign and local firms through revised definition in very clear terms so as to eliminate misuse and exploitation of each other's status due to previous vague definition,
- Removal of 'non-availability of technology' as prerequisite for registration of foreign firms so as to import modern engineering procedures and techniques in addition to facilitating foreign investment essential for mega projects,
- Restriction on foreign firms to be registered in C-A, C-B and C-I only in order to relieve local construction industry of undue competitive pressure of foreign firms,
- Online registration of Constructors and Operators,
- Introduction of Annual Based License instead of Project Specific one for foreign firms, embedded with monitoring, control and record maintenance mechanism.
- Employment opportunities for 10,000 fresh Engineers (Supervisory License),
- Incentive schemes for Constructors and Operators,
- Multistage checking of mandatory JV between foreign and local firms,
- Introduction of the condition of equivalence / compatibility between JV partners so that the JV may sustain resulting in timely finalization of projects,
- Consideration of rented plant and machinery instead of owned machinery for registration of firm,
- Increase in mandatory financial standing as pre-requisite and fee for foreign firm registration so that only credible and serious foreign companies are allowed to work in Pakistan,
- Simplification of registration forms and documents,
- Updation of progress to the applicant about registration case,
- Establishment of Facilitation Center.

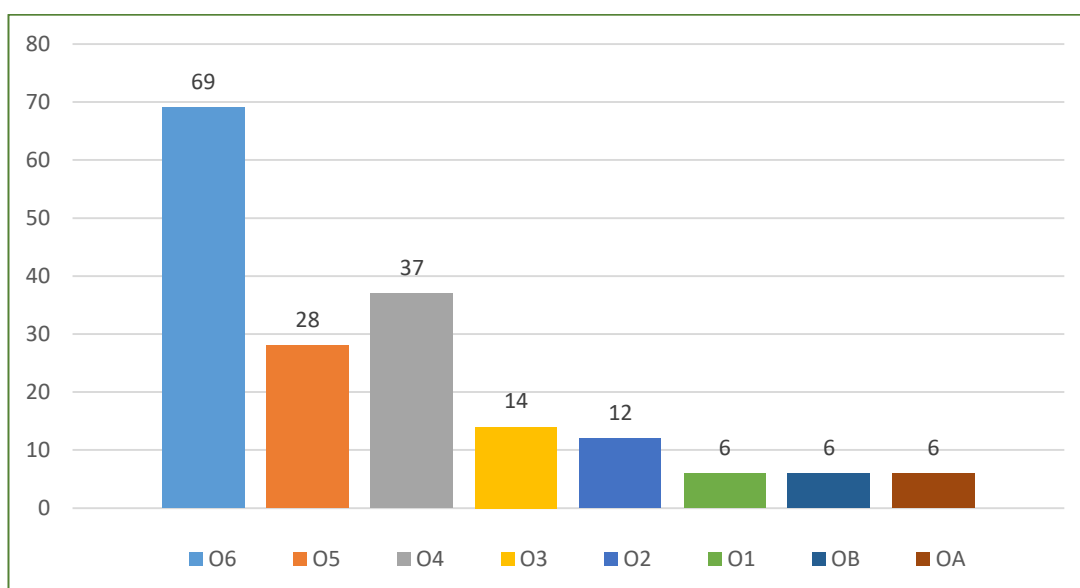
Incentive Scheme for Constructors, Operators and Consulting Engineering Firms

PEC allowed renewal of all such constructors, operators, and consulting engineering firms without charging fine/ arrears of previous years which could not get their licenses renewed. This scheme is valid up to December 31, 2018.

