

Table of Contents

Executive Summary	1
I PAKISTAN SCIENCE FOUNDATION (PSF)	12
1. Research Support Section	12
1.1 Under process Projects:	12
1.2 On-going Projects	12
1.3 Completed Projects	12
1.4 Scientific Publications Produced through PSF Supported Projects	52
2. International Liaison Section	53
2.1 Joint R&D Bilateral Projects and Calls	53
a. PSF-NSFC, China joint call for proposals	54
b. PSF-TUBITAK, joint call for proposals	54
c. PSF-MSRT joint call for proposals	54
d. Call for Joint Proposals with NSF, Sri Lanka	54
2.2 Meetings of PSF Screening Committees	54
3. Science Popularization Section	58
3.1 Regular Activities	587
3.2 World Science Day for Peace and Development (WSDPD):	58
3.4 Financial Assistance to the following Schools of Balochistan	59
3.5 Part Youth Space Maker Camp 5 th Belt and Road Teenager	59
3.6 Popular Science Lecture	60
3.7 Descriptive Letter Writing Competition	60
4. Planning & Development (P&D) Section	62
4.1 On-going Development Projects	63
I) Financial Support to Scientific Societies in Pakistan (Phase-II)	63
II) Competitive Research Programme	65
IV) Science Talent Farming Scheme (STFS)	687
V) Science, Technology Engineering and Mathematics	69
VI) Development of National Digital Archive of Research published in Pakistani Journals	72
a) Travel Grants Under Non-Development Budget	73
b) Travel Grants Under PSDP Project “Financial Support to Scientific Societies in Pakistan (Phase-II)”	74

5. PAK-US Natural Science Linkage Programme (NSLP) Endowment Fund	78
i. Research Funding	797
a) Under process Projects	80
b) On-going Projects	80
c) Completed Projects	808
iii. Scientific Publications and Patents Produced through PSF Funded Projects	886
iv. Project Formulation Workshops	886
v. Meetings of Fund Management Committee of NSLP	886
VI. Meetings of Technical Committee of NSLP	897
II. PAKISTAN SCIENTIFIC AND TECHNOLOGICAL INFORMATION CENTRE (PASTIC)	88
1. Introduction	88
2. Pastic Objectives	89
3. Activities and Services	90
3.1 Bibliographic Information & Document Supply Service	90
3.2 Abstracting and Indexing Service	91
3.3 Technology Information Service (TIS)	92
3.4 PASTIC National Science Reference Library Service	94
3.5 Reprographic Service	975
3.6 IT Support Service	986
3.5 International	Liaison
8	100
3.6 News Letters and Reports	98
3.7 PASTIC Services Awareness Seminars/Stalls	98
3.8 Human Resource Development	100
3.8 Meetings / Workshops / Trainings / Seminars/ Conferences Attended by PASTIC Officials	105
3	
3.10 Miscellaneous Activities	111
09	
III. PAKISTAN MUSEUM OF NATURAL HISTORY	111
1. Botanical Sciences Division	1153
1.1 Collection, Cataloguing, Digitization of Natural History Specimens	113
1.2 Research Projects	114

1.3 International Collaborative Projects/Research Work	114
1.4 Research Publications	115
1.5 Conference abstracts/Proceedings	116
1.6 Presentations/Lectures	116
1.7 Popular Science Articles / Book Published	116
1.8 Training Courses/Workshops Held/Attended	117
1.9 Trainings Courses / Workshops Conducted	117
1.10 Services to Other Organizations	118
2. Earth Sciences Division	118
2.1 Field Works	118
2.2 Research Publications	119
2.3 LABORATORY WORK	120
2.4 Services to other Organizations	121
2.5 Summary of students provided assistance	121
2.6 Design and Display Activities of PMNH for Informal Education	121
i. “Up- gradation of Paleo Gallery”	121
ii. Construction of “Invertebrate Fossils of Pakistan” Diorama	122
2.7 Seminars/Trainings attended	122
2.8 Research Project (National & International)	122
2.9 National & International Liaison	124
3 Zoological Sciences Division	1264
3.1 Field Works	124
3.2 LABORATORY WORK	125
3.3 RESEARCH PAPERS	126
3.4 On-Going Research Projects	128
3.5 Workshops Organized	129
3.6 Trainings	129
3.7 Internships	129
3.8 Services Rendered to other Organizations	130
3.9 NO of Students Supervised: 09 (3 PHD AND 06 M. PHIL)	130
3.10 Workshops/Trainings/Seminars Attended	130
3.11 National/International Collaboration/ Liaison	131
4. PUBLIC SERVICES DIVISION	1331
4.1 Educational Activities	131
4.2 Internships	132
4.3 Visitors Data	132
4.4 Other Display Activities	132
IV. Organization and Administration	1353

i. PSF Organizational Chart and Sanctioned Posts	133
i.PASTIC Organizational Chart and Sanctioned Posts	138
V. Photo Gallery and Press Clipping	141
1. PSF Photo Gallery	141
VII. Financial Statements	231
1.PSF Financial Statement	232

Executive Summary

Pakistan Science Foundation (PSF)

Pakistan Science Foundation (PSF) is apex body for promotion and funding of scientific and technological research and other related activities in the country. The tasks undertaken by the Foundation for the performance of its statutory functions are divided into two broad categories viz., Science Promotion and Science Popularization. Some of these activities pertaining to above mentioned categories are undertaken by Pakistan Museum of Natural History (PMNH) and Pakistan Scientific and Technological Information Centre (PASTIC), the two subsidiary organizations of PSF, while others are performed by PSF Science Wing and are reflected as under:

Research Support

During the report period, **281** research proposals/concept papers remained under active consideration of the Foundation. Out of these, **101** projects were under-process, **36** projects were recommended by the Technical Committee for the approval of the Foundation and **29** were approved by the Foundation at a total cost of Rs. **89,201,985/- million (Annexure-II)** whereas Rs. **52,066,433/- million** were released on account of first installments of already approved projects. A total of **0** projects were also recommended by various technical Committees for approval, however, these could not be approved by Executive Committee due to paucity of fund. During the period, **81** research projects remained on-going and **23** progress reports (semi annual, 1st, 2nd annual & final) of these projects were received. Semi annual reports were scrutinized by PSF staff, whereas the annual and final reports, after initial scrutiny, were sent for evaluation to the subject experts to assess the interim progress of the projects. It may be mentioned that due installments of ongoing projects are released only if the interim progress of the projects is satisfactory. An amount of **Rs. 14,653,339/-** was released on account of due installments and evaluation fee of ongoing projects. A list of the semi-annual, annual and final reports is given in **Annexure-III**. **23** Research projects were completed during the year. The subject experts evaluated the final technical reports of these projects, which were subsequently placed before the respective PSF Technical Committees for consideration. After the adaptation of these reports by the Committee, the accounts of these projects were settled and files were closed.

Science Promotion Activities

Institutional Support Programme

One of the functions of the Foundation is to support the emerging R&D Organizations/Universities to strengthen their laboratories. During the report period, one case was entertained and an amount of Rs. 5,000,000/- (Rupees 05 million) was approved and an amount of Rs. 4,000,000/- was released during the report period.

Financial Assistance for Holding Science Conferences, Seminars, Symposia and Workshops

Another function of the Foundation is to provide funding for holding conferences/seminars/symposia/workshops etc. In 2022-23, 71 requests were approved at a total cost of Rs. **9,306,500/-** and amount of Rs. **5.03 million** was released to **52** cases from various institutions for organizing conferences, seminars and workshops on important scientific topics.

R & D Industry Programme

Technology development and commercialization is the only way through which the benefits of scientific research can be transferred to the common man. PSF has formulated an effective strategy for the achievements of this function by encouraging applied research rightly identified in collaboration with the industrial community to address and solve specific industrial issues. So that the technologies and processes developed at the laboratory level can be taken up for the pilot level production to pave way for commercialization.

Focusing on this approach research and strong industrial linkages, R&D-Industry Programme is bringing 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.

International Liaison Section

PSF has the mandate to liaise with similar international bodies across the globe and is in active collaboration with many similar International bodies. In the prevalent global scenario, the importance of international collaborations has become vital for the technological developments and

advancement of knowledge. Therefore, PSF has re-vitalized its international collaborations and embarked upon new linkages to harness potential of technologically advanced nations like China, Turkey, Iran and Sri Lanka. In addition to this PSF regularly plays role as a facilitator to link various international organizations/ universities with local universities and research institutions. Delegates from the reputed universities and similar collaborating bodies regularly hold meetings with PSF to discuss the areas of joint collaboration.

Over the years, PSF has established cordial bilateral relations with various international bodies to synergize efforts for achieving technological excellence and socioeconomic well-being of the people at large. Joint research projects are already ongoing with The National Natural Science Foundation of China (NSFC); Scientific and Technological Research Council of Turkey (TÜBİTAK); Ministry of Science, Research and Technology (MSRT), Iran and National Science Foundation, Sri Lanka.

During the report period, PSF launched 5th joint R&D call for proposals with National Natural Science Foundation (NSFC), China under which 10 projects were awarded. 81 projects remained ongoing (including newly initiated projects) while 17 technical reports (semi-annual, annual & final) of ongoing projects were received and an amount of Rs.58.46 million was released on account of due installment of already ongoing projects and 93.4 Million was released on the account of first installment of newly initiated projects with NSFC-China. Whereas 15 projects were completed during 2023-24. In addition, 18 projects of IL remained ongoing funded under PSDP project Competitive Research Program. 12 technical reports (semi-annual, annual & final) of ongoing projects were received and an amount of Rs.14.28 million was released on account of due installment of already ongoing projects and first installment. PSF has the mandate to liaise with similar international bodies across the globe and is in active collaboration with many similar International bodies. In the prevalent global scenario, the importance of international collaborations has become vital for the technological developments and advancement of knowledge. Therefore, PSF has re-vitalized its international collaborations and embarked upon new linkages to harness potential of technologically advanced nations like China, Turkey, Iran and Sri Lanka. In addition to this PSF regularly plays role as a facilitator to link various international organizations/ universities with local universities and research institutions. Delegates from the reputed universities and similar collaborating bodies regularly hold meetings with PSF to discuss the areas of joint collaboration.

Over the years, PSF has established cordial bilateral relations with various international bodies to synergize efforts for achieving technological excellence and socioeconomic well-being of the people at large. Joint research projects are already ongoing with The National Natural Science Foundation of China (NSFC); Scientific and Technological Research Council of Turkey (TÜBİTAK); Ministry of Science, Research and Technology (MSRT), Iran and National Science Foundation, Sri Lanka.

During the report period, PSF launched first joint call for proposals on Joint Scientific Exchange Program (JSEP) with National Natural Science Foundation (NSFC), China under which 18 Mobility grants to the researchers were awarded. 93 projects remained ongoing (including newly initiated projects) while 33 technical reports (semi-annual and annual) of ongoing projects were received and an amount of Rs. 59.6 million was released on account of due installment of already ongoing projects and first installment of newly initiated projects with NSFC-China. In addition, 18 projects of IL remained ongoing funded under PSDP project Competitive Research Program. 08 technical reports (semi-annual and annual) of ongoing projects were received and an amount of Rs. 50.8 million was released on account of due installment of already ongoing projects and first installment of newly initiated projects with TUBITAK-Turkey.

Planning and Development Section

P&D is the coordination/facilitation arm of the Pakistan Science Foundation (PSF) and acts as the focal point on behalf of PSF and its subsidiary organizations i.e. PASTIC and PMNH for transmission of information to the Ministry of Science & Technology (MoST) and other ministries including Planning Commission. It is mainly responsible for preparation / finalization of PSDP projects pertaining to the statutory functions of PSF as well as their processing with MoST for approval by the competent forums at MoST and M/o Planning Development & Reforms. Following activities are being undertaken by the P&D Wing,

- Preparation/finalization and processing of New Development Projects / PC-1s.
- Submission of PC-IVs / PC-Vs to MoST
- Coordination with different Sections of PSF, PASTIC, PMNH and MoST regarding ongoing and new PSDP projects.
- Implementation of on-going development projects of PSF, PMNH and PASTIC Attending various Review meetings at MoST/Planning Commission.

- Views/Comments on the PC-Is received from MoST/ Planning Commission
- Compilation & submission of Monthly / Quarterly Reports, Reviews, Briefs, Presentations to MoST
- Replies to National Assembly / Senate Questions and other related information to MoST
- Coordination / preparation of material related to the National Assembly and Senate Standing Committee on S&T
- Activities under Non-Development Budget (Travel Grants).
- Activities to support the PSF Registered Scientific Societies in Pakistan

After the establishment of P&D Directorate in Year 2000, so far seventeen (17) projects have been completed while six (06) projects are ongoing.

Competitive Research Programme

The PSDP Competitive Research Programme (CRP) was awarded to Pakistan Science Foundation to finance research projects under four streams viz., Individual Research, Consortium Research, Triple Helix Model and International Linkages.

This project was approved by CDWP in its meeting held on December 04, 2017 and the authorization was issued by the Ministry of Planning, Development and Reforms (MoPDR) vide Office Memorandum No. 27(186) PIA-IV/PD/2017 dated March 06, 2018. The administrative approval from Ministry of Science & Technology (MoST) was received vide F.No. 4(66)/2017-DEA (P&D) dated June 20, 2018 at a total cost of Rs. 1964.500 Million. The project was revised on 24th September 2021 without any change in its cost for extended period of implementation up to 30th June 2026.

Launching of Stem in Pakistan (Phase-I)

The "Launching of STEM in Pakistan, Phase-I (Revised)" project, initiated by the Pakistan Science Foundation (PSF) under the Ministry of Science and Technology, seeks to revolutionize Science, Technology, Engineering, and Mathematics (STEM) education across Pakistan. The project began with a pilot phase targeting 50 Higher Secondary Schools (HSS), including 6 Cadet Colleges, and universities, with an emphasis on transforming traditional science classrooms into innovative STEM environments. This transformation is achieved through the establishment of FABLABs equipped

with state-of-the-art tools and equipment for hands-on, inquiry-based learning. The project aims to provide specialized capacity-building programs for educators, develop modern pedagogical tools aligned with global best practices, and foster entrepreneurship skills among students. Through this initiative, the project seeks to nurture the next generation of innovators and job creators, thereby contributing to the development of a knowledge-based economy in Pakistan. Originally approved in March 2021, the project was revised in August 2021 to expand its scope and increase its impact. With a revised budget of PKR 993.784 million and a revised completion date set for June 2025, the project continues to make significant strides in enhancing STEM education, equipping students with the skills and knowledge to thrive in the 21st century.

Science Talent Farming Scheme

Development project “Science Talent Farming Scheme (STFS) for Young Students, Phase-I, Component-I (Revised)” was conceived by the Pakistan Science Foundation (PSF). The original PC-I was approved by the CDWP in June 2015, however the PC-I was revised and approved by the CDWP on July 6, 2017 at a total cost of Rs. 1,285.361 million for a period of 5 years (December 2015 – December 2020). The project revised at total cost of Rs.1517.071 million by DDWP forum on 14.01.2022 till 30.06.2025 with some changes in scope of the project.

Science Popularization Section

Popularization of science, increasing science awareness and development of scientific culture in the society are major functions entrusted to Pakistan Science Foundation. Under the action plans of various S&T Policies, the task of Popularization of Science at grass roots level in the country has also been assigned to PSF. Popularization of Science plays a vital role in the socio economic, cultural, and environmental development across the country. In this regard, a number of activities were initiated to develop Science culture in the country. Under the action plan of the National Science Policy 1984 and STI Policy 2012, the Government has emphasized on strengthening and expansion of PSF programs for Popularization of Science at grass roots level. These programs are organized outside the formal education system particularly for the students to motivate them towards Science education. PSF also seeks to collaborate with International Scientific Organizations for this purpose. It also helps to enhancing/improving the critical sense of the population, by increasing its involvement in decision-making and contributing to sustainable development. In this regard, Pakistan Science Foundation undertakes a number of programs through its various sections.

Natural Sciences Linkage Programme Endowment Fund 2023-24

Natural Sciences Linkage Programme (NSLP) Endowment Fund is an important component of Pakistan Science Foundation (PSF) which is aimed at enhancement of agricultural production through effective research. The outcome of this research will benefit the end user by uplifting the life standard and income of the farmers. The Fund is being managed by PSF through Board of Governors (BoG) and Fund Management Committee (FMC). The Chairman, PSF is the Chief Executive of the Programme/Fund.

Pakistan Scientific and Technological Information Centre (PASTIC)

The Pakistan Scientific and Technological Information Centre (PASTIC) is premier national organization with prime focus on collection and dissemination of Scientific and Technological Information to scientists, researchers, academicians, industrialists, entrepreneurs, planners, and policymakers for research support. It also organizes various activities e.g., training workshop, seminars/webinars, conventions, symposia, conferences etc. for skill development of scientific and industrial community. PASTIC National Center is located at Quaid-i-Azam University Campus, Islamabad. It has six Sub Centers throughout Pakistan including Karachi, Lahore, Peshawar, Quetta, Faisalabad and Muzaffarabad. PASTIC's services include Bibliographic & Document Supply Service, Abstracting and Indexing Service, National Science Reference Library, Reprographic Services, Technology Information Services, Awareness and Promotion of PASTIC Services, Capacity/skill development of researchers & entrepreneurs and International Liaison.

Pakistan Museum of Natural History (PMNH)

Pakistan Museum of Natural History the only Natural History Museum in the country was established in 1976 as an attached organization of the Pakistan Science Foundation, Ministry of Science & Technology, Government of Pakistan. Pakistan Museum of Natural History (PMNH) has four principal divisions namely Botanical Sciences Division, Earth 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. For this purpose, PMNH regularly organizes trainings, workshops, seminars, symposia and other educational interactive activities related to natural history, environment and biodiversity of Pakistan. International days are also observed. PMNH has formed many national and international liaisons with the other research institutes in the country and abroad. Due to these collective efforts of scientific and technical staff of PMNH and collaborations with other research institutions, PMNH has 1.4 million 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 their research in the form of information, technical assistance, specimens as a loan and guidance in their research work. The detail of activities and progress of 2023-2024 are given next in detail. Following are the major Divisions of PMNH.

- Botanical Science Division
- Earth Science Division
- Zoological Science Division
- Public service Division

Pakistan Science Foundation

Introduction

Pakistan Science Foundation was established on June 30, 1973, under the Pakistan Science Foundation Act No. III of National Assembly (*Annexure-I*) as an autonomous body to promote and finance scientific and technological activities bearing on the socio-economic needs of the country. The tasks undertaken by the Foundation for the performance of its statutory functions are divided into following three broad categories:

- i) Science Promotion supports basic and fundamental as well as applied research involving researchers/academia at universities and R&D organizations focusing socio- economic needs/development of the country.
- ii) Science Popularization endeavoring to image scientific ideas to grasp the concept of fundamental science.
- iii) Science Centers to encourage all segments of society in thinking, understanding and exploring science.

Under the Act, the Foundation has been entrusted to carry out the following functions:

- i) Establishment of comprehensive scientific and technological information and dissemination centers.
- ii) Promotion of basic and fundamental research in universities and other institutions on scientific problems relevant to the socio-economic development of the country.
- iii) Utilization of the results of scientific and technological research including pilot plant studies to prove the technical and economic feasibility of processes found to be promising on a laboratory scale.
- iv) Establishment of science centers, clubs, museums, herbaria and planetaria.
- v) 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.
- vi) Organization of periodical science conferences, symposia and seminars.
- vii) Exchange of visits of scientists and technologists with other countries.

- viii) Grant of awards, prizes and fellowships to individuals engaged in developing processes, products, and inventions of consequence to the national economy.
- ix) Special scientific surveys not undertaken by any other organization and collection of scientific statistics related to the scientific efforts of the country.

The Foundation shall also:

- i) Reviews the progress of scientific research sponsored by it and evaluates the results of such research.
- ii) Maintain a National Register of highly qualified and talented scientists/engineers and doctors both in and outside Pakistan, and to assist them in collaboration with concerned agencies to seek appropriate employment.
- iii) Establish liaison with similar bodies in other countries.

The activities performed under the above-mentioned statutory functions are as under, however, the details are given in different chapters:

Activities and Programmes

The activities and programmes undertaken by the Foundation to perform its statutory functions can be divided into the following four categories:

- i) Promotion and Financing of Scientific Research in the Country and the Utilization of the Research Results.
- ii) Promotion and Popularization of Science in Society.
- iii) International Liaison.
- iv) Establishment of Comprehensive Scientific and Technological Information Dissemination Centers.

The main functions of the Foundation i.e., research support, and science popularization, planning and development etc., are performed by the Science Wing of the Foundation and their detail is given as under:

1. Grants for Research Projects
2. Grants for Institutional Support
3. Promotion/funding of Scientific Societies/Learned Bodies
4. Funding of Conferences, Symposia, Seminars & Workshops
5. Travel Grants
6. International Liaison

7. Awards and Fellowships
8. Scientists Pool
9. Innovations & Inventions
10. Public Sector Development Programme (PSDP)

Pakistan Scientific and Technological Information Centre (PASTIC) is subsidiary organization of PSF, performs as Scientific and Technological Information Dissemination Center with its sub offices in all provincial capitals of the country.

Pakistan Museum of Natural History (PMNH) is a another subsidiary organization of PSF, established in 1979 to serve the national needs in the vitally important areas of research, conservation and education involving Pakistan's heritage of natural resources. The Museum is a National Repository for permanent storage of plants, animals, rocks, minerals and fossils of the country.

I PAKISTAN SCIENCE FOUNDATION (PSF)

1. Research Support Section

1.1 Under process Projects:

During the report period, **281** research proposals/concept papers remained under active consideration of the Foundation. Out of these, **101** projects were under-process, **36** projects were recommended by the Technical Committee for the approval of the Foundation and **29** were approved by the Foundation at a total cost of Rs. **89,201,985/-** (*Annexure-II*) whereas Rs. **52,066,433/-** were released on account of first installments of approved projects.

1.2 On-going Projects

During the period, **81** research projects remained on-going and **23** progress reports (semi annual, 1st, 2nd annual & final) of these projects were received. Semi annual reports were scrutinized by PSF staff, whereas the annual and final reports, after initial scrutiny, were sent for evaluation to the subject experts to assess the interim progress of the projects. It may be mentioned that due installments of ongoing projects are released only if the interim progress of the projects is satisfactory. An amount of **Rs. 14,653,339/-** was released on account of due installments and evaluation fee of ongoing projects. A list of the semi-annual, annual and final reports are given in *Annexure-III*

1.3 Completed Projects

23 Research projects were completed during the year. The subject experts evaluated the final technical reports of these projects, which were subsequently placed before the respective PSF Technical Committees for consideration. After the adaptation of these reports by the Committee, the accounts of these projects were settled and files were closed. A list of the completed projects followed by their scientific output is given below:

S.#	Project No.	Project Title
1.	PSF/Res/B-ARI/Agr (492)	Screening of Indeterminate Tomatoes hybrids/varieties under the High Tunnels in Balochistan
2.	PSF/Res/C-NESCOM/Agr (497)	Wild Olive (Olea Cuspedata) utilization as Root Stock for Oil Plants through Different Topworking Techniques
3.	PSF/Res/KPK-PU/Bio(661)	Molecular Characterization of Clostridium perfringens and development of Toxide Vaccine
4.	PSF/Res/P-MNS-UET/Chem (587)	Titanium Dioxide Based Self-Cleaning Textiles:Comparative study of Degradation of Different Dyes using Visible-light active Self-Cleaning Cotton, Wool and Polyester
5.	PSF/Res/S-ICCBS/Chem (596)	Structural and Function Study of Metabolites of Fluorinated Drugs Produced by Fungal Transformation of Fluorinated Steroids
6.	PSF/Res/S-MUET/Engg(155)	Dyeing of Synthetic Polyester Fabric with Natural Dye using Radcure Techniques
7.	PSF/Res/C-SEECs-NUST/Engg (164)	iDOC: A Portable, Cost Effective Diagnostic Screening Device for Early Dengue Fever Detection
8.	PSF/Res/KPK-GIKI/Engg(170)	Development of Natural Fiber (wool/cane fiber) Reinforced Polymer Matrix Composites
9.	PSF/Res/P-CUI/Engg (124)	Synthesis of Chemically Modified Polymeric Membranes for Biogas Purification and Natural Gas Sweetening
10	PSF/Res/B-BUITEMS/Comp (61)	Extended Classroom Learning via Online Social Networking Male-Female Learning Comparative Impact
11	PSF/Res/P-LUMS/ Phys (159)	Development of Low Field, Low Cost,Reconfigurable NMR and MRI
12	PSF/Res/P-IUB/Phys (189)	Synthesis and Characterization of Nano-ferrities for Thermoelectric Power Generation

13	PSF/Res/P-FCC/Phys (202)	Quasilinear Theory of Electromagnetic Instabilities with Non-Maxwellian Distribution Functions
14	PSF/Res/P-GCUF/Phys (203)	Fabrication of Metal Semiconductor Diodes by Home Developed Thermal Evaporation System
15	PSF/Res/KPK-IBMS/Med (493)	The Role of Circulating Tumor DNA in Monitoring Treatment Response in Patients with Breast Cancer
16	PSF/Res/CP/S-AKU/Med (488)	Analysis of Population-Specific Epitope and Drug-resistance Mutations in HIV-1 in Pakistan
17	PSF/Res/P-UHS/Med (492)	Biochemical and Molecular Analysis of Oculocutaneous Albinism in Families from Pakistan
18	PSF/Res/P-IUB/Med (481)	Development of Optimized Dry Injectable Product of Docetaxel via Freeze Drying Method to Enhance the Solubility and Stability
19	PSF/Res/C-PIMS/Med(450)	Identification of Molecular Determinants of Hereditary Deafness
20	PSF/Res/P-NUST/Med (453)	EMG Powered Active Ankle Lower Limb Prosthetic Foot
21	PSF/Res//P-GCU/Med (485)	Bioassay Guided Screening and Purification of Medicinal Plant against Hepatitis C Virus
22	PSF/Res/KPK-AWKU/Med (459)	Development of Coumarin Based Compounds for U2OS Bone Cancerous Cell Treatment
23	PSF/Res/C-IBGE/Med (509)	Exploring Predictive biomarker for Aplastic anemia:An appropriate tool for diagnosis and Treatment

Agricultural Sciences

1. Project No:	PSF/Res/B-ARI/Agr (492)
Project Title:	Screening of Indeterminate Tomatoes hybrids/varieties under the High Tunnels in Balochistan
Duration:	02-Years
Date of Initiation:	01.12.2017
Date of Completion:	30.05.2020
Total Cost	1,484,100/-
Total Expenditure:	1,479,303/-
Principal Investigator:	Mr. Bashir Ahmed Bangulzai Director
Name of Institution:	Directorate of Vegetable Seed Production-ARI, Sariat Quetta

SUMMARY:

The main theme of this project was to develop the conducive area for modern Agricultural practices regarding vegetable crop production. Farmers of Balochistan are facing multi miseries and the whole endure turned in dilemma due to low yield per acre. This factor (low yield) indicate that the socio economic conditions of farming communities of Balochistan are thriving in adverse conditions. The precarious rues of farming communities tighten the noose more worse around the economic prosperity due to average yield of Vegetable crops. Among vegetables, tomato is one of the most cultivated crops in Balochistan. Balochistan produced almost 50% of the tomato of country overall. But the average yield of Tomato has been recorded less than 5 tons per acre. Along with that, farmers were facing the nefarious roles of middle man in open markets which aggravate the situation more in odd way. Fluctuation in markets pose the negative remarks on available yield and the produced some time sold out in very high prices and some time in very least even 5-10 rupees per kilograms. Keeping these issues in mind this project was designed to destine the farming communities in sustainable way through modern agronomic tactics. High tunnels are the most advance and reliable method to produced high yield of tomatoes from small area. In tunnels mostly indeterminate cultivars of tomatoes has been

cultivated. Nature of indeterminate tomatoes are climbing up to 10 feet. Meanwhile indeterminate tomato produced more than 8 months as compare to traditional (determinate) tomatoes. Indeterminate tomatoes also having the potential to produced yield as off season. In this project 10 beneficiaries were selected from 5 districts of Balochistan i.e. Quetta, Mastung, Qilla Saifullah, Jaffarabad and Barkhan. All beneficiaries were awarded with high tunnel (bamboo structure) with all inputs from seedlings to pesticides. The other object was to assess the yield potential of various indeterminate cultivars of tomato under high tunnels. So in first year tunnels was awarded and 2nd year seedlings and other inputs like pesticides, fertilizers were provided on selected sites to measure the girth of under high tunnels. These projects impose many positive responses on farming conditions of Balochistan. On all project sites the production of tomato cultivars were satisfactory and farmers were willing to adopt this technology by their own capacity even after project which was the real achievement. Various cultivars were tested under this project. High tunnels divulge the potential of tomato yield and realized the masses as method of impended nature. Ana and Shail (cultivars of indeterminate tomato) produced more cunning results as compare to rest. Farming communities were rejoiced by adoption and comprehension of this technology at grass root level.

2. Project No:	PSF/Res/C-NESCOM/Agr (497)
Project Title:	Wild Olive (<i>Olea cuspedata</i>) utilization as Root Stock for Oil Plants through Different Topworking Techniques
Duration:	03-Years
Date of Initiation:	24.07.2017
Date of Completion:	23.07.2022
Total Cost	5,528,400/-
Total Expenditure:	5,261,479/-
Principal Investigator:	Mr. Abrar Ahmad, General Manager
Name of Institution:	National Development Complex, NESCOM, Islamabad

SUMMARY:

A vast area of project sites of NESCOM is blessed with a natural population of wild olives (oleacuspitate). The area has specific climate conditions that generally are as requirements for olive cultivation worldwide. These wild olives have vigorous vegetative growth and bear small in-edible fruit with no economic value. The subject study is an effort on scientific lines to find out a practically feasible method to improve the quality of fruit. The total numbers of 4224 plants are taken as sample for study from these wild olive plants growing naturally in NESCOM project sites. The variety of these sample trees is changed by different Grafting & budding techniques where the Root Stock or Root Portion is of naturally growing native wild olives while the scion stock or the stem portion of some other desired variety of olive is placed to bear the fruit. The study has revealed that Tongue Grafting and side Veneer Grafting are most suitable techniques for our special demanding climate with its hot summers and extreme cold winters. It is also investigated the Monsoon season is the suitable time for top working in terms of survival percentage of either scion stock or scion bud. Different after-care practices and cultural methods for these top-worked plants are also applied and it is found that NPK fertilizer application during the month of August produced maximum vegetative growth in top-worked plants, similarly an interval of irrigation of 30 days had significant results likewise for the young saplings of self-rooted true to type olive plants a weekly irrigation is essential to get maximum survival of plants. Any method that blocks the sunlight to main stem of Root Stock may resolve the issue of continuous vegetative growth and maintenance of wild olives. The findings will be a step forward to guide farmers for better utilization of their waste-lands and how to grow olive plants of economic value under our special climatic conditions. Locally acclimatized varieties, of self-rooted olive plants are also grown on waste-land for investigation of their response to bear fruit of economic value. Both types of olives are growing side by side, attaining the maturity age to bear the quality.

Biological Sciences:

3. Project No:	PSF/Res/KPK-PU/Bio (661)
Project Title:	Molecular Characterization of Clostridium perfringens and development of Toxide Vaccine
Duration:	03-Years
Date of Initiation:	16.07.2018
Date of Completion:	15.07.2021.
Total Cost	2,278,680/-.
Total Expenditure:	2,090,899/-
Principal Investigator:	Dr. Sher Bahadar Khan, Associate Professor Department of Animal Health
Name of Institution:	The University of Agriculture, Peshawar

SUMMARY:

For sample collection, the whole province of KPK is divided into four zones, including Southern (Kohat, Bannu, Karak, Lakki Marwat and D.I. Khan), Plain (Peshawar, Nowshera, Charsaddah, Mardan and Swabi), Northern (Buner, Swat, Bahrain, Shangla and Mohmand) and Mountainous (Havelain, Baffa, Abbottabad, Mansehra and Haripur). A total of 4000 samples were collected, from the Plain (Peshawar, Charsadda, Jamrud, and Mardan), some zones of the northern zone (Buner, Swat, Bahrine, Shangla, and Mohmand), some zones of the southern 5 (Kohat, Bannu, Karak, Lakki Marwat, and D.I. Khan) and mountainous (Havelain, Baffa, Abbottabad, Mansehra, and Haripur). The details of the disease, Dead animals, samples, and history of the disease were collected on a questionnaire during the field outbreak of the disease. The fecal samples and rectal swabs were collected in a sealable plastic bag and transported to the lab. All the collected faecal swabs were processed in thioglycollate broth and were incubated in the CO₂ incubator (Galaxy 48 S, New Brunswick, an Eppendorf Company). After 24 to 48hrs, the incubated samples in the screw-capped tube were observed daily for the presence of the Clostridium perfringens by observing a change in color along with turbidity inside the thioglycollate broth. The positive samples were recultivated to obtain the first culture; the first

cultures were then subjected to the tryptose sulphite cycloserine (TSC) agar media on the plates and polymerase chain reaction to confirm the presence of *Clostridium perfringens* from its colony appearance. The characteristic grey to darkish colonies was observed. Out of 4000 samples, growth was observed in 1116 samples. The biochemical and molecular analysis is also performed for the confirmation of the specific toxin type of *Clostridium perfringens* and its types obtained from local isolates. Alpha, beta and epsilon toxin is optimized for molecular characterization of the positive confirmed growth. 22 isolates were confirmed on PCR having an amplicon size of 247bp, 317bp and 206bp respectively. *Clostridium perfringens* type B and D were submitted to Macrogen NGS for sequencing. NGS process involves sample preparation, library construction, sequencing, raw data and generation of data and statistical analysis. Reads for *Clostridium perfringens* type B and D were submitted to the comprehensive genome analysis service at PATRIC. For Toxoid preparation, Glucose broth was prepared by adding 1% peptone (1ml/100ml), 0.5% beef extract and 0.5% sodium chloride to 9 litre of distilled water. Moreover, the HAI test showed that the titer of antibodies were high in serum collected from sheep inoculated with our toxoid vaccine compared with serum collected from sheep inoculated with VRI vaccine. The growth in flasks was tested for purity. Purified (0.1%) trypsin (Sigma USA) was added to the flask containing *C. perfringens* type D culture and incubated at 37°C for 2 hr. Formalin (0.5%) was added to the flask having *C. perfringens* type D and *C. perfringens* type B and was stored at room temperature for 07 days. Pooled the whole batch of toxoid vaccine with the addition of alum sulphate and carbolic acid (0.3%). Inactivated toxoid were adjuvanted with an equal 6 volume of aluminium hydroxide gel and were preserved in sterile vials at 4°C. For safety, inactivation of the toxin was tested by injecting 2 mL of toxoid intraperitoneally to 3 healthy rabbits. Inactivation of the toxin was confirmed with no mortality or morbidity for 24-72 h of the inoculation. For sterility testing, toxoids were inoculated on different media i.e. nutrient agar, nutrient broth, Tarrozi and Sabouraud's agriculture media to check the presence of any contamination. The stability of the toxoid was tested after keeping the toxoids at different temperatures, i.e. 25, 35, and 45°C for 45 days.

Chemical Sciences:

4 Project No:	PSF/Res/P-MNS-UET/Chem (587)
Project Title:	Titanium Dioxide Based Self-Cleaning Textiles: Comparative study of Degradation of Different Dyes using Visible-light active Self- Cleaning Cotton, Wool and Polyester
Duration	03-Years
Date of Initiation:	03.06.2019
Date of Completion:	02.06.2022
Total Cost	Rs. 2,523,480/-
Total Expenditure:	Rs. 1,975,768/-
Principal Investigator	Dr. Shabana Afzal Assistant Professor Department of Basic Sciences
Name of Institution	Muhammad Nawaz Sharif University of Engineering & Technology, Multan

SUMMARY:

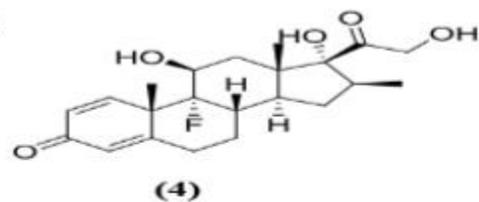
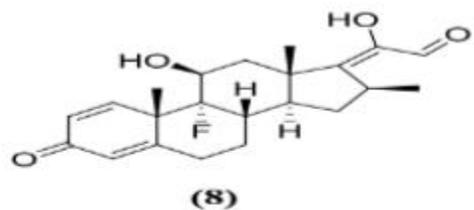
The research related to formation of self-cleaning fabrics has been a hot topic for several decades. In fact, application of TiO₂ in developing self-cleaning textiles has received increasing attention. TiO₂ nanocrystals have been grown on natural and synthetic fibres, leading to the successful development of a number of UV-active self-cleaning textiles such as cotton, polyester and wool. However, TiO₂ can only absorb UV light ($\lambda \leq 385$ nm) due to its wide band gap. In order to extend light absorption of TiO₂ toward visible region, various strategies have been implemented including metal /non-metal doping, semiconductor coupling and dye sensitization. Application of dyes such as porphyrins is particularly of interest because of their high absorption coefficient in the solar spectrum. Many research efforts have recently been devoted to

investigating the effect of porphyrins and metal porphyrins on visible-light sensitization of TiO₂. In addition to selection of an efficient catalyst, photocatalytic process is affected by several other factors such as concentration of the catalyst, reaction conditions and chemical nature of the degrading material. Therefore, to optimize the various catalytic parameters, it is required to study various parameters systematically and thoroughly. In our first phase of study, two model dyes methylene blue and methyl orange have been used as a pollutant material to investigate efficiency of self-cleaning cotton prepared from meso-tetra(4- carboxyphenyl) porphyrin (TCPP) and anatase titanium dioxide (TiO₂) particles. It had been found that under the given set of reaction conditions of acidic medium and visible light irradiation, methyl orange degraded faster as compared to methylene blue. This can be attributed to the chemical nature of methyl orange, in which -N=N- bond undergoes photocatalytic breaking more readily as compared to -CH₃- groups in methylene blue. To enhance the efficiency of photocatalysis, application of other dyes such as phthalocyanines have been investigated in this work. In our second phase of study, phthalocyanines with different metal centres (Zn, Cu and Co) have been synthesized and applied to cotton fabrics in combination with anatase TiO₂. It had been found that under the given set of reaction conditions, copper phthalocyanine gave highest photocatalysis-based self-cleaning performance as compared to zinc and cobalt derivatives. Future studies include to apply metal phthalocyanines to other substrates, such as wool for assessment of selfcleaning. The substrate on which photocatalytic process takes place is an important parameter in determining the efficiency of a photocatalyst. In our third phase of project, wool and polyester have been used as the substrate. In this study, methylene blue has been used as a pollutant material to investigate efficiency of self-cleaning wool prepared from meso-tetra(4-carboxyphenyl) porphyrin (TCPP) and anatase titanium dioxide (TiO₂) particles. In addition to TCPP, meso-tetraphenyl porphyrin (TPP) has also been used as a photocatalyst on wool and cotton fabrics. It had been found that under the given set of reaction conditions of acidic medium and visible light irradiation, MB degraded faster for wool, cotton and polyester samples coated with TCPP/TiO₂ as compared to the samples coated with TPP/TiO₂. Enhanced efficiency of TCPP/TiO₂ based catalyst as can be attributed to the 6 availability of anchoring group i.e. carboxylate group to bind with TiO₂, whereas no binding site is present in case of TPP to attach with TiO₂, leading to decrease in the photocatalytic efficiency of TPP/TiO₂. Furthermore, it has also been found out that the cotton-coated samples gave better photocatalytic efficiency as compared to wool and polyester coated samples.

5. Project No:	PSF/Res/S-ICCBS/Chem (596)
Project Title:	Structural and Function Study of Metabolites of Fluorinated Drugs Produced by Fungal Transformation of Fluorinated Steroids
Duration	02-Years
Date of Initiation:	01.02.2019
Date of Completion:	31.01.2021
Total Cost	1,617,516/-
Total Expenditure:	1,575,249/-
Principal Investigator	Dr. Sammer Yousuf, Associate Professor HEJ Research Institute of Chemistry
Name of Institution	International Centre for Chemical and Biological Sciences, Karachi

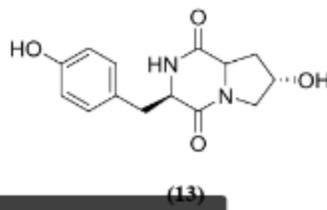
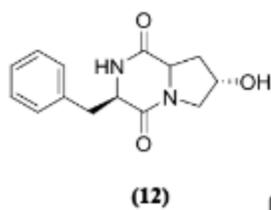
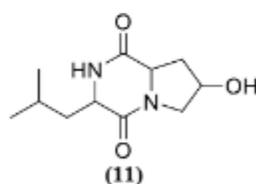
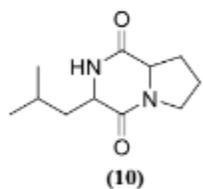
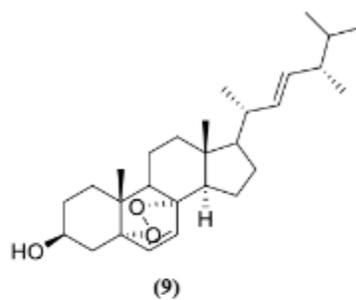
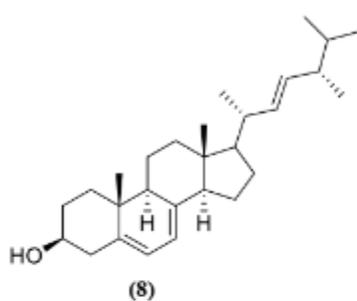
SUMMARY:

The current report is broadly classified into two phases, in phase one various fungal cultures were used for microbial transformation of commercially available fluorinated steroidal drugs, named betamethasone sodium phosphate (1), dexamethasone sodium phosphate (2), betamethasone valerate (3), betamethasone (4), dexamethasone (5), diflorasone (6) and fluromethalone (7). The structures of transformed products were identified on the basis of modern spectroscopic techniques, including 1D-and 2D-NMR, mass spectrometry and singlecrystal X-Ray diffraction technique. Incubation of betamethasone sodium phosphate (1) with *Cunninghamella blakesleeana* (ATCC 8688A) yielded two metabolites, which were identified as betamethasone enol-aldehyde (8) and betamethasone (4).



incubation of dexamethasone sodium phosphate (2) with *Cunninghamella blakesleeana* (ATCC 8688A) furnishes only dexamethasone (5).