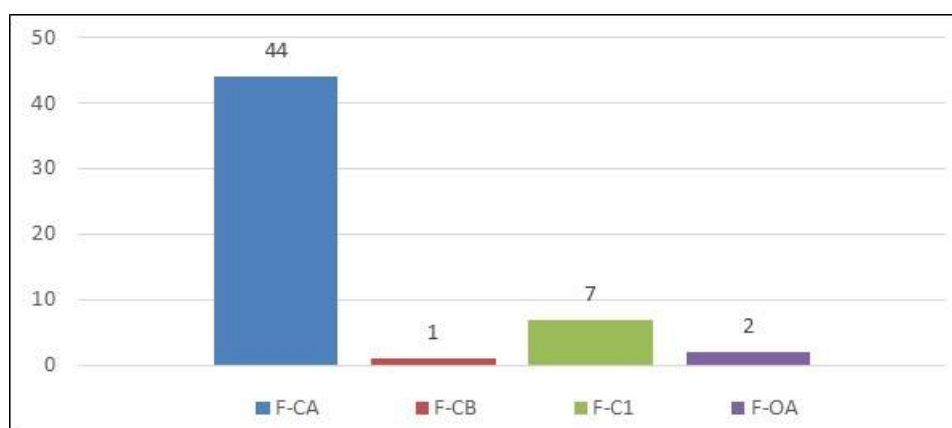
Statistics of Active Constructors, Operators and Consulting Engineering Firms up to 30th June 2018



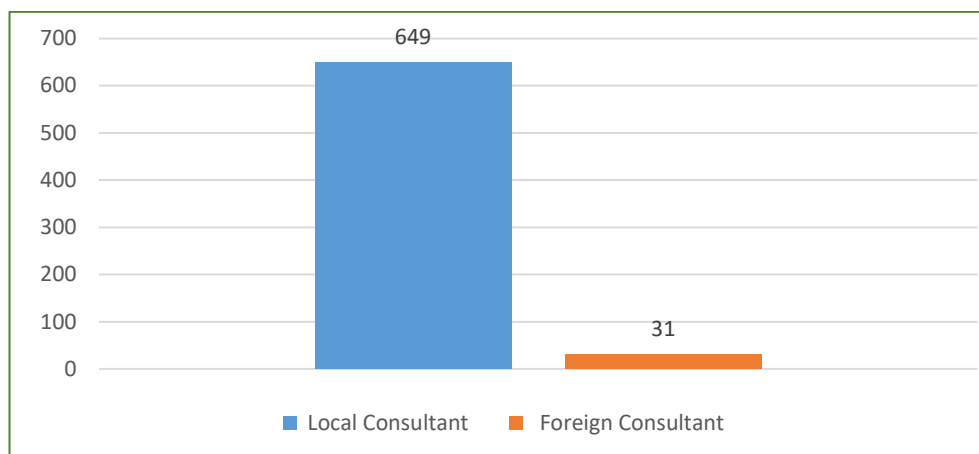
Valid registered Constructors up to 30th June 2018



Valid registered Operators up to 30th June 2018



Valid registered Foreign Constructors and Operators up to 30th June 2018



Local and foreign Consultants valid up to 30th June 2018

Penalties on violation of PEC Act & Byelaws

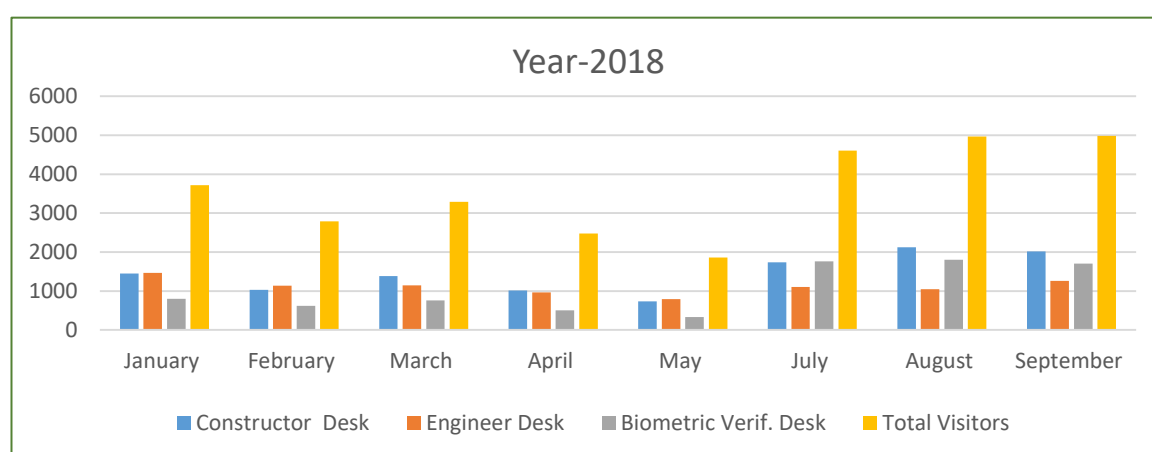
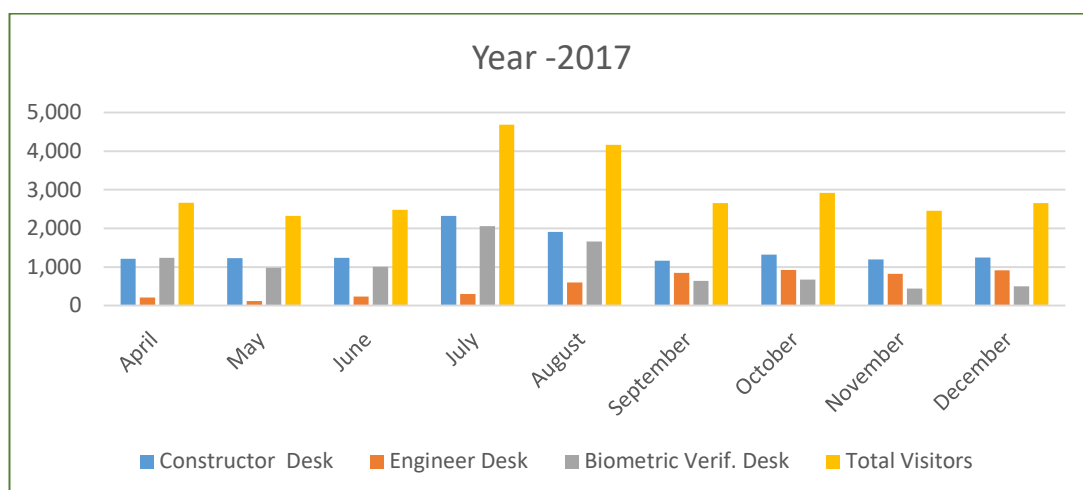
To perform all engineering works, it is mandatory to obtain registration as prescribed in PEC Act and Byelaws. Undertaking engineering works without PEC valid license attracts penalties/punishment under Section 27 of PEC Act including six months' imprisonment or Rs.10,000 fine or both.

Facilitation Centre

In order to address the issues of Constructors, Operators and Engineers besides providing One Window Solution, PEC has established the Facilitation Centre (FC) in PEC HQ and Regional Offices. Engineers, constructors, and operators are gathering requisite information to improve their professional statuses and manage expeditious disposal of their registration and allied cases. FC is basically PEC's interface with its clients, functioning on a solution providing approach through one window operation. With its dedicated staff, FC manages centrally all the queries/issues of visiting engineers and constructors by interacting directly with them as well as the concerned departments/offices of PEC. Following resources and basic facilities have been provided in FC:

- Dedicated & trained staff.
- Separate counters for Engineers Consultants & Constructors/Operators for submission of applications, provision of information and resolution of problems.
- Biometric verification of engineers. Computers connected with NADRA for online biometric verification of Engineers through finger/thumb impression and Computerized National Identity Card (CNIC).
- Help Desks with desktop computers and printers for engineers' online registration.
- Facilities of photocopier machine & scanner have also been provided for the ease of visitors.
- Token Machine System for Queue Management of visitors.
- Proper seating arrangement for visitors with pleasant ambiance.