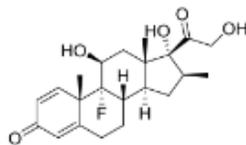
During purification of transformed metabolites, six known fungal metabolites (8-13) were also isolated for the first time from the crude extract of *Cunninghamella blakesleeana* (ATCC 8688A).



(12)

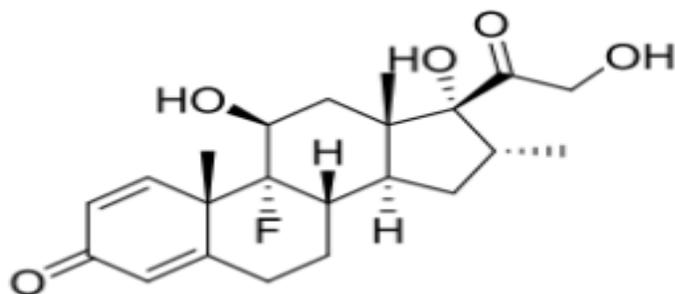
(13)

Out of 12 fungi only *Rhizopus stolonifera* (TSY 0471) transform Betamethasone valerate (3) into betamethasone (4)



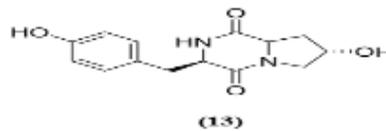
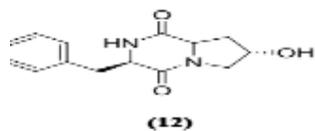
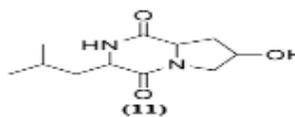
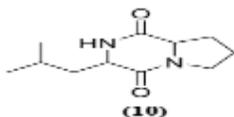
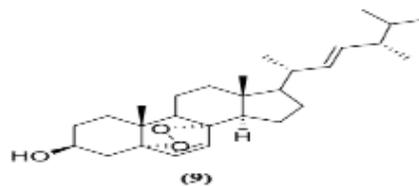
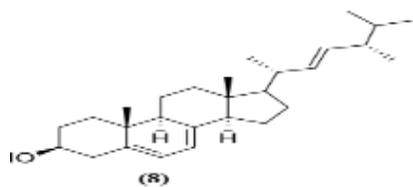
(4)

However, betamethasone (4), dexamethasone (5), fluorometholone (7) and diflorasone (6) yields no biotransformation with 12 different fungi.

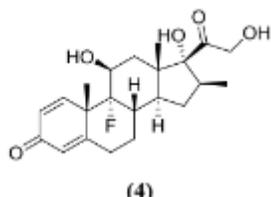


(5)

During purification of transformed metabolites, six known fungal metabolites (8-13) were also isolated for the first time from the crude extract of *Cunninghamella blakesleeana* (ATCC 8688A).

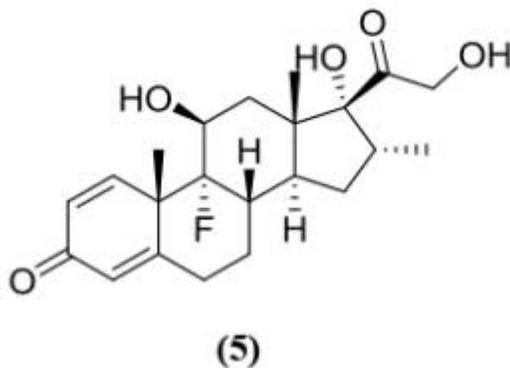


Out of 12 fungi only *Rhizopus stolonifera* (TSY 0471) transform Betamethasone valerate (3) into betamethasone (4)



9

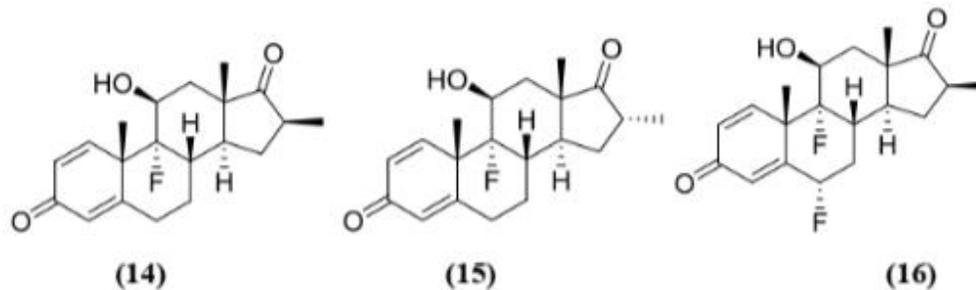
However, betamethasone (4), dexamethasone (5), fluorometholone (7) and diflorasone (6) yields no biotransformation with 12 different fungi.



3

Last part of this report explains syntheses of some fluorinated steroids (14-16), which are

already incubated with different fungal strains, to observe structural modifications as a part.



Engineering Sciences:

6. Project No:	PSF/Res/S-MUET/Engg (155)
Project Title:	Dyeing of Synthetic Polyester Fabric with Natural Dye using Radcure Techniques
Duration	2-Years
Date of Initiation:	01.04.2018
Date of Completion:	31.03.2020
Total Cost	Rs 1,064,676
Total Expenditure:	Rs 411,490
Principal Investigator	Dr. Samander Ali Malik Associate Professor Department of Textile Engineering
Name of Institution	Mehran University of Engineering and Technology (MUET) Jamshoro

SUMMARY:

Eco-friendliness products and processing have become the most important issue not only in other fields but also in textile. A large sector of Pakistan textile industry is the coloration. In dyeing sector, dyes and chemicals are used which require large amount of energy to be

transferred to the textile material. Energy issues in Pakistan are also increasing day by day 5 which raise the need for the development of energy efficient processing. Moreover, many dyes and auxiliaries used in textile coloration are a great concern to the environment when discharged to waste water and also for employees working in the dye manufacturing industry. In this concern many synthetic dyes have been banned and others are on the risk of toxicity, so textile dyers are searching for the alternative sources of dyes. Dye from “natural” source may be the alternative way for “green” textile product. Thus, to give an economic technique of dyeing with nontoxic dye and process with least possible energy consumption was the aim of this project. In this research, dye from Henna leaves is chosen to use on the fabric made of synthetic

textile fiber, i-e, polyester. Extraction method of natural dye from henna leaves is suggested by comparing with conventional extraction methods used. The suggested extraction methods such as ultrasonic and microwave are optimized in terms of time and liquor ratio. Subsequently, mordanting and dyeing is carried out by radcure techniques that are microwaves and ultrasonic and results are compared with conventional standard dyeing method used for polyester exhaust dyeing. Two ecofriendly mordants, lemon* and ferrous sulphate are used separately to provide the binding of natural henna dye with polyester fibre. Optimized recipe for mordanting and dyeing with microwave and ultrasonic method is developed and detailed investigation of results are done by assessing the color strength, dye uniformity, color fixation and color fastness properties to give the standard dyeing procedure. Radcure techniques reduce the extraction, mordanting and dyeing time with 60-65 % savings in chemical and energy intake as compared to the traditional dyeing method used for polyester.

1. Project No:	PSF/Res/C-SEECS-NUST/Engg (164)
Project Title:	Dyeing of Synthetic Polyester Fabric with Natural Dye using Radcure Techniques
Duration	2-Years
Date of Initiation:	01.09.2017

Date of Completion:	31.08.2019
Total Cost	Rs 1,550,568/-
Total Expenditure:	Rs 926,911/-
Principal Investigator	Dr. Faisal Shahfai Associate Professor School of Electrical Engineering and Computer Sciences
Name of Institution	National University of Science and Technology (NUST) Islamabad

SUMMARY:

Dengue is a major public-health concern throughout many tropical and subtropical regions of the world, particularly Asia-Pacific region. The World Health Organization (WHO) estimates that 50–100 million dengue infections occur each year and that almost half of the world’s population lives in countries where dengue is endemic. Dengue Fever is caused by mosquitoes which thrive in areas with standing water, including puddles, water tanks, containers and old tires. Lack of reliable sanitation and regular garbage collection contribute to the spread of the dengue mosquitoes. In the developing countries like Pakistan, there are many cases of overcrowded hospitals which are under-staffed and have a low doctor to patient ratio which makes diagnostic screening a big challenge, especially in the case of an epidemic breakout like dengue. One such example was the 2011 dengue breakout during which, more than 21,204 people were diagnosed with Dengue fever. Dengue epidemic is a major public threat in Pakistan since 2005, following millions of people at risk. Since 2010 till date, dengue outbreak in Pakistan has resulted in 16,580 confirmed cases and 257 deaths in Lahore [38]. Nearly 5,000 cases and 60 deaths have been reported from the rest of the country [38]. In 2019, about 1,585 cases have been stated solely from Karachi due to stagnant water which resulted from the poor sanitation system after record breaking rainfall this year [39]. The twin cities is also suffering from the epidemic, resulting in almost 200 patients in August 2019. The province of Khyber Pakhtunkhwa is also affected by endemic disease reporting a number of 1,200 cases in 25 days. To account for the human suffering caused by

the epidemics of dengue, WHO has designed a global strategy with an objective to reduce the mortality and morbidity rate by at least 50% and 25% respectively. The strategy can be better implemented with early case detection and appropriate management of severe cases. Our current project aims to develop a portable device that provides a cost-effective and rapid solution for diagnostic screening of dengue, 7 which can not only help in the early dengue detection but also assist WHO in achieving its goal of reducing mortality and morbidity caused by the epidemics. To achieve the desired goal of the project, noninvasive techniques are used to collect physiological, clinical, and laboratory parameters of the infected subjects. The acquired data is fed in to an Artificial Intelligence powered device which is accompanied by an Android application, providing an easy-to-interact interface for both the doctors and the patients. To further add to the value of the project, a simulation model has also been designed to forecast the epidemic outbreak. Modeling and simulation is widely used to understand epidemic dynamics and helps in planning and decision making processes. Hence, the overall project considers the upsurge of dengue, addresses the medical conditions linked with it to make a screening device, and design a simulation model that can identify the vulnerable areas prone to dengue outbreaks so that necessary precautions can be taken and mortality rate can be controlled. The set of tools and the device, used in the project, can be used for improved management and handling of dengue outbreaks in the future.

2. Project No:	PSF/Res/KPK-GIKI/Engg (170)
Project Title:	Development of Natural Fiber (wool/cane fiber) Reinforced Polymer Matrix Composites
Duration	1-Years
Date of Initiation:	02.07.2018
Date of Completion:	30.06.2020
Total Cost	Rs 759,288/-/-
Total Expenditure:	Rs 670,375/-/-

Principal Investigator Dr. Muhammad Ramzan Abdul Karim
Associate Professor
Faculty of Materials and Chemical Engineering,
Name of Institution GIK Institute of Engineering Sciences and Technology,
Topi

SUMMARY:

Polymer composites are an important class of materials widely being used for many applications. But the main concern of non-degradability and adverse environmental impact of the polymer matrices and the synthetic reinforcements have given forth the need of environmental-friendly polymer matrices and reinforcements used in them. An attempt of such kind is to use the natural plant fibres as the reinforcements that have no harmful impact on the environment and, they are cost effective too. With growing interest in natural fibres in recent years, a lot of work is being done in various directions. Natural fibre composites show variation of properties such as fibre's source, type, and structure. Interfacial adhesion between the fibre and the matrix is the most important factor when mechanical and water absorption properties of natural fibre composites are under consideration. The interfacial strength can be improved by some chemical modification of fibre surface, which changes the adhesion between fibre and matrix. These features of natural fibres as compared to synthetic fibres are motivating manufacturers and the end users to switch to natural fibre-based products. So, in the present research project, an attempt is made to produce bamboo fibers reinforced natural fiber composites where eco-friendly chemical treatment of fibers was done by using sodium carbonate solution as a treatment media. Treating the fibers with sodium carbonate allows the fiber's surface to form a strong contact with the polymer matrix which in return increase the strength of the composite. Use of treatment not only helps in increase of strength of the composite but it also increases the resistance of the composite towards water absorption. Composite ability to absorb water change its physical appearance and deteriorates the mechanical properties of the composite. Finding eco-friendly sodium carbonate treatment for biodegradable bamboo fibers opened new ways to achieve higher strength in composites reinforced with biodegradable bamboo fibers. Results obtained, from the current research work using novel sodium carbonate as an effective and eco-friendly

treatment media for bamboo fibers, have not only been presented in various national and international conferences but they have also been published in reputed impact factor journals of the area.

3. Project No:	PSF/Res/P-CUI/Engg (124)
Project Title:	Synthesis of Chemically Modified Polymeric Membranes for Biogas Purification and Natural Gas Sweetening
Duration	2-Years
Date of Initiation:	01.08.2018
Date of Completion:	31.01.2021(extended)
Total Cost	2,237,880/-
Total Expenditure:	2,104,716/-
Principal Investigator	Dr. Asim Laeeq Khan Associate Professor Department of Chemical Engineering,
Name of Institution	COMSATS University Islamabad, Lahore Campus

SUMMARY:

Energy is inevitable to global prosperity. Fossil fuels are still the primary source of energy by preference. However, as fossil fuels become scarcer and more expensive, the quest for alternate energy sources is a requirement of the utmost importance. Anaerobic digestion of biological resources and, most interestingly, biological waste could be a promising alternative energy carrier. In a controlled reaction system, the gaseous mixture thus produced can contain up to 70% of biohydrogen and biomethane, respectively, used for commercial applications. Biohydrogen generated in the fermentation processes (e.g., anaerobic fermentation, photofermentation, dark fermentation) mainly consists of hydrogen and carbon dioxide. On the other hand, biomethane is generated during the anaerobic digestion of the biological wastes e.g., kitchen waste, landfill sites, animal waste), typically consists of 55–

60% methane, and 38–40% carbon dioxide, smaller amounts of hydrogen sulfide. The biogas could thus be considered a potential source of environmentally benign, clean and cheap alternative energy. However, commercial use of the biogas is restricted near its formation site. The presence of incombustible and acid gases, like CO₂ and H₂S, reduces its calorific value, but their corrosive nature also reduces the possibility of compressing and transporting it over longer distances. The Current efficiency of existing biogas production processes is limited, as the produced gas

streams are too dilute. Therefore, it is important to address this problem by selecting and developing sustainable separations processes that are environmentally benign and commercially viable. The membrane-based separations field provides an efficient and sustainable opportunity to deal with various feed streams. While the advancements over the years have promoted the development of advanced technology, the room for further improvement and the market size is still very large. It will continue to grow as the membrane selectivity, and productivity tradeoffs become further optimized. To compete with the existing commercial separation technologies such as amine absorption, the low selectivity and flux through the membranes is one of the major challenges that must be overcome. This project targeted the development of novel high-performance membranes to separate CO₂ from different gas mixtures of commercial importance. In addition, practical issues that currently hinder the real breakthrough of gas separation were tackled, including a critical evaluation of lab-scale procedures. Through this project an effort was made to establish a step 10 between synthesis and performance via a fundamental study of the synthesis of membranes complemented by a detailed physicochemical characterization of these membranes. The aim was to understand better why one parameter leads to a better membrane than another. Both polymeric and mixed matrix membranes were synthesized in this project. Several synthesis techniques were used based on the requirements of the material and application. Solution casting was selected as the major technique used in this study. Several porous nanofillers, ionic liquids and deep eutectic solvents were also synthesized using hydrothermal preparation techniques. The prepared nano-fillers were characterized using state-of-the-art techniques such as SEM. The synthesized membranes were tested in permeation cells to evaluate their separation performances. Prepared membranes were tested for different variables such as temperature, pressure, and concentration to assess the membranes for expected industrial conditions.

1. Project No:	PSF/Res/B-BUITEMS/Comp (61)
Project Title:	Extended Classroom Learning via Online Social Networking: Male-Female Learning Comparative Impact
Duration	1-Years
Date of Initiation:	01.10.2018
Date of Completion:	30.09.2019
Total Cost	Rs.619,140/-
Total Expenditure:	Rs 670,375/-/-
Principal Investigator	Dr. Jan Muhammad Dean Faculty of Arts and Basic Sciences,
Name of Institution	Balochistan University of Information Technology Engineering and Management Sciences Quetta

SUMMARY:

The past two decades have shown immense technological progression and given rise to internet usage by ordinary people through various gadgets from online shopping, document and photographs exchange, social contact to name a few. Moreover, the proliferation of these electronic gadgets specifically mobile devices and pervasive communication technologies have also contributed in paradigm shift from typical physical-connected world to digital connected“global village”. A similar phenomenal growth is expected to increase in the coming years too, for example, Cisco anticipates an eightfold annual growth of mobile data which is called compound annual growth rate (CAGR) of 53% from 2016 to 2020. People from every walk of life including students and teachers have been using social media on the mobile devices

for socializing, sharing ideas, chatting and other informal learning experiences. Despite of the apparent advantages of the mobile devices and their subsequent use (e.g. social media) for academic purposes, several researchers have regarded social media as risky for students because a potential source of distraction from studies. At the same time, the counter argument has been that social media has the potential to aid the classrooms walls with an extended knowledge. Extensive literature exists on the use of extended classroom learning via Facebook – however its comparative impact on male and female learning is not known. Through this we intend to shade light on the social media usage among the male-female university students and perform a comparative impact analysis whether social media supports extended classroom learning model at the university level or not. We employed a qualitative design with a sample of 300 student respondents from three different universities of Balochistan. Comparative data analysis techniques were used. The significance of the study was that it has highlighted the importance of social media usage in the classroom with the comparative impact on the male and female students learning outcomes at the higher education institutions. The primary purpose of this study was to suggest findings for the improvement of teaching methods with the usage of latest tools. Additionally, it was also aimed at providing more insights about positive use (for academic learning) to university students in a blended learning environment (typical classroom aided by social media). To best of our knowledge, there has been limited related research has been conducted on the benefits and overall usage of social media for educational specifically on comparative analysis as most of those have considered primary elements such as students and teachers perception, identity and social benefits of social media. Hence, the research was targeted to examine the overall viability, advantages, and drawbacks of using mainstream social media with Facebook as a leading example social media aid to supplement the in-class instruction.

PHYSICS

11.Project No:	PSF/Res/P-LUMS/ Phys (159)
Project Title:	Development of Low Field, Low Cost, Reconfigurable NMR and MRI
Duration	2-Years

Date of Initiation: 15.10.2016
 Date of Completion: 15.04.2019
 Total Cost Rs.2,540,820/-
 Total Expenditure: Rs.2,170,805/-/-
 Principal Investigator Dr. Muhammad Sabieh Anwar
 Associate Professor
 Department of Physics,
 Name of Institution Lahore University of Management Sciences
 (LUMS) Lahore

SUMMMARY

The project was aimed at building a low cost NMR spectrometer for tabletop applications consider the project complete and ready for product development. An earth field NMR has been built in the last year and pulse width Calibration and relaxometry measurement completed. Besides a full fledged graphical user –interface for programming the NMR s also been developed and deployed on the spectrometer. The previous report submitted Science Foundation provided details on the construction and design of the table top NMR photograph of the current version of the spectrometer is presented here;

12.Project No: PSF/Res/P-IUB/Phys (189)
 Project Title: Synthesis and Characterization of Nano-ferrites
 for
 Thermoelectric Power Generation
 Duration 2-Years
 Date of Initiation: 01.12.2017
 Date of Completion: 30.09.2020
 Total Cost Rs.1,373,940/-

Total Expenditure:	Rs.1,256,840/-
Principal Investigator	Dr. Muhammad Azhar Assistant Professor Department of Physics,
Name of Institution	The Islamia University of Bahawalpur

Summary

For fundamental and applied research, the study of rare earth and transition metals replacement in ferrites has become of great significance. In advance ceramic research, the synthesis of ferrite at nano-scale along with their corresponding properties depends on the methodology of synthesis. Ferrites are low mobility semiconductors. Electrical transport properties of ferrites provide information suitable for the selection of these materials for specific application. To interpret the conduction mechanism in ferrites, Electrical transport properties such as Hall Effect and thermoelectric properties are widely used. Hall Effect measurement is straightforward and gives precise results. However, in case of ferrites that are low mobility semiconductors, it is somewhat difficult to measure the Hall Effect. In such cases the thermoelectric measurement is the only alternative. Moreover, the measurement of thermo e.m.f or setback coefficient is simple, straightforward and its sign gives vital information regarding the type of charge carriers (electrons and holes) responsible for the conduction process in semiconductors, i.e. whether they are n-type or p-type. Thermoelectric effect is the direct conversion of temperature differences to electric voltage and vice versa, and it can be used to generate electricity, measure temperature or change the temperature of objects. Thermoelectric devices can be used as temperature controllers because the direction of heating and cooling is determined by the polarity of the applied voltage. It enables one to calculate Fermi energy, charge carrier concentration, mobility of charge carriers, etc. Knowledge of Fermi energy gap helps in the determination of various regions namely impurity conduction, impurity exhaustion and intrinsic conduction regions of a semiconductor. The electron jumps between differently charged ions of the same metal present in equivalent crystallographic sites is responsible for the conduction in ferrites. Ferrites have been used widely in highly efficient cooling and energy conversion system during the previous few years. Moreover, the next generation thermoelectric devices have considered as the

important applications for nanostructured ferrites. Investigation of the nano-sized ferrites has been done regarding thermal transport properties. The understanding of thermoelectric properties of nanostructured ferrites and their interrelation is still need to be investigated in more detail. The aim of the project is to design Seebeck system and to optimize the Seebeck coefficient. Various types of nano structured ferrites have been synthesized by using wet chemical methods which include (co-precipitation, sol gel etc.) in this project. Various metal cations such as ytterbium, holmium, magnesium, dysprosium, hafnium etc. in Ni, Sr, Mg, Ba, Li and Zn based ferrites have also been substituted in the Institute of Physics, the Islamia University of Bahawalpur Pakistan. The thermoelectric power or Seebeck coefficient ϕ has been measured by sandwiching the sample between two copper electrodes, where differential method has been used to make a temperature gradient by raising up the temperature of one surface of the sample with a small heating coil. The maximum temperature difference ΔT between the two surfaces of the sample has been kept at 10 °C. The potential difference ΔV between the two surfaces has been recorded using digital voltmeter. Effect of the reference leads has been eliminated by subtracting the absolute potential difference of copper electrodes from the measured thermoelectric voltage at each temperature. As the charge will diffuse from hot surfaces of the specimen to the cold one, the sign of thermoelectric power is taken as the sign of the cold electrode. The Seebeck coefficient (ϕ) will be calculated using following relation; $\phi = \lim_{\Delta T \rightarrow 0} \Delta V / \Delta T \approx \Delta V / \Delta T$ Where: (ΔT) is small compared to the absolute temperature. The Seebeck coefficient has been taken for samples over a wide range of temperature starting from room temperature to higher values depending on the limitation of the device.

13. Project No:	PSF/Res/P-FCC/Phys (202)
Project Title:	Quasilinear Theory of Electrostatic and Electromagnetic Instabilities with Non-Maxwellian Distribution Functions
Duration	2-Years
Date of Initiation:	26.04.2018
Date of Completion:	25.04.2020)

Total Cost	Rs.947,580/-
Total Expenditure:	Rs.646,100/-
Principal Investigator	Dr. Sadia Zaheer Associate Professor Department of Physics
Name of Institution	Forman Christian College (A Chartered University) Lahore

Summary

The present work extends the analysis of Alfvén waves which are low frequency electromagnetic waves propagating along the ambient magnetic field. These waves tend to develop a longitudinal electric field as their wavelength becomes comparable to the Larmor radii of ions. Kinetic properties of the Alfvén wave originating from the finite perpendicular wavelength effects, leads the Alfvén waves to couple with electrostatic wave resulting in the generation of kinetic Alfvén wave (KAW) which has been studied for both linear and nonlinear regimes. The wave has a parallel electric field which helps the wave to propagate in the direction perpendicular to the ambient magnetic field. The kinetic Alfvén waves are linearly compressional as they develop electric field E fluctuations along the magnetic field B_0 due to these E field fluctuations. The dispersion relations for compressional and Shear Alfvén waves in the framework of Quasilinear theory by using Dirac delta function has been derived. It is found, that under certain circumstances, the compressional and shear Alfvén perturbations may exhibit large growth generated due to the kinetic energy of the shear flow. The shear velocity has mode coupling which allow the exchange of energy and possibility of transformation of these modes into each other. The compressional Alfvén mode may extract the energy of the mean flow and transfer it to the shear Alfvén mode via this coupling. The relevance of findings provides a better understanding of the laboratory as well as astrophysical plasmas (e.g., the generation of pulsar radio emission). Since most astrophysical plasmas are relativistic in nature.

14.Project No:	PSF/Res/P-GCUF/Phys (203)
Project Title:	Fabrication of Metal-Semiconductor Diodes by Home Developed Thermal Evaporation System
Duration	2-Years
Date of Initiation:	11.10.2017
Date of Completion:	10.10.2019
Total Cost	Rs.1,727,880/-
Total Expenditure:	Rs.1,696,700/-
Principal Investigator	Dr. Sadia Zaheer Prof. Dr. Nasir Amin Department of Physics Govt. College University Faisalabad
Name of Institution	Govt. College University Faisalabad

Summary

The proposed project aimed to fabricate metal-semiconductor diodes using home developed thermal coating unit. Metal-semiconductor (Schottky) diodes have fundamental importance in every electronic and optoelectronic device. The quality of Schottky diodes directly related to performance of electronic device because charge transport across the metal semiconductor junction is depends upon the junction quality. The project was divided into three stages; in first stage we have completed the fabrication of thermal evaporation system by purchasing various components such as pirnai gauge, pinning gauge and diffusion pump, the 2nd part of this project was the growth of various oxide semiconductors. We are able grow different oxide semiconductors such as Zn₂GeO₄, Mg₂GeO₄ and Cu₂InO₄ and results have been published in International Journals with high impact factor. In the 3rd part of project, we have successfully fabricated the metal-semiconductor junctions on the grown oxide semiconductors and results are again published in International Journal.

Health Sciences:

15.Project No:	PSF/Res/ KPK-IBMS/Med (493)
Project Title:	The Role of Circulating Tumor DNA in Monitoring Treatment Response in Patients with Breast Cancer
Duration	3-Years
Date of Initiation:	01.04.2019
Date of Completion:	31.03.2022
Total Cost	Rs.4,145,280/-
Total Expenditure:	Rs.3,452,500/-
Principal Investigator	Dr. Asif Ali Associate Professor Institute of Basic Medical Sciences
Name of Institution	Khyber Medical University Peshawar

SUMMARY:

DNA fragments are released into the blood system from dying (apoptotic or necrotic tumor (cancer) cells). These DNA fragments are called cell-free or circulating tumor DNA (ctDNA). It has been investigated for decades that extracellular nucleic acids are released into the plasma of healthy individuals and patients with tumor. This resulted in a series of investigations to identify the clinical potential of ctDNA. Recent literature shows tumor associated changes can be identified at RNA and DNA level. In response to the physiological and pathological mechanisms, DNA fragments are released into the bloodstream from apoptotic and necrosis cells. Tumor cells also shed DNA into the peripheral blood and evidence suggests that the DNA in peripheral blood is tumour derived. Thus, ctDNA may function as a representative DNA of primary tumour in the body. Tissue biopsy is considered as a gold standard in the diagnosis of patients with tumour. In addition, prognostic and predictive knowledge can be extracted from

pathological factors from tissue biopsy. However, information from tissue biopsy are not sufficient to explain the diversity in the tumour (also called heterogeneity) and adaptation due to anticancer treatments. The repeated tissue biopsy is not feasible. It has been mentioned in literature that currently, liquid biopsy is an attractive approach that aims to overcome such limitations and provide a more accurate representation. For the purpose of the current project, liquid biopsy is taking a blood sample and the quantification of ctDNA through real time polymerase chain reaction (RT-PCR). At present, liquid biopsy is an approach aiming to get rid of limitations of the tissue biopsy and has the potential to accurately represent the biology of disease. Liquid biopsy is a non-invasive technique and it helps in diagnosis, prognosis and monitoring of treatment response in patients with tumours. In the current project, we have recruited patients with breast cancer and we followed them for around 4 to 5 years. Blood samples were collected before surgery for breast cancer and then serially after surgery. Blood samples were collected during the treatment and then at the end of treatment. Initially, the challenge was to optimize the RT-PCR technique, clinical, pathological, demographic, treatment, follow-up and survival data of each patient recruited in the current project (for 3 to 4 years). The aim of the project was evaluate the role of ctDNA in monitoring treatment response in patients with breast cancer. Our results showed that ctDNA as a liquid biopsy help in the prognosis of patients with breast cancer, predicting treatment response (potential responders and non-responders) and thus in monitoring of treatment response in patients with breast cancer. Thus, liquid biopsy (a blood sample taken like for any other blood test) may be used as a non-invasive test for monitoring treatment response in patients with breast cancer. We believe these results are transferable to other cancers and we are in the process of presenting this data to colleagues in oncology practice for potential commercialization.

16.Project No:	PSF/Res/CP/S-AKU/Med (488)
Project Title:	Analysis of Population-Specific Epitope and Drug-resistance Mutati in HIV-1 in Pakistan
Duration	2-Years
Date of Initiation:	11.09.2018

Date of Completion: 30.06.2021
Total Cost Rs. 2,153,145/
Total Expenditure: Rs. 1,896,279/-
Principal Investigator Dr. Syed Hani Abidi
Assistant Professor
Department of Biological and Biomedical
Sciences
The Aga Khan University
Karachi,
Name of Institution The Aga Khan University, Karachi

SUMMARY:

Human immunodeficiency virus (HIV) rapidly evolves in response to host or drug selection pressures, because of which drugs or vaccines against HIV are rendered ineffective after a while. HIV Gag is a highly immunogenic protein, comprising several well-characterized epitopes that evolve under selection pressures from host immunity. A prime target for antiretroviral therapy (ART), HIV Pol also carries well characterized epitopes. Pressures from the host immunity and the ART select and amplify mutations in Pol as well. Such mutations in the epitopes of Gag and Pol can disrupt epitope processing. Mutations helping the virus to override any of these four steps will interfere with epitope maturation and will help the virus to escape recognition by host immunity. In this study, we hypothesized that certain HIV genes will evolve under dual selection pressure to harbor mutations that can facilitate both immune and drug escape. Results from our analyses, conducted so far, suggested subtype A1 be the prevalent subtype. Analysis of gag gene revealed the presence of the following mutation only specific to the Pakistani cohort: 303V, S332T, P339T, 370A, I376M, and an insertion 372Q. Similarly, analysis of pol mutations suggested the presence of multiple drug resistance mutations in our cohort, among them E138A, K103N, M184V/L, K219E were commonly found. Some major mutations, M46I, I47V, I54V/L, V82M, in the protease region were only found in virological failure patients. In Pakistan, ART- and immune-escape mutations in HIV have not been explored adequately. Similarly, data on mutations evolving under dual selection pressure (drug/ immune) does not exist at all. This

proposal intends to investigate the mutation profile of HIV pol and gag genes in HIV-positive Pakistani patients, where mutations evolving to confer HIV ART resistance as well as an immune escape will be especially focused. Additionally, host genes involved in defining the immune response, i.e., HLA will be studied. The knowledge of HIV ART and immune- escape mutations, and their correlation with host HLA types, is critical in obtaining data that will be necessary for designing effective population-specific treatment and control strategies against HIV.

17.Project No:	PSF/Res/P-UHS/Med (492)
Project Title:	Biochemical and Molecular Analysis of Oculocutaneous Albinism in Families from Pakistan
Duration	2-Years
Date of Initiation:	05.06.2018
Date of Completion:	04.04.2021 (Extended)
Total Cost	Rs.586,500/-
Total Expenditure:	Rs. 500,994/-
Principal Investigator	Dr. Saqib Mahmood Associate Professor Department of Human Genetics
Name of Institution	University of Health Sciences Lahore

SUMMARY:

Albinism is adverse genetic disorder which is described as a defect of diminished formation of melanin pigment in organs like hair, skin and eyes . oculocotaneous albinism (OCA) is a cluster of autosomal recessive abnormalities discernedas a complete absence or a lessening of melanin synthesis in skin cells (melanocytes) .OCA is explicated for different types on the basis of genetic mutations in the candidate genes however clinically ,OCA1A is considered as most

severe type of OCA represented as an absolute deficiency of melanin .whereas other types like OCA1B ,OCA2,OCA3, and OCA4 are showing some pigment deposition with passage of time the causative mutations in genes including TYR,OCA2,TYRP1,SLC45A2,SLC24A5, and C100r f11 are liable for OCA phenotype .in a Pakistani family ,a new locus for non-syndrome OCA has been confined to chromosome 4q24 designed as OCA5. The objective of this current study is to evaluate the congenital OCA families clinically and to identify the causative mutations and also to elucidate the biochemical pathway through impact of the mutations on protein function. Twenty families of OCA with autosomal recessive mode of inheritance will be included and EDTA blood will be collected .Genomic DNA extraction will be done by standard methods .Linkage analysis will be carried out to localize the causative variation (known LOCI) in multi affected families, gene mutation will be performed and excluded families ,will be processed for genome wide scan by SNP based microarray. After localizing the chromosomal region, candidate genes of that region will be screen for mutations /s by using whole exome sequencing strategy. It may be proposed that identification of pathogenic alterations of OCA genes in families’ will also support in setting the basis for genetic counseling, pre-natal screening and diagnosis of disease in affected families.

18.Project No:	PSF/Res/P-IUB/Med (481)
Project Title:	Development of Optimized Dry Injectable Product of Docetaxel via Freeze Drying Method to Enhance the Solubility and Stability
Duration	1-Years
Date of Initiation:	25.02.2020
Date of Completion:	24.02.2021
Total Cost	Rs.642,396/-
Total Expenditure:	Rs.553,106/-
Principal Investigator	Prof. Dr. Muhammad Akhtar Department of Pharmacy

Name of Institution

The Islamia University of Bahawalpur

Bahawalpur

SUMMARY:

In Pakistan various kinds of cancer have claimed over 91,000 lives in 2013 and an increasing trend was witnessed in new cases of fatality from lung cancer among men and breast cancer among women across the country between 1990 and 2013. The breast cancer rate incidentally increases to 0.3 percent annually from 2012 to 2016, according to the American Cancer Society. Over the past several decades, docetaxel (DTX) has become one of the most important chemotherapeutic agents, whose antitumor activity is due to its ability to disrupt the normal process of microtubule assembly and disassembly. In clinical trial, DTX was successfully applied, mostly against ovarian carcinoma, advanced breast cancer, lung cancer, and head/neck cancer. DTX injection is available commercially, but these injections show severe side effects and need expertise to make a dilution before injection. Low aqueous solubility and stability are the major limitations in safe and effective delivery of DTX and a special solvent system (13% w/w hydroalcoholic solution of 95% ethanol with Water for Injection) is required for reconstitution before IV administration of currently marketed DTX. A dry product of DTX injectable can be prepared to overcome these problems. The objective of this study was to develop optimized solid dispersions (SD) of DTX with a hydrophilic carrier like poloxamer 407 and poloxamer 188 in combination with variable ratios of polymers by lyophilization method and its comparison with formulations containing Tween 80 as solubility and stability enhancing agent in an attempt to enhance the aqueous solubility and therapeutic efficacy of the drug by improving its bioavailability and stability. All the dry injectable were prepared by freeze drying method because DTX is an expensive drug and freeze drying allows small quantities to be processed with 100% yield. Freeze drying at low operational temperatures minimizes the risk of thermal degradation of DTX. Freeze drying reduces the crystallization ability of the amorphous phase. Improved stability of a dry powder. Removal of water without excessive heating of the product and rapid and easy dissolution of reconstituted product. The advantage of this product does not need a special solvent. This was prepared by lyophilization which can reduce or prevent the DTX from oxidation and hydrolysis. A solid form does not only make the drug more stable

but also ease in transportation. The DTX loaded dry product would be a novel stable and safe dosage form for the treatment of various cancer. Our newly developed drug delivery system for DTX with enhanced solubility and stability will be a great contribution to cure the various cancers with increased safety and therapeutic efficacy at affordable cost and have a good social impact.

19.Project No:	PSF/Res/C-PIMS/Med (450)
Project Title:	Identification of Molecular Determinants of Hereditary Deafness
Duration	3-Years
Date of Initiation:	01.07.2016
Date of Completion:	31.12.2019
Total Cost	Rs.4,257,480/-/-
Total Expenditure:	Rs.3,888,412/-
Principal Investigator	Dr. Mohsin Shahzade Assistant Professor
Name of Institution	Shaheed Zulfikar Ali Bhutto Medical University Islamabad

SUMMARY:

Sixty hearing impaired families, comprising 212 affected members were enrolled during the three year periods of this project. The level of hearing was determined by audiometric analysis at the time of enrollment. Clinical phenotyping was done to diagnose type of hearing impairment and to distinguish between syndromic or nonsyndromic type. Here we report the underlying genetic causes of pre-lingual hearing loss (HL) segregating in sixty large consanguineous families, ascertained from the Punjab and Khyber Pakhtunkhwa provinces of Pakistan. Sixty hearing impaired families, comprising 212 affected members segregating hearing impairment were enrolled during this project. After getting informed written consent, blood samples of 212 affected and 251 normal siblings and their parents were collected. DNA was extracted from all the enrolled 465 blood samples. This study highlights the genetic diversity of hearing disorders

in the Pakistani population and reports the identification of sixteen pathogenic variants out of which four are novel mutations and lead to the discovery of a novel gene. Genetic characterization of these families will help in genetic counseling of these families.

20.Project No: PSF/Res/P-NUST/Med (453)

Project Title: Electromyogram (EMG) Powered Active Ankle
Lower Limb Prosthetic Foot

Duration 2-Years

Date of Initiation: 01.09.2017

Date of Completion: 28.02.2021

Total Cost Rs.2,610,996/-

Total Expenditure: Rs.1,775,421/-

Principal Investigator Dr. Mohsin Islam Tiwana
Associate Professor
Department of Mechatronics Engineering
College of Electrical and Mechanical
Engineering
(EME)
National University of Science and Technology
Rawalpindi,

Name of Institution National University of Science and Technology
Rawalpindi

SUMMARY:

Amputation may be caused by different accidents or medical complications and are one of the most dreadful kinds of life changing traumas. The burden of amputees in Pakistan is on the rise due to the different acts of terrorism and suicide bombings during the last decade. The armed

forces, being in the front line of the war on terror, have suffered the most and lost thousands of soldiers, whilst hundreds more have sustained long-term permanent disabilities including amputation. According to the annual report of PWDs (2012) developed by R&D Department of HHRD (Helping hand for Relief and Fund), Islamabad, a total of 5.035 million people in Pakistan, greater than the population of any of the individual countries like Norway, New Zealand, Lebanon or Kuwait have undergone amputation. Annual growth rate of disabilities is 2.65% per annum compared to the annual growth rate (2.03%) of population of Pakistan. The most practical solution to this tragedy is to replace the amputated part by active ankle-foot prosthesis. Active bionic prosthesis is an actuator powered device that works on actual muscle principles to replace the amputated part. The concept actuator design employs a unidirectional spring and a ball screw coupled with a brushless motor as the actuator to replicate the human ankle mechanism encapsulated in a casing exhibiting features like a human ankle. In simpler words, when the user will think about taking a step, an electromyogram (EMG) impulse will be generated in the residual muscle (point of amputation). The artificial foot developed in this project will pick this EMG signal and it will assist the person to take a step. For the current prototype, we have set our design requirements such that the weight of the amputee is under 80kg with the foot size to be of 9. Once a prototype is ready, it can be manufactured for any given person. However, for the development of control architecture the neuromuscular model of dorsiflexion and plantarflexion is analyzed differently for swing and stance and then control is to be developed for them in two phases. In the first phase the prosthesis control would aim imitate natural human gait whereas in the second phase, it is expected to adapt to speed transients and inconsistent terrains by obtaining a feed of data from EMG signals and multiple sensors like IMUs, encoders and stress stain gauges etc. It is a complete prosthesis model which caters for the important task of manufacturing prosthesis products in our own country which will be cheap and widely available anytime.

21.Project No:

PSF/Res//P-GCU/Med (485)

Project Title:

Exploration of Medicinal Plants Against
Hepatitis

C Virus

Duration	2-Years
Date of Initiation:	21.05.2019
Date of Completion:	20.11.2021
Total Cost	Rs.1,977,780/-
Total Expenditure:	Rs.1,921,043/-
Principal Investigator	Dr. Nosheen Aslam Assistant Professor Department of Biochemistry Government College University Faisalabad ,
Name of Institution	Government College University Faisalabad

SUMMARY:

Hepatitis C virus (HCV) is a potential cause of liver disease and a significant cause of considerable morbidity and mortality all over the world. The overall prevalence of HCV infection is more than 2%, representing 140 million people across the globe. Current standard treatment is direct acting antivirals (DAAs) with or without ribavirin is effective in the patients chronically infected with HCV but available therapeutic intervention against HCV remains compromised because of various side effects of DAAs as well as drug-resistance due to evolution of resistance associated substitutions (RASs). Therefore, it is still of importance to develop new novel and cost-effective anti-viral drugs for treatment of HCV with minimum side effects. A number of plant species contain more potential compounds which have good anti-HCV properties. Therefore, in this study, we evaluate the therapeutic potential of different parts of a traditional medicinal herbs and their biological active multi-target flavonoid constituent against HCV.