Monthly Progress of Facilitation Centre



Visitors facilitated on monthly basis

Continuing Professional Development (CPD) Program for Engineers

Continuing Professional Development Activities

For the professional growth and skill development of engineers in the country as per PEC Act, PEC has implemented a comprehensive framework of “Continuing Professional Development” under CPD Byelaws-2008 to develop competence and ability of engineers leading towards international competitiveness and job opportunities. In order to implement the CPD framework, PEC has devised three-pronged strategy with improved policies as under:

- PEC regularly organizes nation-wide short courses, seminars, and trainings for engineers in different disciplines.
- Encouraging professional bodies all over country (Engineering Institutions and organizations) by registering these to impart CPD activities (list available on PEC website).
- Establishing professional development academies at various engineering universities/PEBs.

Regulation of Professional Engineering Bodies (PEBs)

To facilitate the engineers, PEC has registered large number of Professional Engineering Bodies and the list is available on PEC website. As per provision of Byelaw-16 of PDE Byelaws 2008, from July 2010 onwards, most of Continuing Professional Development activities (courses, training workshops, etc.) are being undertaken by these PEBs.

The courses/ CPD activities are being planned by the PEBs according to the specified criteria and guidelines. Such bodies also provide schedule of courses and share verified list of participants with PEC to maintain transparent record of CPD activities and points for all the registered/ professional engineers. PEC Regional /Branch and Liaison Offices play role of facilitator for the professional bodies in organizing CPD activities.

Registration/ Renewal Status of PEBs

- Total No. of PEBs, as on 30th June 2018 134 Nos.
- No. of PEBs having valid License/Renewal 79 Nos.
- PEBs Registered during the Period (July 2017- June 2018) 07 Nos.

S.#	Category of PEBs	Total PEBs
1	Engineering universities/ institutions	85
2	Technical organizations	43
3	Professional Institutes	06
Total		134

Period	No. of Activities	No. of Engineer Participants
July 2017 to June 2018	137	4,234

Engineering Practice Exam (EPE)

As per provisions of Byelaw-5(e) of PDE Byelaws-2008, PEC holds Engineering Practice Examination for Registered Engineers (REs) to get prestigious title of Professional Engineer (PE) through assessment of engineering competence, knowledge and skills as an engineer. The EPE is an essential part of assessment for the title of Professional Engineer (PE).

So far, PEC has conducted 12 examinations in which 1,169 candidates appeared. The 12th EPE was conducted as per the revised scheme. The details of exams conducted during the period is as under:

S.#	EPE	Held on	Eligible	Appeared	Qualified
1	11 th EPE (Summer-2017)	20.08.2017	149	141	24
2	12 th EPE (Spring-2018)	01.04.2018	226	212	164
Total		447	375	353	188

Outcomes of CPD

- Knowledge and Skill development of the fresh engineers to help in job/ professional career.
- Capacity building of middle level engineers towards technical problem solving and skill enhancement.
- Management trainings of senior engineers for leadership and decision making.
- The overall outcome is to maintain the professional competence of engineers to contribute in national development and betterment of the society as a whole.

Think Tank - Assistance to the Federal Government

Assistance to the Federal Government as Think Tank is another major function of the Council, for which the Council formed a Think Tank Committee comprising eminent engineers, allied professionals, academicians, policy makers, and researchers. Under the Convenorship of Chairman PEC, the Sub-committees are working in major sectors of energy, water, telecommunication, manufacturing, infrastructure and engineering education.

International License Agreement between PEC and ICC for Revision of Building Code (Seismic Provisions-2007)-12th July 2017

Pakistan Engineering Council (PEC) being a supra body is providing “Assistance to the Federal Government as Think Tank” on various national issues and development plans. For instance, after devastating earthquake of October 2005, wherein 80,000 people were killed with huge economic losses. Subsequently, the Federal Government through Ministry of Housing & Works and NESPAK approached PEC for development of Seismic Provisions-2007 for Building Code of Pakistan and notified vide SRO 971(1)/2008 dated October 2008.