22.Project No: PSF/Res/KPK-AWKU/Med (459)

Project Title:	Development of Coumarin Based Compounds for U2OS Bone Cancerous Cell Treatment
Duration	2-Years
Date of Initiation:	23.05.2019
Date of Completion:	22.05.2021
Total Cost	Rs.1,922,700/-
Total Expenditure:	Rs.1,775,421/-
Principal Investigator	Dr. Muhammad Ikram Assistant Professor Department of Chemistry
Name of Institution	Abdul Wali Khan University Mardan

SUMMARY:

The project is based on the synthesis of coumarin based compounds and their derivatization. The well characterized compounds were subjected for their cancer studies. We have successfully synthesized many coumarin derivatives. So far, a research paper has also been published in Journal of Molecular Structure with impact factor of 2.5. PSF has been acknowledged. Many coumarin derivatives have been characterized and very soon another publication will be published out of this project. Sodium and Zinc Dicoumarol derivatives were also obtained and studied for U2OS bone cancer treatment. Only dicoumarols were found very active. Sodium and Zinc derivatives were found completely inactive.

23.Project No:	PSF/Res/C-IBGE/Med (509)
Project Title:	Exploring Predictive Biomarker for Aplastic Anemia: An appropriate Tool for Diagnosis and Treatment
Duration	2-Years

Date of Initiation:	01.09.2020
Date of Completion:	31.08.2022
Total Cost	Rs.2,222,580/-
Total Expenditure:	Rs.2,027,180/-
Principal Investigator	Dr. Sadia Rehman Principal Scientific Officer
Name of Institution	Institute of Biomedical and Genetic Engineering (IBGE), Islamabad

SUMMARY:

This project was about exploring the genetics of Aplastic Anemia Patients, in order to discover biomarkers that can facilitate in early diagnosis and help in designing of treatment strategy to reduce the problems faced by patients and their families. Aplastic anemia (AA) is a blood disorder with low blood cell counts and empty bone marrow. AA can be inherited or acquired. Acquired AA is quite common in Pakistan, with idiopathic etiology, literature reviews have provided several evidences that AA is an autoimmune disorder in which hematopoiesis (production of blood cell) is halted that leads to bone marrow failure. The diagnostic and treatment strategies of AA are quite complex with very high financial constraints. Hematopoietic stem cell transplantation (HSCT) is always given priority over immunosuppressive therapy (IST). But HSCT is very costly (Approximate cost two to three million Pakistani rupees) and is also hindered by the non-availability of HLA-matched sibling donors. Our study has very strong socio-economic significance identification of a reliable genetic predictors would not only provide a useful tool for determining the most appropriate treatment choice for AA patients, including up-front HSCT from HLA-matched unrelated donor but also help in monitoring disease prognosis, thus increasing survival rate. The scientific research especially genetic based research on AA in Pakistan is almost negligible. We have done few studies on genetic aspects of AA. Main objectives of this study is to assess variations in genetic biomarkers among Pakistani

AA patients and controls using advance molecular biology techniques and pave a way to design a panel of genetic biomarkers, that can be used in combination with clinical evaluation to estimate disease prognosis and guide for better treatment options. Sample collection was done after literature review and consultation with renowned clinicians. Our sample pool contained clinically evaluated severe AA patients waiting for HSCT, along with ethnically matched normal controls. Informed signed consent was taken from all participants. DNA extraction was done and required amount of DNA of one hundred AA samples were sent to Singapore for genome wide association studies (GWAS). Total of 700K SNPs were analyzed in 93 cases using the Illumina microarray technology (also known as Bead Array technology) as seven samples failed to pass purification test in Singapore. Genome-wide association analysis was done by running the homozygosity mapping analysis on the generated binary files. Results from GWAS have shown certain region of chromosome 1, 3, 5, 7, 11, 15 shared³ among patients. Reported SNPs were selected for genes associated with autoimmunity, hematopoiesis and various blood related disorders by using various on line browser and available literature. Primers for reported SNPs were designed and patients and controls were screened, No association with the disease was found. Our results indicate that the associated chromosomal were not reported in other related studies therefore it is recommended that these region should be screened with targeted gene sequencing by designing another comprehensive study with larger cohort of a patient and controls. In conclusion our data provides valuable and new information about genetic variations related to AA in Pakistani samples that can help in providing deep insight in its pathogenesis and has tremendous applications in disease management.

1.4 Scientific Publications Produced through PSF Supported Projects

One of the main achievements and usefulness of any research is the publication of its results in scientific journals. Based upon the results of completed projects, research papers were published in different national/international journals. Details are at Annexure-IV.

2. International Liaison Section

PSF has the mandate to liaise with similar international bodies across the globe and is in active collaboration with many similar International bodies. In the prevalent global scenario, the importance of international collaborations has become vital for the technological developments and advancement of knowledge. Therefore, PSF has re-vitalized its international collaborations and embarked upon new linkages to harness potential of technologically advanced nations like China, Turkey, Iran and Sri Lanka. In addition to this PSF regularly plays role as a facilitator to link various international organizations/ universities with local universities and research institutions. Delegates from the reputed universities and similar collaborating bodies regularly hold meetings with PSF to discuss the areas of joint collaboration.

Over the years, PSF has established cordial bilateral relations with various international bodies to synergize efforts for achieving technological excellence and socioeconomic well-being of the people at large. Joint research projects are already ongoing with The National Natural Science Foundation of China (NSFC); Scientific and Technological Research Council of Turkey (TÜBITAK); Ministry of Science, Research and Technology (MSRT), Iran and National Science Foundation, Sri Lanka.

During the report period, PSF launched first joint call for proposals on Joint Scientific Exchange Program (JSEP) with National Natural Science Foundation (NSFC), China under which 18 Mobility grants to the researchers were awarded. 93 projects remained ongoing (including newly initiated projects) while 33 technical reports (semi-annual and annual) of ongoing projects were received and an amount of Rs. 59.6 million was released on account of due installment of already ongoing projects and first installment of newly initiated projects with NSFC-China. In addition, 18 projects of IL remained ongoing funded under PSDP project Competitive Research Program. 08 technical reports (semi-annual and annual) of ongoing projects were received and an amount of Rs. 50.8 million was released on account of due installment of already ongoing projects and first installment of newly initiated projects with TUBITAK-Turkey.

2.1 Joint R&D Bilateral Projects and Calls

a. PSF-NSFC, China joint call for proposals

Pakistan Science Foundation (PSF) and National Natural Science Foundation of China (NNSFC) signed a MoU on 30th of October, 1992 for joint research activities. In order to further strengthen

the ties between Pakistan and China, and to take maximum benefit from the experience of Chinese Scientists.

PSF launched first joint call for proposals on Joint Scientific Exchange Program (JSEP) with National Natural Science Foundation (NSFC), China. As a result, in total 279 joint proposals were received both at PSF and NSFC, which were being processed for screening and critical review. 18 top projects were awarded grants mutually both at China and Pakistan Sides. List of successful projects is placed at *Annexure-VI*.

39 projects awarded under four joint calls were ongoing in different universities/S&T organizations across the country. Final Technical and fiscal reports of 08 Projects were also received during this period.

b. PSF-TUBITAK, joint call for proposals

20 projects awarded under three were ongoing in different universities/S&T organizations across the country. Final Technical and fiscal reports of 03 Projects were also received during this period.

c. PSF-MSRT joint call for proposals

12 projects awarded under first and second calls were ongoing in different universities/S&T organizations across the country. Final Technical and fiscal reports of 05 Projects were also received during this period.

d. Call for Joint Proposals with NSF, Sri Lanka

Final Technical and fiscal reports of 03 Projects were also received during this period. 19 Projects were completed in the report period. While these projects produced 18 research publications in reputed journals. 03 patents were also filed. 84 students (M. phill/PhD) completed their degrees.

2.2 Meetings of PSF Screening Committees

The call for joint research proposals between PSF and National Natural Science Foundation, China (NSFC), was opened from 14.04.2022 to 6.07.2022. As a total of the call, 279 projects commonly received at PSF and NSFC. In order to scrutinize the project, three screening committees were held on 22.09.2022, 05.10.2022 30.09.2022 at PSF Committee Room The committees thoroughly reviewed the proposals and gave its recommendations. 79 Proposals were shortlisted for critical review by subject experts.

2.3 Online Joint Technical Meeting with NSFC-China

An online Joint Technical meeting of PSF officials with NSFC authorities was held on 7th Dec, 2022 at PSF. In the meeting, there was formal exchange of results of the PSF-NSFC joint call on Joint Scientific Exchange Program (JSEP) Besides this, two sides also exchange gratitude on existing collaboration and modalities to launch joint 5th calls were also discussed. Afterwards, 18 successful projects were announced and awarded grants.

2.4 First Secretary, Embassy of China, Islamabad meets Chairman, PSF

Pakistan and China, the two brotherly neighboring countries, are collaborating with each other in scientific research through their scientific institutions. As regards the field of science and technology, various organizations of the two countries have signed and implemented more than 300 instruments of cooperation. As a follow up of these instruments, the support and assistance of Chinese institutions for the transformation and capacity building of Pakistani institutions and individuals has been remarkable and has resulted in the strengthening of academic and R&D infrastructure facilities across the country. PSF in collaboration with National Science Foundation, China, China Academy for Science and Technology-CAST and other S&T institutions is undertaking various programs for uplift of science in the country.

To further strengthen the collaboration, Mr. CAO Zhouhua, First Secretary, Embassy of China in Pakistan visited PSF on 26th August, 2022 and hold a meeting with Chairman, PSF, Prof. Dr. Shahid Mahmood Baig. Following officers from PSF and MoST also attended the meeting.

1. Mr. Khan Muhammad Wazir, Deputy Scientific Adviser (IL-I), MoST
2. Ms. Zaiban Farooq (Senior Scientific Officer, IL), PSF
3. Dr. M. Tahir Waseem (Associate Curator/Deputy Director-STEM), PSF

The meeting started with the introduction. Later on, Chairman, PSF explained in detail about the PSF functions and activities and collaboration with Chinese S&T organizations. Mr. CAO has proposed some areas of cooperation of mutual interest in order to expand the bilateral ties. These proposals were appreciated during the meeting and Chairman, PSF assured their full cooperation for implementation in near future. At the end, Chairman, PSF presented PSF crest to the guest and meeting ended with vote of thanks.

2.5 PSF participation in E-Waste Policy Conclave held at COMSATS, Islamabad

An event titled “E-Waste Policy Conclave” organized by COMSATS under PSF-TUBITAK joint project titled “*Investigation of Selected Persistent Organic Pollutants (POPs) and Heavy Metals Pollution from E-waste Processing Facilities*” was held on 4th August, 2022 at COMSAT University, Islamabad. Dr. Muhammad Tahir Waseem, Associate Curator/Deputy Director-STEM, PSF participated in the event.

The said Policy Conclave focused on: -

1. Emissions from the unethical E-waste dismantling produce a huge quantity of hazardous chemicals that pose threat to human health and the environment.
2. Inventory development on the country level about legal/illegal import and domestic generation.
3. Development of Policy/legislation specifically addressing e-waste in Pakistan.
4. Legal framework for establishing formal recycling of e-waste in the country.

2.5 PSF participation in a one-day Introductory Course on Science Diplomacy at COMSTECH

Miss Zaiban Farooq, Senior Scientific Officer, IL participated in a one-day introductory seminar on “Science Diplomacy and Sustainability” offered by COMSTECH on 6th March, 2023 at COMSTECH Auditorium. Prof. Zakri Abdul Hamid, the former science advisor to the Malaysian Prime Minister and Mr. Kamran Akhtar, Additional Secretary, Ministry of Foreign Affairs spoke at the course. The Coordinator General, COMSTECH, Prof. Dr. M. Iqbal Chaudhary and Dr. S. Shaukat Hussain, Adviser, COMSTECH also addressed on the occasion. The course was attended by numbers of diplomats, representative of the foreign ministry, professors, researchers, and experts in the subject of sustainable developmen

3. Science Popularization Section

Pakistan Science Foundation is an Organization that has a mandate of promotion and of Science at grass root level under the National Science Policy 1984 and STI Policy 2012 to Pakistan Science Foundation. So, for that purpose Pakistan Science Foundation has established 9 Science Caravan Units in all over the country. The federal Unit is also striving to achieve the above mentioned objective. PSF through its Science Promotion activities like Mobile Science Exhibition has been doing wonderful job. Mobile Science Exhibition has been designed to increase public awareness about science and to motivate the teenage of the country towards study of science. The people living in rural/backward areas of the country are exposed to some of the most fascinating scientific and technical developments of modern world through Science Caravans. Mobile Science Lab consist of lab equipment for the practicals of Physics, Chemistry, Biology, Scientific Models, Scientific documentaries and Star lab/Planetarium Show. Science Caravan Federal unit is conducting the one-day Capacity Building / Teacher Training workshops on Inquiry Based Science Education approach during the Science Caravan Exhibitions. IBSE kits consist of low cost material like balloons, plastic bottle, ten can, vinegar, eggs shield, cloth candle air fresheners papers, ink, thermometer, Glycerin, etc . By using the low cost material, students are trying to investigate the reasons behind the natural phenomenon through hands on activities.

3.1 Regular Activities

Science Caravans (Mobile Science Labs) is a Mobile Science Exhibit that has been designed to increase public awareness about science and to motivate the younger generation of the country towards study of science. Science Caravans consist of three major components; firstly, demonstrate the exhibits & display items, secondly screening of science films/documentaries and lastly the Star lab Planetarium system. Microscopes, Computers, laser holograms and working models reflecting various phenomena of physics, chemistry, mathematics and biology are included in Caravan Exhibitions. At present, 09 Science Caravan units are in operation, 02 for each of the 04 provinces and 01 for Federal and adjoining areas.

- Science Caravan Federal Unit
- Science Caravan Unit Peshawar & Karak
- Science Caravan Unit Multan
- Science Caravan Unit Faisalabad
- Science Caravan Unit Tandojam
- Science Caravan Unit Sukkur
- Science Caravan Unit Quetta & Jaffarabad

Summary of Science Exhibitions by PSF Science Caravan

S. No.	Unit	No of Exhibition	No. of Days	No. of Schools	No. of Students
1.	Science Caravan Federal	06	24	38	11161
2.	Science Caravan Peshawar	14	50	61	17100
3.	Science Caravan Multan	06	18	10	4784
4.	Science Caravan Faisalabad	09	42	40	10429
5.	Science Caravan Tandojam	03	13	20	4513
6.	Science Caravan Sukkur	05	21	24	6868
7.	Science Caravan Quetta	07	12	20	4630
Total		50	180	213	59485

Detail of Science Caravan Exhibition carried out by all Caravan Units is placed at (**Annexure-VII**)

3.2 World Science Day for Peace and Development (WSDPD)

Commemoration of World Science Day for Peace and Development (WSDPD), was organized on 16th November, 2022 jointly by The United Nations Educational, Scientific and Cultural Organization (UNESCO), Standing Committee for Scientific and Technological Cooperation (COMSTECH), the Commission on Science and Technology for Sustainable Development in the South (COMSATS), Pakistan Academy of Sciences (PAS), ECO Science Foundation (ECO-SF) and Pakistan Science Foundation (PSF) on the theme of importance of **“Basic Sciences for Sustainable Development”**. The theme of the WSD -2022 decided by UNESCO within the celebrations of the year 2022 as “International Year of Basic Sciences” kicked off on July 8, 2022.

3.3 Strengthening of High School Laboratories

PSF also helps the schools in strengthening of the Laboratories. Since most of the high schools working in government sector in the rural areas have acute shortage of laboratory equipment for performing science experiments and practical. In December 2022, the financial assistance granted to five Govt high schools for the strengthening of scientific labs to promote and popularization of science at grassroots level.

3.4 Financial Assistance to the following Schools of Balochistan

S. #	School Name	Amount
1.	Divisional Public School, Loralai	150,000
2.	Govt. High School, KachiBaig, Quetta	100,000
3.	Govt. High School, Kuchlak	100,000
4.	Govt. High School, Hazara Town, Quetta	100,000
5.	Govt. Model High School, Noshki	80,000
6.	Govt. Girls High School Postal Colony Quetta	100,000

3.5 Part Youth Space Maker Camp 5th Belt and Road Teenager

The Memorandum of Understanding (MOU) was signed on 6th December, 2022 between Pakistan Science Foundation (PSF) and Institute of Space Technology (IST) for promotion and popularization of science, STEM / STEAM education in general and space science, technology and its applications in particular, in the country.

Memorandum of Understanding (MOU) was signed between Pakistan Science Foundation (PSF) and Institute of Space Technology (IST).

PSF in collaboration with Institute of Space Technology (IST), Islamabad organized Space Maker Camp at IST Islamabad. in this regard PSF a MoU were Signed between Both

Organization. On account of various activities the Foundation releases an amount of Rs. 750000/- in favor of IST.

3.6 Popular Science Lecture

“Phenomena and Causes of Floods and Indus River System” by Dr. Imran Hashmi, Tenured Professor & Associate Dean, Institute of Environmental Sciences and Engineering (IESE), NUST, Islamabad

Climate change is impacting adversely to most of countries as per their geographic and ecological conditions including Pakistan, which is at the verge unfavorable effects of climate change like increased monsoon rains, melting of Himalayan glaciers, and increase in population and urbanization. This was disclosed by Prof. Dr. Shahid Mahmood Baig, Chairman, PSF while addressing the mix gathering of students, teachers and science managers on the occasion of popular science lecture on “Phenomena and Causes of Floods and Indus River System” organized on 14th September, 2022 at PSF Auditorium.

Renowned Climate Change Expert, Dr. Imran Hashmi from NUST in his lecture discussed that the floods are caused usually by high-water levels in rivers, lakes, or along the coasts, which exceed their natural or man-made boundaries. Flash floods are a chaotic and natural occurrence that are brought on by heavy rain, storm surges, typhoons, broken dams, glacial lake outbursts, or tsunamis. Flood damage is triggered by encroachment and unplanned urban development along streams and in floodplains.

He stressed that there is an urgent need to evaluate technological, institutional, and regulatory solutions since the Indus Basin floods contains valuable freshwater reserves that, if managed well, may be put to good use.

A large number of students, teachers and science managers attended the lecture. At the end, a quiz competition related to the topic was organized for the participating students and prizes were also distributed among the winners.

3.7 Descriptive Letter Writing Competition

Science and Technology cooperation between China and Pakistan was started in early sixties and since then, it has been increasing day by day and encompassing almost all scientific fields. The China Pakistan cooperation saw the heights of mutual collaboration, when seeds of

medicinal plants were sent to space by the Chinese “Shenzhou XIV Manned Spacecraft” which was launched on 5th June, 2022.

PSF in collaboration with Embassy of China, Islamabad organized a Descriptive Letter Writing Competition in September, 2022 to the Chinese Astronauts, who were the member of the Chinese team responsible for this space experiment. Chinese Astronauts joint project. Forty-nine school/college students submitted their entries, which were evaluated by a Committee constituted by the Competent Authority for the purpose. The winner students were awarded Prize and certificates.

Production of Documentary on Science and Technology Cooperation between China and Pakistan

PSF, MoST and Embassy of China, Islamabad jointly produced a documentary titled “Sowing the Seeds of Friendships”. The video is on the story of seeds, a showcase of China-Pakistan relations, from traditional tea transplantation in the 1980s to the Hybrid varieties of rice and wheat, then the Genetically Modified Cotton till the current space experiment of medicinal seeds, all highlight the achievements of China-Pakistan science and technology innovation cooperation.

PSF team visited Lahore, Karachi, Multan, Peshawar, Shinkiari, Pakpattan, and Islamabad for picturization and video recording of various ongoing projects in various Pakistani universities and facilities with support of Chinese Ministry of Science and Technology. The documentary was screened in a Seed handing over ceremony hold in February, 2023.

4. Planning & Development (P&D) Section

P&D is the coordination/facilitation arm of the Pakistan Science Foundation (PSF) and acts as the focal point on behalf of PSF and its subsidiary organizations i.e. PASTIC and PMNH for transmission of information to the Ministry of Science & Technology (MoST) and other ministries including Planning Commission. It is mainly responsible for preparation / finalization of PSDP projects pertaining to the statutory functions of PSF as well as their processing with MoST for approval by the competent forums at MoST and M/o Planning Development & Reforms. Following activities are being undertaken by the P&D Wing,

- Preparation/finalization and processing of New Development Projects / PC-1s.
- Submission of PC-IVs / PC-Vs to MoST
- Coordination with different Sections of PSF, PASTIC, PMNH and MoST regarding ongoing and new PSDP projects.
- Data Compilation for Future Plans
- Monitoring and Evaluation (M&E)
- Execution of Approved PSDP projects of PSF, PMNH and PASTIC
- Attending various Review meetings at MoST/MoPD&SI
- Views/Comments on the PC-Is received from MoST/ MoPD&SI
- Compilation & submission of Monthly / Quarterly Reports, Reviews, Briefs, Presentations to MoST
- Replies to National Assembly / Senate Questions and other related information to MoST
- Coordination / preparation of material related to the National Assembly and Senate Standing Committee on S&T
- Activities under Non-Development Budget (Travel Grants).
- Activities to support the PSF Registered Scientific Societies in Pakistan

After the establishment of P&D Directorate in Year 2000, so far seventeen (17) projects have been completed while six (06) projects are ongoing.

4.1 On-going Development Projects

I) Financial Support to Scientific Societies in Pakistan (Phase-II)

The project proposes to strengthen the role of Scientific Societies in Pakistan by providing them financial assistance for

- i. Holding National and International Conferences, Seminars, Symposia, Workshops and Lectures on important scientific topics
- ii. Publication of Scientific Journals / Books
- iii. Development and maintaining the Linkages with Counterpart International Societies in advanced countries.
- iv. Providing travel grants to the members of the Societies who have been invited in the prestigious International forums for giving plenary talks/lead papers or as invited speakers.
- v. Provision of travel grants to the Ph.D. Scholars for presentation of research papers in International Science conferences/symposia and trainings abroad
- vi. Provision of Young Researcher Awards for outstanding achievements/ papers in a particular year by each society.

The long term objective of the project is to strengthen the scientific/research base and to develop a culture of science in society which would ultimately result in development of Science & Technology in the country.

During the period an amount of Rs. **24.75** million was utilized under the PSDP project and spent mainly for provision of financial assistance to the registered Scientific Societies for undertaking their regular scientific activities. In this regard, Grant-in Aid provided to following Fifteen (15) registered Scientific Societies.

- i. Islamic Society of Statistical Sciences
- ii. Soil Science Society of Pakistan
- iii. Pakistan Academy of Engineering
- iv. Pakistan Society of Nematologists
- v. Pakistan Nuclear Society
- vi. Society of Economic Geologists and Mineral Technologists (SEGMITE)

- vii. The Zoological Society of Pakistan
- viii. Pakistan Thalassaemia Welfare Society
- ix. Weed Science Society of Pakistan
- x. Pakistan Botanical Society
- xi. Pakistan Association for the Advancement of Science
- xii. Pakistan National Heart Association (PANAHA)
- xiii. The Biological Society of Pakistan
- xiv. Pakistan Vacuum Society
- xv. Society of Mechatronics Engineers
- xvi. Pakistan Society of Nuclear Medicines

During this period PSF registered three (03) Scientific Societies i.e Pakistan Biological Safety Association (PBSA), Society of Mechatronics Engineers (SOME) and Pakistan Society of Nuclear Medicine (PNSM). The requests received from the societies were considered in the five (05) meetings of the Committee constituted in the approved development project. The meetings were held on **17th October, 2022, 24th November, 2022, 5th January, 2023, 4th April 2023 and 8th May 2023**. Following activities were undertaken by the societies,

- ✓ Forty One (41) International / National Science Conferences / Workshops / Seminars / Symposia organized (**Annex-IX**).
- ✓ Thirty Six (36) issues of eleven (11) Scientific Journals were published (**Annex-X**).
- ✓ Linkages Fee paid to five (05) International Federations. (**Annex-XI**)
- ✓ Websites maintenance of six (06) societies was financially supported. (**Annex-XII**)
- Ten (10) travel grants were provided to the Ph.D scholars and PSF registered Society Members for their participation in International Science Conferences/ Seminars / Workshops and Training Abroad.
- Four (04) events physically monitored by PSF staff.
- Advertisement for the registration of new societies as well as for the travel grant were published in the national dailies

II) Competitive Research Programme

The PSDP Competitive Research Programme (CRP) was awarded to Pakistan Science Foundation to finance research projects under four streams viz., Individual Research, Consortium Research, Triple Helix Model and International Linkages.

This project was approved by CDWP in its meeting held on December 04, 2017 and the authorization was issued by the Ministry of Planning, Development and Reforms (MoPDR) vide Office Memorandum No. 27(186) PIA-IV/PD/2017 dated March 06, 2018. The administrative approval from Ministry of Science & Technology (MoST) was received vide F.No. 4(66)/2017-DEA (P&D) dated June 20, 2018 at a total cost of Rs. 1964.500 Million. The project was revised on 24th September 2021 without any change in its cost for extended period of implementation up to 30th June 2026.

Project Objectives:

The main objectives of the project are:

- i. Provision of the Research Grants to address the mega national issues and promote world class research.
- ii. Development of the new processes/ products/ applications/ technologies through native knowledge / skills of the researchers working in the universities and R&D Institutions.
- iii. Multi-disciplinary Research on the mega issues of National importance through provision of Consortium Research Grants.
- iv. Collaborative projects with the established International Partners for Indigenous Technology Development particularly for substitution of imports.
- v. Public-Private collaborations by providing strong platform to R&D institutions to liaise with Industry and Academia for the improvement and commercialization of their end-products so as to enhance the exports.
- vi. Technological transformations in the specified thrust / priority areas to boost the economy that may result in the generation of S&T Human resource as well as financial capital.
- vii. Promotion of demand-driven research by linking public sector capability and private sector marketability.
- viii. Capacity building trainings for the project staff (National) and Project Formulation Workshops for the researchers.

Achievements:

- A total of **31** new projects were initiated amounting **Rs. 130.995 million** on account of first instalment while **Rs. 19.57 million** were released on account of **27** ongoing projects.
- During the report period **7** meetings of Scrutiny Committee, **7** meetings of Technical Committee, **2** meetings of Project Award Committee and **01** meeting of Steering Committee) was held for review and award of the research projects/grants.

Call Title	Year	No. of Concept Proposal Received	Recommended by Scrutiny Committee	Peer Review	Recommended by Technical Committee	Approved by Project Award Committee	Approved by Steering Committee
6th Call for Concept Proposals Addressing Energy Crisis in Pakistan through Research and Innovation	2022	430	78	74	11	6 projects	-
7th Call for Concept Proposals in the areas of Nanotechnology, Materials	2023	964	42 out of 286 from AI 48 out of 292 from Materials	38	-	-	-

and Artificial Intelligence							
-----------------------------	--	--	--	--	--	--	--

- The **6th Call** was launched in August 2022 to address Energy Crises in Pakistan through Research and Innovation. Under the said call a total of **430** concept proposals were received and scrutinized by relevant committees, as per provision of the PC-I.
- The **7th Call** was launched in February 2023 in the areas of Nanotechnology, Materials and Artificial Intelligence. Under the said call a total of **964** concept proposals were received and scrutinized by relevant committees, as per provision of the PC-I.
- Three-days training workshop on “Project Management and Monitoring & Evaluation” was arranged at PASTIC for the capacity building of project staff.

Onsite monitoring of 22 ongoing research projects has been conducted to review the progress of the research projects.

Summary of Concept proposals received & processed under 6th and 7th CRP call

Sr.#	Particulars	Meetings Conducted
1.	Scrutiny Committees	7
2.	Technical Committees	7
3.	Project Award Committees	2
4.	Steering Committees	1

III) SCIENCE TALENT FARMING SCHEME (STFS)

Brief Progress of the STFS Project

Development project “Science Talent Farming Scheme (STFS) for Young Students, Phase-I, Component-I (Revised)” was conceived by the Pakistan Science Foundation (PSF). The original PC-I was approved by the CDWP in June 2015, however the PC-I was revised and approved by the CDWP on July 6, 2017 at a total cost of Rs.1,285.361 million for a period of 5 years (December 2015 – December 2020). The project revised at total cost of Rs.1517.071 million by DDWP forum on 14.01.2022 till 30.06.2025 with some changes in scope of the project.

Objectives of the Project:

- To support and groom the talented but less privileged science students from government schools, in their studies and groom them to become productive scientists.
- To groom and support the selected students by progressively exposing them to advancements in science and mathematics through inquiry based learning approach.
- To arrange training sessions for students on Inquiry Based Science Education (IBSE).
- Promotion/Popularization of S&T through different platforms including but not limited to social, print and digital media for teenagers, young adults and specifically out of school children.
- To establish a database/tracking system of all the beneficiary students of the project.

Implementation Strategy

The project objectives are achieved through the following processes and activities:

- Selection of 500 students, each year, through evaluation by a specialized testing agency
- e.g. NTS, CTS etc. Scientific aptitude test is conducted in 03 phases:
- Specialized written/screening test
- Paper Based IQ Test
- Presentation on innovative ideas/Interview
- Scholarships @Rs.15,000/- per month to each successful student for 02 years. For disable students the Scholarship is @18,000/- per month
- Tuition fee @Rs.10,000/- per year for each student
- Additional interventions and activities mainly include (but not limited to) the following:
- Research projects are developed by each student every year, duly supervised by a university teacher/researcher. Science graduates also provide guidance to the students
- Science lectures, Presentations, Film/ Planetarium Shows and Hands on activities through Mobile Science Labs
- Visits to universities and S&T organizations
- Participation in Summer Colleges and National Youth Science Forums
- Computer/android based learning through laptops/tablets.
- Online meetings and Interaction with eminent scientists through Mobile Science Labs

Budgetary allocation for the initiatives, programmes or projects undertaken

- Fund allocation for Year 2022-23: 300.00
- Revised allocation million
- Expenditure incurred:

120.00

million

119.690

Information on progress of the project

- Cumulative Physical Progress: 75%
- Cumulative financial Progress: 47%

Details of activities, achievements and progress till the preceding financial year (2022-23)

Targets (Out Puts):

- Monetary benefits to 5 batches completed (total 1500 students)
- STFS 6th batch (500 students) has been provisionally selected.
- Complete Monetary Benefits to 233 students of STFS 6th batch have been paid amounting to Rs.88.54 million in June.
- For arrangement of Summer Camp/Local Study Visit of STFS 6th batch, financial bids have been invited from the pre-qualified tour operators. Advertisement has been floated in the daily newspapers for hiring of testing agency for selection of STFS 7th batch.
- International study visits of STFS 1st and 2nd batch were arranged in 2016 and 2017 respectively. The activity was deleted from the revised PC-I of the project.
- Laptops/internet connectivity devices were distributed among 1st and 2nd batch students. The activity was deleted in the revised PC-I of the project.
- As per revised PC-I, six new universities have been selected for undertaking research activities of STFS students. Financial assistance amounting to Rs.3.645 has been paid to four universities for provision of lab facilities to STFS students to undertake research activities. In total 350 posters/ research reports from 5 batches have been received.

Outcome/Impacts:

- The project outcomes are;
- Scholarship to 3000 students in total.
- The project outcomes is to develop inquiry and critical thinking in the young generation,

who will become future scientists and researchers. This will also provide a way to avert the extremism, which is based on blind dogma and creed.

- Direct Employment as per revised PC-I

IV. LAUNCHING OF STEM IN PAKISTAN, PHASE-I (REVISED)

The "Launching of STEM in Pakistan, Phase-I (Revised)" project, initiated by the Pakistan Science Foundation (PSF) under the Ministry of Science and Technology, seeks to revolutionize Science, Technology, Engineering, and Mathematics (STEM) education across Pakistan. The project began with a pilot phase targeting 50 Higher Secondary Schools (including 6 Cadet Colleges), 3 R&D organizations and 5 universities, with an emphasis on transforming traditional science classrooms into innovative STEM environments. The project is focused on enhancing capacity of public sector schools by establishing STEM-FAB labs and teacher training programs on modern teaching techniques mainly teaching of science subjects in an integrated and interdisciplinary way. In connection China Association for Science and Technology (CAST) will provide assistance and training material to undertake the activities of this novel STEM project.

1. Project Overview & Objectives

The project's objectives include:

- To introduce STEM as a modern educational tool in 50 Higher Secondary Schools (HSS), 6 Cadet Colleges, and 5 universities across Pakistan.
- To coordinate national and international capacity-building programs for science teachers, empowering them with contemporary STEM teaching methodologies.
- To facilitate the development and adoption of modern pedagogical frameworks such as Inquiry-Based Science Education (IBSE) and LAMAP.
- To equip students with the skills and mindset to become job creators rather than job seekers, fostering entrepreneurship and innovation.

2. Achievements

Following achievements have been made during FY-2022-23 under the STEM Project:

- 56 Million has been released to 48 HHSs/Cadet colleges and 8 Higher Institutions (1 million to each institution) on the account of Enabling the FABLAB. The enabling process in designated institutions has started.
- The Tender for the Development of Training Modules on STEM Education has been finalized and first draft of 230 Modules has been prepared.
- Nominations of 15 reviewers from Federal College of Education and Federal Directorate of Education have been received and finalized.
- Tender for the Establishment of FABLAB has been opened and Pre-Qualification is completed. The tender will be awarded as soon as the exemption from Austerity Measures is conveyed.
- Tender for the Establishment of STEM PSF Academy/PMU has completed. The work has been completed in the basement of PSF. The STEM Project Management Unit (PMU) and Pilot Academy have been established at PSF.
- The Project Staff has been recruited in April 2023.
- A MoU has been signed with the Children and Youth Science Center (CYSC) of CAST China in January 2023 to provide assistance and training material to undertake the activities of this novel STEM project. CYSC shared 30 STEM modules which will serve as reference for local development of STEM modules of international standard.
- 40 Master trainers have been trained which will play role in the capacity building of STEM designated teachers in coming years.
- The selection process for STEM teachers was completed with four teachers chosen from each designated STEM school.
- STEM Staff has developed approximately 200 prototype STEM kits from low cost materials at STEM PSF academy.
- Activities videos of modules are in the process of development.

3. Benefits on completion of STEM project

The project will develop entrepreneurship skills, cognitive skills and critical thinking among the young generation, which will change their mindset. Major outcomes include;

- Transformation of Science Labs into 57 Mini/High STEM FABLABs on the pattern of internationally acclaimed Digital Fabrication Labs in 50 Higher Secondary Schools/ 6 Cadet Colleges/5 Universities & 2 research/Science Centers.

- Provision of a Pool of 200 STEM Experts (teachers) for implementation of STEM in designated Schools/Cadet Colleges/Universities.
- Provision of STEM Activity Reference Books/Working Models (Kits) for guidance and assisting of teachers for teaching of STEM.
- Provision of an online Learning Management System (LMS) for learning/ assistance of teachers/students on STEM Activities through online videos, lectures, documentaries, projects, simulations, assessments, articles.

The above mentioned interventions will equip the youth with 21st century skills including curiosity, critical thinking, informed decision making, creativity, innovation and entrepreneurship which will change the youth mindset and also help avert extremism.

V. Development of National Digital Archive of Research published in Pakistani Journals

As per mandate, abstracting and Indexing of scientific material published in Pakistani journals are being carried out by PASTIC (Hard Copy/online Database) since its inception (1957). Looking onto the dire need of scientific community to access indigenous scientific knowledge through single online forum and to fill the research gap in line with the national needs, PASTIC has taken the initiative to collect, preserve and disseminate indigenous research published in S&T Journals through development of national digital repository.

Objectives:

Development of National Digital Repository of Pakistani S&T Journals through ICT's infrastructure expansion

Development of National Consortium of publishers of Pakistani S&T Journals

Online federated search of digital repository of S&T Journal's.

Capacity building of publisher's/researchers toward software application utilization.

Achievements:

During the FY 2022-23, following activities were undertaken:

Project/Consortium website <http://nda.pastic.gov.pk/> has been updated.

- Project funds allocated for the financial year 22-23 have been fully utilized as per allocation.
- 17 new Scientific Research Journals of Pakistan got registered to the project consortium.

- Contract agreement was made with Mercurial Minds (Private) Limited (MM) for software development, integration and cloud services was signed on May 8, 2023 at Pakistan Science Foundation (PSF).
- Four (4) Project awareness/Consortium launching activities and one Training workshop on Open Journal System (OJS) for Scientific Journal Publishers of Pakistan were organized in different regions of the country (Details are provided in the following table).

Name of Activity	Location	Date	No. of participants
Project Consortium/ Awareness Activity	Bahawalpur	20-Sep-22	60
	Quetta	09-Mar-23	81
	Gilgit	26-May-23	50
	Skardu	29-May-23	50
OJS Training Workshop	Peshawar	17-Jun-23	80
Total participants			321

Travel Grants Under Non-Development Budget

- The main objective of the programme is to provide financial assistance to Pakistani scientists, technologists, doctors and engineers working in R&D organizations and educational institutions for their active participation and presentation of research papers in international conferences, seminars & workshops abroad; attending short term specialized training course; and undertaking part of research work for which facilities are not available in Pakistan,
- During the year 2022-23, an amount of Rs.**4.481** million were allocated / released and spent mainly for provision of travel grants to scientists/technologists/ other heads of the project. A total of **93** requests were received from scientists and technologists of the country. After comprehensive scrutiny as per eligibility criteria **89** requests were

presented in **07** meetings of Travel Grant Award Committee (TGAC). Out of the **89** requests presented to the TGAC, **23** were recommended whereas **20** scientists/technologists availed the grant and **03** could not proceed abroad due to visa problems and other reasons. However, **66** requests were not recommended by the Committee due to eligibilities short coming and funds constrain. TGAC recommended three **05** cases from NSLP funds of an amount of **1.93** million. However, six (06) requests from FY 2021-22 were funded in FY 2022-23. (**Annex-xii**).

Travel Grants under PSDP Project “Financial Support to Scientific Societies in Pakistan (Phase-II)”

- ✓ PSF provides financial support to PhD Scholars and Members of PSF registered Scientific Societies for presentation of their research papers in International science conferences, seminars and for undertaking short term specialized research work/trainings in advanced laboratories abroad, for which facilities are not available within the country.
- ✓ During the year 2022-23, PSF published advertisement in six National Newspapers for participation of PhD Scholar and members of PSF Registered Scientific Societies in International Conferences, Seminars and Trainings. In this regard, 23 requests were received from Ph.D Scholars and Society Members. After comprehensive scrutiny as per eligibility criteria **19** requests were presented in **08** meetings of Travel Grant Award Committee (TGAC). The TGAC recommended 13 cases for an amount of Rs.**2.631** million whereas 10 applicants were availed the grant and **02** could not proceed abroad due to visa problems and other reasons.

TRAVEL GRANTS AVAILED UNDER DEVELOPMENT BUDGET IN FY 2022-23

. No	Name/Institution	Amount Released
1.	Dr. Rana Manzoor Ahmad University of Okara, Okara	386,172
2.	Mr. Mohammad Waqas MUET, Jamshoro, Sindh	190,000
3.	Mr. Ans Ahmed Memon	190,000

	MUET, Jamshoro, Sindh	
4.	Dr. Samiullah Khan QAU, Islamabad	246,227
5.	Dr. Niaz Ahmad Pakistan Nuclear Society Islamabad	120,000
6.	Ms. Asia Noureen IIU, Islamabad	409,584
7.	Raja Muhammad Waseem Ullah Khan National Textile University, Faisalabad	500,000
8.	Dr Wajid Nasim Jatoi University of Bahawalpur (IUB), Bahawalpur	181,000
9.	Prof. Dr. Muhammad Ishtiaq Ali QAU, Islamabad	155,560
10.	Ms. Amina Najam NIH, Islamabad	252,457
Total		2,631,000

5. PAK-US Natural Science Linkage Programme (NSLP) Endowment Fund

Natural Sciences Linkage Programme (NSLP) Endowment Fund is an important component of Pakistan Science Foundation (PSF) which is aimed at enhancement of agricultural production through effective research. The outcome of this research will benefit the end user by uplifting the life standard and income of the farmers. The Fund is being managed by PSF through Board of Governors (BoG) and Fund Management Committee (FMC). The Chairman, PSF is the Chief Executive of the Programme/Fund.

Aims and Objectives:

- To enhance cooperation among scientists from Pakistan and the United States of America, in areas of significant mutual interest and benefit relating to natural sciences as applicable to agriculture.
- To increase the contact and collaboration among scientists and institutions of biological research, development and higher learning institutes between the two nations.
- To provide researchers and institutions with opportunities to exchange information, ideas, skills and techniques.
- To enhance opportunities to collaborate in solving problems of common interest relating to natural sciences and to utilize special research and development facilities or opportunities available.
- To identify the researchable areas in natural sciences especially agricultural sciences with aim to increase farmers profitability

Research Priority Areas:

Selected priority areas for collaboration may include, but are not limited to; Collection, Evaluation and Exchange of Germplasm, Plant Genomics, Plant Biotechnology, Stress Biology, Bio-Informatics, Application of Information Technology in Agriculture, Identification and Control of Animal/Plant Diseases, Dryland/Sustainable Agricultural Production System; Integrated Pest and Disease Management, Biotechnology, Microbiology, Agribusiness Development, Biophysics, Chemistry, Environment, Energy, Water Resource Management and Climate Change particularly with reference to Agriculture.