As per SRO notification, Pakistan Engineering Council has decided the revision of said code and 1st Meeting of PEC Think Tank Sub-Committee (Task Force) on Revision of Building Code of Pakistan (Seismic Provisions-2007) held on May 09, 2017, at PEC HQs, Islamabad, wherein the house recommended to get copy right permission for utilization of relevant International Building Codes as the “Base Documents” for revision of said Code. Accordingly, PEC entered into a royalty free International License Agreement on 12th July 2017 with International Code Council, USA. In light of recommendation of PEC Think Tank Sub Committee on Revision of Building Code of Pakistan Seismic Provisions-2007. PEC approached International Code Council (ICC) and submitted an official request for grant of a copy right permission of following international Codes to be used for revision of Building Code of Pakistan:

- 2015 International Building Code
- 2015 International Performance Code for Buildings and Facilities
- 2015 International Zoning Code

ICC and PEC signed an International License Agreement on July 12, 2017 for revision of Building Code of Pakistan to use above documents. ICC has granted initial permission of two years for revision of said code. PEC will accomplish the revision within stipulated time or earlier, and after that final draft of revised building code will be submitted to ICC for vetting. After vetting and approval by ICC, the second phase of license agreement will be executed to publish and circulate the building code by PEC.

Standards for Engineering Contracts, Cost and Services

In order to bring transparency, efficiency, and timeliness in the implementation of public and private sector projects, PEC developed unified Bidding and Contracts Documents for procurement of engineering goods and services. These documents were approved by the ECNEC and also adopted by PPRA. PEC has further developed thirteen documents to facilitate procurement of goods and services. These documents are available at websites of PEC (www.pec.org.pk), PPRA (www.ppra.org.pk). In order to strengthen the PEC efforts and as per provisions of PEC Act, PEC has now undertaken the initiative to revise/update these documents based on latest FIDIC and MDBs (Multi Development Banks) documents 2012; incorporating users’ feedback and Federal Governments relevant laws.

PEC Acts as bridge between Engineering Forums & Federal Government

PEC provides advice and expert opinion to various Government departments and private organizations on engineering procurements, services, and Bidding Documents. The large number of services is being provided to various public and private organizations and individuals.

Forum for Arbitration

PEC is also serving as a forum for arbitration pertaining to disputes in construction and consultancy contracts as per PEC Act 1976 - Section (8)-s. The matters referred to PEC are adjudicated as per PEC Construction/Consultancy Byelaws. A panel of arbitrators/ experts is being maintained by PEC.

Pakistan Halal Authority (PHA)

Introduction

Pakistan Halal Authority (PHA) was established through an Act of the Parliament known as the Pakistan Halal Authority Act No. VIII of 2016.

The purpose of establishing PHA is to promote imports and exports, trade and commerce with foreign countries and inter-provincial trade and commerce in Halal articles and processes. The Provincial Governments and the respective governments of Gilgit Baltistan and Azad Jammu and Kashmir may also opt to adopt the provisions as envisaged in the Act.

There exists a huge international market of Halal business worth trillions of dollars, bulk of which is being taken away by non-Muslim countries. Countries mostly involved in the Halal products exports are Brazil, Australia, Malaysia, Indonesia, Thailand, China, Korea, South Africa, America etc. The scope of the Halal sector covers a wide range of items such as food, pharmaceuticals, health, food supplements and toiletries etc. 85% of the Halal Food imports by OIC Nations are from Non-Muslim Countries. Pakistan being a Muslim country is taking only a nominal share of this huge export potential, due to non-existence of a legal and recognized entity / authority at the national level dealing with the Halal sector.