Project proposals which highlight main problems of agricultural sector are invited from universities and R&D organizations across the country. Research work is emphasized on the food production & food security issues in Pakistani scenario. Currently 248 projects are being funded in different Universities and R&D organizations around the country under this programme.

Projects are received from researchers throughout the year; they undergo scrutiny and peer review before presenting to the Technical Committee, which comprises of eminent scientists from different specialized areas of agriculture and natural sciences. The target areas of these projects include germplasm screening of different crops, insect and pest management for the disease free crop production, nutrition management of crops and post-harvest technology. All these research issues are vital component of today's agriculture and are imperative in bringing the value added products in the market. Apart from this, many projects from specialized fields of animal sciences are also being funded. These projects include research in genetic screening of different animal breeds, feed technology and milk quality areas. In future, the fund aims to maintain focus on applied research projects related to Energy, Water resources management, Environment and Climate Change.

ACTIVITIES AND PROGRAMMES

i. Research Funding

Research funding is the principal activity of Natural Sciences Linkage Programme (NSLP) efforts are being made to establish linkages between end-users and scientists of different R&D organizations and Universities throughout the country. Projects of applied nature are selected for funding and research proposals received undergo the strict process of scrutiny before the funding. The criteria include the competence of the scientific personnel to carry out the research, institutional capabilities i.e availability of the basic equipment and laboratory facilities, scientific merit of the proposed research proposals and likelihood of completion of proposed research work within the stipulated time and funds requested. The proposals are reviewed by two Pakistani experts along with US experts. The proposals recommended by experts are placed in the relevant subject Technical Committee for technical evaluation and recommendation. Technical Committee on NSLP comprises of the renowned scientists from various fields of agriculture and natural sciences. The proposals recommended by the Technical Committee are then submitted

to NSLP Fund Management Committee (FMC) for administrative and budgetary approval, before the release of funds.

a) Under process Projects

During the report period, 170 concept papers remained under consideration of the NSLP. Out of these concept papers, 49 projects were presented in four Technical Committee meeting held during the report period. Technical Committee recommended 32 new projects for funding at total cost of Rs.136.968 million. List of projects recommended for funding during the report period is given in *ANNEXURE XIII*

b) On-going Projects

During the year, there were seventy (116) ongoing research projects and (71) progress reports of projects (semiannual, 1st and 2nd annual & final reports) were received. The NSLP staff scrutinized the semiannual reports before releasing of next due installment. Whereas, annual and final reports after initial scrutiny by NSLP team were sent for evaluation to the subject experts to assess the interim progress of the projects before next due installment was released. It is worth mentioning that due installment of the on-going projects are released only if the interim progress of the projects at the end of each year is rated as satisfactory by the subject expert. An amount of Rs.21.710 million was released on account of due installments of on-going projects. A list of semiannual, annual and final reports is given in *Annexure XIX*.

c) Completed Projects

During the year eleven (08) projects were completed. The subject experts evaluated the final technical reports of the projects which were subsequently placed before the Technical Committee for adoption. The accounts of these projects have been settled. Details of the projects along with the scientific output are given below.

Project No	PSF/NSLP/S-KU (692)
Project Title	Preparation of Industrially Important Instant Starches (Cold Water Swell-able) and its Application in Food Products.
Duration	3-Years

Date of initiation	20.02.2019
Date of completion	19.02.2022
Final report received	17.05.2022
Final technical report was adopted in the Technical Committee meeting held on	24.08.2022
Location of project	Department of Food Science and Technology University of Karachi, Karachi.
Principal Investigator	Dr. Tahira Mohsin Ali Assistant Professor
Total Expenditure	Rs. 7,095,645/-
Main objectives	<ul style="list-style-type: none"> • The first objective will be to isolate a good quality pure starch from potato, sorghum and corn grains. • The second objective is to make instant starches using extrusion method (pilot scale) and alcoholic alkaline method (laboratory method). • Both sorghum and corn starches prepared by above mentioned will be compared in terms of functional, rheological, pasting, thermal and textural characteristics. Thus comparison will be both in terms of source of starch and in terms of method employed to make it cold water soluble. • The starches will be chemically modified by using different methods like esterification, etherification and crosslinking. • The chemically modified starches will be converted to instant starches using extrusion and alcoholic alkaline method. • The chemically modified instant starches will be compared in terms of functional characteristics. • The chemically modified starches will be then utilized in different food products like cheese, sauces and biodegradable films.

Project No	PSF/NSLP/P-UVAS (747)
Project Title	Potential of Hen Egg White Lysozyme (Ec 3.2.1.17; Muramidase) as A Natural Antimicrobial and Antioxidant in Controlling Microbial Growth and Oxidation in Mozzarella Cheese.
Duration	1-Year
Date of initiation	01.03.2021
Date of completion	28.02.2022
Final report received	19.04.2022
Final technical report adopted in the Technical Committee meeting was held on	24.08.2022
Location of project	Department of Dairy Technology, University of Veterinary and Animal Sciences, Lahore
Principal Investigator	Dr. Nabila Gulzar Assistant Professor
Total Expenditure	Rs.1,631,608 /-
Main objectives	<ul style="list-style-type: none"> • Use of natural antimicrobial to inhibit the growth of microbes in cheese • Use of natural binder of “Reactive Oxygen Species” that increase the oxidative stress • Increase the shelf life of Mozzarella cheese • Development of bioactive cheese

Project No	PSF/NSLP/C-PCRWR(888)
Project Title	Rainwater harvesting to improve groundwater storage and quality in saline and water scarce environment.
Duration	1-Year

Date of initiation	17.06.2020
Date of completion	16.06.2021
Final report received	20.12.2021
Final technical report was adopted in the Technical Committee meeting held on	24.08.2022
Location of project	Pakistan Council of Research in Water Resources (PCRWR) Lahore
Principal Investigator	Mr. Zamir Ahmad Soomro Regional Director,
Total Expenditure	Rs. 6,687,200/-
Main objectives	<ul style="list-style-type: none"> • Development of rainwater harvesting techniques on pilot scale for beneficial use and disaster risk reduction. • Prospects of promoting saline agriculture to provide agriculture livelihood opportunities for the local community. • Development of guidelines and adoption strategy for large scale implementations of groundwater recharge activities for replenish of groundwater recharge in critical areas of the province

Project No	PSF/NSLP/KP-AU (647)
Project Title	Development of simple photo-bioreactor for quality algal biomass and oil Production
Duration	03-Years
Date of initiation	25-04-2017
Date of completion	24-06-2021 (12 months no cost extension)
Final report received	08-02-2022
Final technical report was adopted in the Technical Committee meeting held on	22.11.2022
Location of project	The University of Agriculture, Peshawar

Principal Investigator	Dr. Saleem Ullah Associate professor Department of Agricultural Chemistry
Total Expenditure	Rs.3,715,911/-
Main objectives	<ul style="list-style-type: none"> • To develop a simple photo bioreactor for biomass production of already identified algal species. • To enhance algal biomass and oil production through nutrients management in the photo bioreactor • To economize the process through physical changes in the photo bioreactor and nutrient media • To produce biomass, oil and FAME on commercial scale using known methods with slight modification

Project No	PSF/NSLP/P-UVAS(701)
Project Title	Isolation, Molecular Characterization of Pathogenic Bacteria and Development of Fish Vaccine for Culturable Fish Species of Pakistan
Duration	03-Years
Date of initiation	02.07.2018
Date of completion	01.07.2021
Final report received	14.09.2022
Final technical report was adopted in the Technical Committee meeting held on	22.11.2022
Location of project	Department of Fisheries and Aquaculture, University of Veterinary and Animal Sciences, Lahore
Principal Investigator	Dr. Muhammad Hafeez-ur-Rehman Assistant Professor

Total Expenditure	Rs.2,175,228 /-
Main objectives	<ul style="list-style-type: none"> • Isolation, identification, molecular and biochemical characterization of pathogenic bacteria (<i>Aeromonas hydrophila</i> and <i>Aeromonas salmonicida</i>) that cause freshwater fish disease. • The development of fish vaccines for the fish producers to improve the fish health, welfare, production of fish in a cost-effective way and prevent from fish zoonosis. • To evaluate the efficacy and immunogenicity of vaccine and its ability to protect against (<i>Aeromonas hydrophila</i> and <i>Aeromonas salmonicida</i>) infection in fish ponds and develop methods to administer fish vaccines by dip, immersion or oral delivery • The ultimate successful outcome of fish vaccine through research and development is the generation of a preventive product that will be available in the market place and will be used in the field to achieve pet outcomes. Successful development of fish vaccines against bacterial pathogen, will lead to the field for adaptation of novel technologies and application. The major impact of development of fish vaccine is not only on the fish health, enhancement of fish production but also on health of humans by enhancing safe and hygienic food supplies and preventing infectious diseases transmission from fish-to-human (fish zoonosis).

Project No	PSF/NSLP/C-QU (568)
Project Title	Isolation of Brucella Species from Cattle and Buffaloes and Construction of a Gene Knock out Vaccine against Bovine Brucellosis

Duration	03-Years
Date of initiation	15.12.2016
Date of completion	14-12-2020 (One Year no-cost extension)
Final report received	02-11-2022
Final technical report was adopted in the Technical Committee meeting held on	22.02.2023
Location of project	Department of Animal Sciences, Quaid-I-Azam University, Islamabad
Principal Investigator	Dr. Saeed ul Hassan Khan Assistant Professor
Total Expenditure	Rs.6,746,673/-
Main objectives	<ul style="list-style-type: none"> • To isolate Brucella (<i>B. abortus</i> and <i>B. melitensis</i>) strains prevalent in cattle and buffaloes in Pakistan using microbiological techniques and to identify these strains at the genus and species level using biochemical and molecular techniques. • To construct a gene-deletion (Δpgk) mutant of <i>B. abortus</i> (and also of <i>B. melitensis</i>, if isolated) using the most prevalent local strain of Brucella by plasmid mediated homologous recombination. • To test the potential of the gene-deletion mutant as a candidate vaccine by comparison of its immunogenicity with that of a reference vaccine (S19) in mice. • To test the immunogenicity of the vaccine in experimental cattle/buffaloes after successful trials in mice.

Project No	PSF/NSLP/P-NIAB(658)
Project Title	Control of Excessive Fruit Drop in Citrus and Improvement in Yield and Quality through Plant Nutrients and Growth Regulators Management
Duration	03-Years

Date of initiation	10-01-2017
Date of completion	09-07-2021 (07 months no cost extension)
Final report received	14-11-2022
Final technical report was adopted in the Technical Committee meeting held on	22.02.2023
Location of project	Department of Animal Sciences, Quaid-I-Azam University, Islamabad
Principal Investigator	Dr. Muhammad Saleem Principal Scientist Nuclear Institute for Agriculture and Biology (NIAB), Faisalabad
Total Expenditure	Rs.4,024,450/-
Main objectives	<ul style="list-style-type: none"> • Development of technology, based on nutrients, PGRs and insect/pest management effective in reducing fruit drop and improving the fruit set percentage. • Identification of biotic factors responsible for fruit drop and its remedy. • Devise formulation rates and time of application of nutrients alone, and combinations of nutrients, PGRs/ insecticides/pesticides to reduce heavy fruit drop and to improve fruit set percentage, fruit yield and quality

Project No	PSF/NSLP/C-IIU(683)
Project Title	Development of Edible Vaccine Against Mastitis in Livestock by Transgenic Forage Grass
Duration	03-Years
Date of initiation	10-09-2017
Date of completion	09-09-2021 (07 months no cost extension)
Final report received	01-02-2023

Final technical report was adopted in the Technical Committee meeting held on	17.05.2023
Location of project	Department of Bioinformatics and Biotech International Islamic University, Islamabad
Principal Investigator	Dr. Nyla Jabeen Assistant Professor,
Total Expenditure	Rs.3,317,812/-
Main objectives	<ul style="list-style-type: none"> • To develop a protocol for introduction of antigen against livestock mastitis in the grass • To develop a protocol for the regeneration of transgenic plants • Introduction of plants having transgene in to fields • The transgenic grass will be provided to farmers to use as the forage grass

iii. Scientific Publications and Patents Produced through PSF Funded Projects

One of the main achievements and usefulness of any research is the publication or patents of its results in scientific journals. Based upon the results of research projects nine (10) research papers were published in peer review journals the details of which are given at **Annexure XV**.

iv. Project Formulation Workshops

A total of four (04) Project Formulation Workshop was organized to enhance the capacity of the researchers for writing project proposals. The workshop were organized at the Pakistan Museum of Natural History, Islamabad, Shah Abdul Latif University, Khairpur, FC College University, Lahore and University of Baltistan, Skardu.

The workshop enabled and trained 212 researchers and Scientists in preparing fund wining project proposals.

v. Meetings of Fund Management Committee of NSLP

During the year two (04) meeting of the Fund Management Committee (FMC) were held on 30.08.2022, 15.12.2022, 12.05.2023 and 16.06.2023, respectively to review the financial matters of NSLP. The meeting was chaired by the Chairman, PSF/Chief Executive, NSLP and attended by members of the Fund Management Committee. The FMC approved budgets of 32 new projects

of worth Rs.136.968 Million, recommended by the NSLP Technical Committee. An amount of Rs.21.710 million was released to these new projects on account of 1st installment. List of projects recommended for funding during the report period is given in **Annexure XVI**.

VI. Meetings of Technical Committee of NSLP

During the year 2022-23 four (04) meeting of the Technical Committee (TC) were held on 24.08.2022, 22.11.2022, 22.02.2023 and 17.05.2023, respectively to technically evaluate the projects to be funded. The meetings were chaired by the Chairman, PSF/Chief Executive, NSLP and attended by the renowned scientists related to agriculture and natural sciences. A total of 49 new projects were presented to the Technical Committees out of which 32 projects were recommended for funding.

II. PAKISTAN SCIENTIFIC AND TECHNOLOGICAL INFORMATION CENTRE (PASTIC)

Pakistan Scientific and Technological Information Center (PASTIC) is the premier organization for dissemination of Scientific and Technological Information to the Scientists, Researchers, Engineers, Entrepreneurs, Industry and Citizens of Pakistan. PASTIC National Center is located at Quaid-i-Azam University Campus, Islamabad. It has six Sub Centers throughout Pakistan including Karachi, Lahore, Peshawar, Quetta, Faisalabad and Muzaffarabad. The main objective of PASTIC is to acquire, process and disseminate information in all S&T disciplines. PASTIC's services include Bibliographic & Document Supply Service, Abstracting and Indexing Service, National Science Reference Library, Reprographic Services, Technology Information Services, Awareness and Promotion of PASTIC Services, Capacity/skill development of researchers & entrepreneurs and International Liaison.

Major achievements and initiatives taken during 2022-23 are summarized below:

- **Bibliographic & Document Supply Service:** 18031 S&T documents and 1256 bibliographies in digital form were supplied to 1066 R&D workers.
- **Abstracting and Indexing service:** 11107 records were abstracted and indexed into the database of Pakistan Science Abstracts (PSA).
- **National Science Reference Library:** 3435 users visited PASTIC library for getting references, reading, photocopying, internet browsing and web searching. Besides, the library received 145 issues of national and international journals in exchange and on gratis basis. 12 issues of Fresh Arrivals of PASTIC library published online as well as in print form and distributed among the members.
- **Reprographic Services:** 51 printing jobs from 11 R&D organizations were completed.
- **Technology Information Service:** Six (6) online issues of “Technology Roundup” a bimonthly Trade and Technology news e-bulletin were published. 02 Workshops under UIP (University Industry Partnership) and 5 Seminars/workshops on IPR (Intellectual Property Rights) and Digital Marketing were organized.
- **Awareness and Promotion of PASTIC Services:** 53 awareness seminars including 13 stalls at various departments of universities across the country through sub-centers were organized.
- **Capacity/skill Development of researchers:** 23 workshops and 18 webinars/seminars on various research related themes such as data analysis (SPSS, R), Literature Search,

Research Methodology and Research Proposal/Paper Writing and Reference Management (Mendeley, EndNote, Zotero) have been organized. PASTIC also collaborated with Academia for organizing of 7 Conferences.

- **International Liaison:** PASTIC has been designated as National Focal Point of UNESCO IFAP National Committee (UNESCO Information for All Programme IFAP).

During the year, a total number of 4600 users/researchers have been served through various PASTIC S&T Information services while 4390 researchers were trained.

1. Introduction

PASTIC is an ISO 9001: 2000 Certified S&T Information Provider and is the oldest organization in the field of S&T information management and dissemination serving as a gateway for access to and delivery of global S&T information. It caters to the information needs of the researchers in all areas of Science and Technology as well as social sciences. Users of PASTIC services include researchers, academicians, scientists, engineers, entrepreneurs & the industry.

PASTIC National Centre is housed in its own building at Quaid-i-Azam University Campus, Islamabad with comprehensive information resources in different fields of Science and Technology. Its six Sub-Centres are working in different cities viz. Karachi, Lahore, Peshawar, Quetta, Faisalabad and Muzaffarabad; all have access to global information resources for dissemination of information to their users. The total sanctioned strength of PASTIC National Centre and its 6 sub-centers including Scientific, Technical and Administrative Staff is 164.

2. Pastic Objectives

Development of a National S&T/R&D Information Repository of indigenous information resources (databases)

S&T/R&D information dissemination through contemporary reference information tools

Strengthen National Science Reference Library for resource sharing & Inter-library collaborations (consortium) and empowerment of information professionals.

Promotion of R&D based industrial development

Facilitate printing of S&T/R&D Publications

Capacity/skill development of researchers & entrepreneurs

Develop collaborations with national and international information networks

3. Activities and Services

PASTIC is a national multidisciplinary S&T Information Centre. It procures, processes and preserves national scientific, technological and industrial information for catering to the S&T information needs of R&D and industrial community through anticipatory and responsive Information Services leading to sustainable socio-economic development in the country.

The Services provided and activities undertaken during the period, July 2022 to June 2023 are described below:

3.1 Bibliographic Information & Document Supply Service

This service promotes local Research and Development (R&D) among young scientists/researchers/engineers, technologists, faculty members, R&D workers and & industry people. Under this service, copies of Research Articles (Abstracts/Full text) Reports, Conference Papers, Books or Book-chapters, etc., published locally or abroad are provided free of cost and within no time to the clients. Documents and bibliographies are supplied through email service for quick delivery and minimizing delays.

For acquisition of documents from within the country, the Union Catalogue of the S&T libraries of Pakistan compiled by PASTIC, resources of LEJ-HEJ and HEC are mainly used.

PASTIC has access to digital resources such as:

A. LEJ Resources, Karachi (Under MoU)

- Institute of Electrical and Electronics Engineers (IEEE)
- American Chemical Society (ACS)
- Nature Publishing
- JSTOR
- SpringerLink
- Research gate

B. HEC licensed databases

PASTIC has also access to HEC subscribed databases through VPN which are as under:

- Tayler & Francis
- Science Direct
- JSTOR
- Springer link
- Wiley online Library
- IEEE

Under the Bibliographic Information & Document Supply Service, 18031 S&T documents and 1256 bibliographies in digital form were supplied to 1066 users belonging to R&D Organizations, Universities, Professional Colleges, Hospitals & Industry upon their request during the reporting period.

3.2 Abstracting and Indexing Service

Pakistan Science Abstracts (PSA)

PASTIC has been providing abstracting and indexing service by compiling abstracts of research articles published in Pakistani Journals and Conference proceedings under the title of “Pakistan Science Abstracts” in different scientific disciplines, which serves as a secondary information resource to give support to research and development activities in the country. This service is being provided through an online database application with an efficient searching facility.

During the period 2022-23, Bibliographic data of 11107 abstracts were entered into the database of Pakistan Science Abstracts.

PUBLICATIONS

PASTIC supports printing of abstract books of the national or international conferences organized by the renowned national S& T or R& D institutes/ HEIs. During the reporting period seven (07) Abstract Books along with one (01) Book was published as follows:

- Abstract Book of “*International Food & Nutrition Conference*” organized by Institute of Food Science and Nutrition, University of Swat, Swat on August 18-20, 2022.
- Abstract Book of “*First International Conference on Revamped Scientific Outlook of the 21st Century*” organized by Rawalpindi Women University, Rawalpindi on October 12, 2022.
- Abstract Book of “*Sixth International Conference on Sustainability in Process Industries (SPI 2022)*” organized by UET, Peshawar and GIKI, Swabi on October 19-20, 2022.
- Abstract Book of “*Global Science, Technology & Management Conference (GSTM-23)*” organized by Islamia University, Bahawalpur on February 9-11, 2023.

- Abstract Book of the “*Second International Industrial Chemistry Conference (IICC 23)*” was organized by Department of Chemistry, NED University of Engineering and Technology, Karachi on March 3-4, 2023.
- Abstract Book of “*Second International Conference on Recent Approaches in Plant Sciences (RAPS-23)*” organized by Department of Botany, Division of Science and Technology, University of Education, Lahore on May 4-5, 2023.
- Abstract Book of “*International Conference on Life Sciences (ICLS-23)*” organized by Gomal University, Dera Ismail Khan on May 11-12, 2023.
- A Book titled “*In Quest of Knowledge*” was published in 2022-23”.