Powers and functions of the Authority:

Powers and functions of the Authority shall be to:—

- (a) Develop and implement strategies, plans and programmes for promotion of imports and exports, trade and commerce with foreign countries and inter-provincial trade and commerce in Halal articles and processes;
- (b) Recommend the Halal Standards developed for articles and processes, to be notified in the official Gazette by the Federal Government for adoption and notification by the National Standards Body;

In this context, the Authority may consider the OIC Guidelines in schedule-I, relating to Halal food and other articles or processes, as modified by the Organization of the Islamic Cooperation from time to time, as a reference point;

- (c) Recommend mechanism for the Accreditation of Halal Certification Bodies and adoption of Halal Certification systems;
- (d) Develop policies, plans and programmes for ensuring compliance of Halal articles and processes with the Halal Standards;
- (e) Develop and authorize use of Halal logo for Halal articles and processes;
- (f) May operate as a certification body after obtaining due accreditation from the National Accreditation Body;
- (g) Levy fees for issue or renewal of the Halal certificate and / or authorizing the use of Halal Logo;
- (h) Maintain a register of all persons, firms and companies authorized to use the Halal logo;
- (i) Inspect and test Halal products and processes for their quality, specification and characteristics with relation to the Halal Standards, for purposes of imports and exports, trade and commerce with foreign countries and inter-provincial trade and commerce;
- (j) Prohibit production, storage and sale in the Islamabad Capital Territory of such Halal products as do not conform to the Halal Standards;
- (k) Arrange and conduct public awareness campaigns in relation to the Halal sector in general and to Halal products and processes in particular;

- (l) Secure international recognition of the Halal logo to build confidence in the Halal Certification system and Pakistani Halal products abroad;
- (m) Co-ordinate with national and international organizations for strengthening the Halal sector;
- (n) Promote and encourage establishment of libraries and laboratories for the purpose of developing the Halal sector;
- (o) Collect and circulate statistical and other information relating to the Halal sector; and
- (p) Any other function assigned by the Government for development of the Halal sector and promotion of Halal products and processes for purposes of the Act.

National University of Technology (NUTECH)

Introduction

National University of Technology (NUTECH) has emerged as the first ‘University for Industry’. The University is focused on promoting technology research, development and training of the youth in the relevant fields and qualifications needed by the industries, economy to ensure knowledge and technology based productivity driven rapid and sustainable economic development. NUTECH Bill 2018 was approved by the National Parliament on 14th February, 2018. Consequently, the university was established as a Federally Chartered University through an Act of Parliament and Gazette notified on 26th February, 2018. NUTECH has adopted/implemented policies as per HEC guidelines. NUTECH aims to prepare the youth of Pakistan to take on the challenges of the twenty first century proffered by rapid technology advancements. NUTECH has achieved far beyond the targets set for the first fiscal year.

Objectives:

Following are the objectives set for NUTECH:

- a. Approval of charter from Parliament.
- b. Commencement of inaugural Academic Session with effect from Year 2018.
- c. Infrastructure development required for Administration and Academic systems to support academic program of NUTECH in near future.
- d. Estimation of financial and budgetary requirements for financial year 2018-19.
- e. Hiring of manpower for effective commencement of academic programs.
- f. Statutes and Policies requirement.
- g. Design of technology programs requirement for future needs of country.
- h. Design of framework for University-Industry collaboration.

Objectives Achieved during 2017-18:

NUTECH is achieving administrative and academic domains goals in a very short span of time and its first batch will start from 1st October, 2018. Following objectives were achieved during 2017-18:

- a. NUTECH Bill 2018 was approved by the National Parliament on 14th February, 2018 and NUTECH was established as a Federally Chartered University.
- b. NUTECH established its basic infrastructure for administrative and academic requirement of the University.
- c. Financing and budgetary requirement were estimated and got approved from Ministry of Finance.
- d. Academic and management staffs is being hired for smooth functioning of the University.
- e. Statutes have been approved from MoST and are in the process of publication.
- f. NUTECH policies were approved by the Board of Governors in a meeting held on 4th June, 2018.
- g. Five technology programs were designed as per the guidelines of HEC.
- h. NUTECH has devised University-Industry working model after visiting industries, consulting and addressing concerns of all stakeholders and MoST.