3.3 Technology Information Service (TIS)

This service is focused on dissemination of Technological Information Services to Academia/R&D community, Engineers, Entrepreneurs, SMEs, Industrialists and various Government entities. To promote R&D based industrial development in the country, this service undertakes following activities:

- Develop collaborations with Chambers of Commerce and Industry (CCIs) across Pakistan to promote local industry, small manufacturing enterprises (SMEs), their products/services and challenges/issues by developing different indigenous industrial databases available on PASTIC Website (TIS-Databases) and Technology Roundup online bulletin (<http://www.pastic.gov.pk/technews.aspx>).
- Promote S&T/R&D organizations/academia and their commercializable technologies/research expertise and R&D projects in different industrial sectors by developing different *indigenous S&T/R&D databases* available on PASTIC Website (TIS Databases).
- Promote *University-Industry Partnership (UIP)* through seminars/workshops across Pakistan for "Building Effective Coordination between R&D & Industry for Enhancing Innovations Competitiveness and Productivity of Indigenous Technologies".
- Enhance Capacity building of scientists on *communication skills* and creating platforms between scientists and members of the media for promotion of scientific and technological innovation in the society.

- Organize *Technology & IT-Expos* across Pakistan for empowering youth and general public on new and faster ways of delivering and accessing information to improve their productivity in ICTs, education, health and other social services, banking, and government services, and create earning opportunities.
- Provide Technology and Innovation Support Services under Technology and Innovation Support Centre (TISC) Desks (in collaboration with HEC-IPO Pakistan & WIPO) at PASTIC National centre Islamabad as well as at its 06 sub-centres for guidance and support of the innovators on “*how to exploit their potential to create, protect, and manage their intellectual property rights(IPRs)*” by providing assistance in searching and retrieving technology information through patent database search; creating awareness of TISC program through trainings/seminars/library visitors/online queries etc.

Patent Information

During the reporting period 99 Clients were provided 4266 full text Patent and 204 Patent abstracts/other information through Offline/Online Patent Query Form at PASTIC website.

Technology Roundup

Six online issues of bimonthly Trade and Technology news bulletin titled “Technology Roundup” were made available on PASTIC website.

Training Workshops/Seminars Under TIS

- One Day Training Workshop on "Role of Social Media Tools for Digital Marketing in the Current Era" on February 8, 2023 at National Textile University Faisalabad by PASTIC Sub Centre, Faisalabad (80 participants)
- One Day Training Workshop on "Role of Social Media Tools for Digital Marketing in Future" on December 08, 22 at University of Punjab (PU), Lahore organized by PASTIC Sub Center, Lahore (53 participants)
- One Day Seminar on “Intellectual Property Rights (IPRs)” was jointly organized by PASTIC Sub Centre, Lahore, ORIC GCU, Lahore & IPO on September 22, 2022 at Government College University Lahore (57 participants)
- One Day Seminar on “Intellectual Property Rights (IPRs)” was organized on March 09, 2023 at CECOSE University, Peshawar organized by PASTIC Sub Center, Peshawar (69 participants)

- One Day Seminar on “Intellectual Property Rights (IPRs)” was organized on March 21, 2023 at Swabi University, Swabi organized by PASTIC Sub Center, Peshawar (51 participants)

Total no. of participants who benefited were 310.

TIS Databases

R&D Projects: 2221 new records have been entered into the database of R & D projects.

- National Scientists Directory (NSD): 3815 new records have been entered into the database of NSD.

3.4 PASTIC National Science Reference Library Service

The National Science Reference Library (NSRL) serves the information needs of the research scholars and others seeking scientific literature. PASTIC Library is equipped with both Print and Electronic information resources. It has a collection of more than 8000 books, 900 titles of journals and approximately 5025 miscellaneous documents such as reference material/secondary sources, government documents, conferences/seminars proceedings, etc. All newly acquired library items are assigned accession numbers, classified under DDC and then labelled with RFID tag, Library stickers and spine tags.

The library also organizes capacity building programs in the area of Library & Information Management, Library Automation, Digital Library, Soft Skills for Librarians, and Information Literacy, etc. Monthly Library bulletin “Fresh Arrivals” is published on regular basis and distributed among relevant circles, and uploaded on PASTIC website.

Main Services of Library

Reference & Referral Services

Reader Service

Journal Listings

Photocopying & Scanning Services

Free WIFI access

Acquisition of Library Material

145 Journal issues, 42 documents, 1 book & 20 newsletters were received from different national and international organizations.

Technical Processing

Labelling of Library materials with RFID tags remained in progress, during the reporting period 2250 books are labeled with tags.

Library Automation

Library automation is in progress using the international open-source library automation software i.e., Koha. During the reporting period, metadata of 2500 library items (Gift and donation including PASTIC Publications) are entered into the online system. Now total 10,000 library items are available in OPAC for search at <http://www.koha.pastic.gov.pk:5129/>

PASTIC Koha Cloud Service

PNSR library has successfully executed its PSDP project in 2020 under the title of “Modernization of PASTIC National Science Reference Library for effective Resource Sharing among S&T Libraries of Pakistan”. Under the said project PASTIC provides free of cost library automation software “PASTIC Koha Cloud” as a service to all Pakistani Libraries to ensure optimal and effective utilization of national library resources. In this connection, now 180 college and universities libraries are facilitated for automating their functions through PASTIC Koha cloud service however during the reporting period 80 new libraries have been added into the system.

Library Publication

12 issues of Fresh Arrival have been published during the reporting period. For details please visit at <http://www.pastic.gov.pk/fresharrivals.aspx>

Users Served by PNSR

3435 researchers visited PASTIC library for reference purpose, reading, photocopying and internet browsing.

3.5 Reprographic Service

PASTIC Reprographic Section has facilities for composing, designing, plate making, offset printing, and binding, etc., for books, Pamphlets, Brochures, Journals, Newsletters, Cards, and Folders etc. These facilities are not only used for printing of PASTIC publications but are also extended to all other S&T and R&D Organizations. The Unit is equipped with:

- Offset Printing Machines

- Printing Down Frame
- Cutting Machine
- Stitching Machine
- Creasing Machine
- Dark Room Camera
- Latest Computers/Printers

During the current fiscal year i.e., 2022-23, 51 printing jobs were carried out for 11 R&D organizations of the country.

3.6 IT Support Service

PASTIC has a well-equipped IT Section with a dedicated team of IT professionals working hard to develop and maintain PASTIC electronic resources for effective delivery of information services. PASTIC IT section also extended its technical expertise (on need basis) to PSF and PMNH toward ICT infrastructure development and application development activities

During the year 2022-23, following activities were undertaken by the IT team of PASTIC:

4. Website/Portal Development and Updation

Developed PSF Jobs/Career Portal for online Job application submission.

Developed PSF Research Grants Management System for online Management of Research Grants. (<https://rgms.psf.gov.pk/rgms/>)

Developed and updated PSF PSDP STEM project web portal (<https://stem.psf.gov.pk/>)

Developed PASTIC PSDP Project Web Portal “National Digital Archives of Research Published in Pakistani Journals”. (<http://nda.pastic.gov.pk>)

Supervised website PASTIC and PSF web development, management and updation activities. (www.pastic.gov.pk, www.psf.gov.pk)

Updated and maintained IFAP (Information For All Programme National Committee Pakistan) web portal.

Supervised PSF PSDP project “Science Talent Farming Scheme (STFS)” website along with server management (<http://stfs.psf.gov.pk/>).

Updated and maintained “Consortium of Science & Technology and Research & Development Libraries of Pakistan” CSTRDLP web portal (<http://consortium.pastic.gov.pk/>) for promotion of resource sharing among libraries.

Updated and maintained SAARC Women Entrepreneurs (SMEs) web portal (<http://www.saarcwportal.com>)

Database/Application Modified / Redesigned:

Performed debugging and maintenance of Pakistan Science Abstract (PSA) Web/Desktop application for automated data extraction and searching.

Supervised Data collection and updation of National Information Web Portal of R&D equipment/services available with scientific organization.

Redesigned National Scientist Directory and R&D Project web portal.

Databases Updated:

- Conferences / Workshops / Seminars / Proceedings of Pakistan
- S&T and R&D Projects (Ongoing/Completed) of Pakistan
- Research Material available in Pakistani libraries (UCAT)
- S&T and R&D organizations/Institutions of Pakistan
- Books available in Pakistani libraries (Union OPAC)
- Scientific Books Published by Pakistani Authors
- Industrial Problems & Solutions of Pakistan
- Scientific Societies/Associations of Pakistan
- Pharmaceutical Companies across Pakistan
- Publications (Climate Change) of Pakistan
- Industrial Linkages (Local & International)
- Publications (Energy related) of Pakistan
- Industry-Academia Linkages of Pakistan
- Universities/Institutes of Pakistan

- Foreign Industries in Pakistan
- S&T libraries of Pakistan
- Pakistani Scientists
- Industries of Pakistan
- Chambers of Commerce of Pakistan
- Industrial Associations of Pakistan
- Offices of Research, Innovation and Commercialization (ORIC) in Pakistani Universities
- Overseas Investors of Industry and Commerce in Pakistan
- University-Industry Linkages
- Industrial issues

3.5 International Liaison

Following activities were carried out during the fiscal year 2022-23.

Virtual monthly meetings on Digital Technology of the Asia-Pacific Information Superhighway (APIS) under ESCAP (Economic and Social Commission for Asia and the Pacific) was attended by Director General PASTIC.

12th Session of the Intergovernmental Council for the Information for All Programme (IFAP) June 21-22, 2023 was attended by Director General PASTIC.

3.6 News Letters and Reports

PASTIC Monthly Newsletters are compiled and uploaded at PASTIC website.

Monthly action plans / target reports are prepared and submitted.

Quarterly reports are prepared and submitted.

Annual Report 2021-22 is prepared and submitted.

Monthly Progress Reports of PASTIC are prepared and submitted.

3.7 PASTIC Services Awareness Seminars/Stalls

In order to publicize PASTIC Services & activities, PASTIC service awareness seminars and stalls were organized at various departments of universities on regular basis. Through this activity, PASTIC services are popularized and promoted at the doorsteps of the researchers. As

a result, a large number of new research scholars and faculty members have come to know about PASTIC information services.

During the reporting period (i.e., 2022-23), 53 Awareness seminars/presentation have been organized/delivered and 13 PASTIC Service Awareness Stalls have been installed. Details of the Stalls are as follows:

Date	Venue	Organized by
Sep 19, 2022	Malir University of Science and Technology, Karachi (50 visitors)	PSC, Karachi
Sep 26-27, 2022	Sir Syed University of Engineering & Technology, Karachi (50 visitors)	PSC, Karachi
Oct 18, 2022	Food Expo, Department of Food Science & Technology University of Karachi (400 visitors)	PSC, Karachi
Oct 5, 2022	Dow University of Health Sciences (DUHS), Karachi (250 visitors)	PSC, Karachi
Jul 21, 2022	Baqai Medical University Karachi (100)	PSC, Karachi
Jul 22, 2022	University of Karachi (100 visitors)	PSC, Karachi
Nov 16 2022	Karachi Institute of Economics and Technology (KIET) main campus, Karachi (150 visitors)	PSC, Karachi
Dec 20, 2022	SBK Women's University Quetta	PSC, Quetta
Dec 22, 2022	Dawood University of Engineering & Technology, Karachi (50 visitors)	PSC, Karachi
Feb 9, 2023	Department of Chemical Engineering, University of Karachi(60 visitors)	PSC, Karachi
Mar 03, 2023	Department of Chemistry, NED University of Engineering & Technology, Karachi (100 visitors)	PSC, Karachi
May 18, 2023	Federal Urdu University of Arts, Science and Technology Karachi (100 visitors)	PSC, Karachi
May 31, 2023	Sir Syed University of Engineering & Technology (SSUET) (150 visitors)	PSC, Karachi

3.8 Human Resource Development

Another important activity of PASTIC is to impart training to information professionals and researchers through organizing of workshops / seminars on research related topics e.g., Data analysis, Reference Management, Proposal/paper writing etc. In this regard, during the reporting period following training workshops/seminars/conferences were organized.

TRAININGS/WORKSHOPS/SEMINARS/CONFERENCE ORGANIZED

Title	Date	Venue	Organized/ Collaborated by
PASTIC SUB CENTRE (FSC) FAISALABAD			
Online Training Workshop on " <i>Citation Management by using Mendeley Software</i> " (Participants: 73)	Jul 27, 22	Zoom	PSC Faisalabad in collaboration with AARI Faisalabad
Two Days Training Workshop on " <i>Digital Information Literacy in Agriculture, & Science & Technology Information</i> " (Participants: 88)	Aug 25-26, 22	University of Agriculture, Faisalabad	PSC Faisalabad
One Day Workshop " <i>Free Digital Resources</i> " (Participants: 76)	Sep 12, 22	GCU, Faisalabad	PSC Faisalabad
Online Training Workshop on " <i>Mendeley - Reference Management Software</i> " (Participants: 54)	Oct 11, 22	Zoom	PSC Faisalabad in collaboration with Ghazi University
Online Training Workshop on " <i>Mendeley - Reference Management Software</i> " (Participants: 50)	Oct 13, 22	Zoom	PSC Faisalabad in collaboration with KFUEIT, RY Khan
Online Training Workshop on " <i>Mendeley - Reference Management Software</i> " (Participants: 154)	Nov 23, 22	Zoom	PSC Faisalabad in collaboration with WUM, Multan
One Day Training Workshop on " <i>Digital Information Literacy Search Techniques, Free Digital Resources</i> " (Participants: 80)	Jan 27, 23	Women University Multan	PSC Faisalabad
Conference on " <i>Global Science, Technology & Management Conference (GSTM-23)</i> " (Participants: 100+)	Feb 9-11, 23	IUB, Bahawalpur	IUB, Bahawalpur & Evolution Pakistan in collaboration with PSC Faisalabad
Awareness Seminar on " <i>Role of Statistics in Decision Making</i> " (Participants: 110)	May 30, 23	GCU, Faisalabad	PSC Faisalabad
PASTIC SUB CENTRE (PSC) KARACHI			
One day webinar on " <i>Research Ethics</i> " (Participants: 94)	Jul 20, 22	Zoom	PSC, Karachi
One day Seminar on " <i>How to Write a Research Article</i> " (Participants: 160)	Jul 21, 22	BMU, Karachi	PSC, Karachi in collaboration with BMU & BDC Karachi

Title	Date	Venue	Organized/ Collaborated by
One day Seminar on " <i>Artificial Intelligence in the Diagnosis of Benign & Malignant Tumors</i> " (Participants: 100)	Jul 22, 22	UoK, Karachi	PSC, Karachi in collaboration with UoK, Karachi
One day Webinar on " <i>Management Skills of Researchers</i> " (Participants:70)	Aug 24, 22	PSC, Karachi	PSC, Karachi
One Day Training Workshop on " <i>Effective Research Poster Design</i> " (Participants: 60)	Sep 19, 22	Malir University of S&T, Karachi	PSC, Karachi in collaboration with Malir UST, Karachi
Two Days Training Workshop on " <i>How to Select Different Tests in Analyzing Scientific Data by SPSS</i> "(Participants:60)	Sep 26-27, 22	SSUET, Karachi	PSC, Karachi in collaboration with SSUET, Karachi
One Day Seminar on " <i>World Food Day - Leave No One Behind</i> " (Participants: 300)	Oct 18, 22	UoK, Karachi	PSC, Karachi in collaboration with UoK, Karachi
One Day Webinar on " <i>Ethical Avenues and Conducting Research</i> " (Participants: 95)	Oct 31, 22	Zoom	PSC, Karachi
Online Training Workshop on " <i>Mendeley - Reference Management Software</i> " (Participants: 100)	Nov 24, 22	Zoom	PSC, Karachi
One Day Seminar on " <i>How to Write Review Article</i> " (Participants: 74)	Dec 22, 22	DUET, Karachi	PSC, Karachi in collaboration with DUET, Karachi
One Day Training Workshop on " <i>Research Skill, What they are and their Importance</i> " (Participants: 75)	Jan 26, 23	UoK, Karachi	PSC, Karachi in collaboration with UoK, Karachi
Online Webinar on " <i>Project Writing and Innovation Approach</i> " (Participants: 70)	Feb 15, 23	Zoom	PSC, Karachi
Two Days " <i>Second International Industrial Chemistry Conference (IICC 23)</i> " (Participants: 100+)	Mar 3-4, 23	NEDUET, Karachi	NEDUET, Karachi collaboration with PSC, Karachi etc.
Online Webinar on " <i>Unlocking The Power of Digital Object Identifiers (DOLs) in Research</i> " (Participants: 70)	Mar 09, 23	Zoom	PSC, Karachi in collaboration with AEIRC, Karachi
Online Webinar on " <i>Basic Data Analysis through "R" Software</i> " (Participants: 70)	Apr 27, 23	Zoom	PSC, Karachi
One Day Seminar on " <i>Zoonotic Infections: Emerging Public Health Threats and Monkey Pox Virus outbreak</i> " (Participants: 90)	May 18, 23	FUUAST, Karachi	PSC, Karachi in collaboration with FUUAST, Karachi
One Day Symposium on " <i>One Humanity, Many Genomes</i> " (Participants: 200)	May 31, 23	SSUET, Karachi	PSC, Karachi in collaboration with SSUET, Karachi
Online Webinar on " <i>EndNote and Research Data Management</i> " (Participants:100)	Jun 26, 23	Zoom	PSC, Karachi

Title	Date	Venue	Organized/ Collaborated by
PASTIC SUB CENTRE (LSC) LAHORE			
One Day Training Workshop on " <i>Citation and Literature Management using Mendeley Software</i> " (Participants: 43)	Oct 24, 22	GCU, Lahore	PSC, Lahore in collaboration with GCUL
One Day Training Workshop on " <i>Computer Application in Research</i> "(Participants: 77)	Dec 27, 22	BNU, Lahore	PSC, Lahore in collaboration with BHN University Lahore
One Day Training Workshop on " <i>Citation Management using Mendeley Software</i> " (Participants: 87)	Feb 01, 23	UoL, Lahore	PSC, Lahore in collaboration with UoL, Lahore
Two Days " <i>2nd International Conference on Recent Approaches in Plant Sciences (RAPS-2023)</i> " (Participants: 100+)	May 4-5, 23	UoE, Lahore	UoE, Lahore in collaboration with PSC, Lahore etc.
PASTIC SUB CENTRE (MSC) MUZAFFARABAD			
One Day Seminar on " <i>Information Literacy Skills & Free Online Resources</i> " (Participants: 38)	Jan 26, 23	MUST, Mirpur	PSC, Muzaffarabad in collaboration with MUST, Mirpur
Two-Days training workshop on " <i>Library Automation & Management (ILS Software, KOHA)</i> " (Participants: 24)	Jun 15-16, 23	AJK University, Muzaffarabad	jointly organized by PSC, Muzaffarabad & AJK University, Muzaffarabad
PASTIC NATIONAL CENTRE (PNC) ISLAMABAD			
Three days Training Workshop on " <i>SPSS</i> "(Participants: 30)	Sep 28-30, 22	PNC, Islamabad	PASTIC National Centre, Islamabad
One Day " <i>First International Conference on Revamped Scientific Outlook of the 21st Century</i> " (Participants: 100+)	Oct 12, 22	RWU, Rawalpindi	RWU, Rawalpindi in collaboration with PNC, Islamabad
Three Days Training Workshop on " <i>Research Tools and Techniques (SPSS)</i> " (Participants: 22)	Feb 22-24, 23	PNC, Islamabad	PNC, Islamabad
Two Days Training Workshop on " <i>Research Tools and Techniques (SPSS)</i> " (Participants: 14)	Mar 28-29, 23	PNC, Islamabad	PNC, Islamabad in collaboration with RMU, Rawalpindi
PASTIC SUB CENTRE (PSC) PESHAWAR			
Two Days " <i>International Food & Nutrition Conference</i> " (Participants: 100+)	Aug18-20, 22	University of Swat, Swat	University of Swat, Swat in collaboration with PSC, Peshawar
Two Days Training Workshop on " <i>Statistical Data Analysis using Statistix 8.1</i> " (Participants: 50)	Aug 30-31, 22	PFI, Peshawar	PSC, Peshawar in collaboration with PFI, Peshawar
One Day Breast Cancer awareness (Participants: 70)	Oct 18, 2022	GGMHS-Peshawar	PSC, Peshawar

Title	Date	Venue	Organized/ Collaborated by
One Day Breast Cancer awareness (Participants:35)	Oct 20, 2022	Mashmoom Industries Hattar	PSC, Peshawar
Two Days “ <i>International Conference on Sustainability in Process Industry (SPI 2022)</i> ” (Participants:100)	Oct 19-20, 22	UET, Peshawar	UET, Peshawar in collaboration with PSC, Peshawar
Two Days Training Workshop on “ <i>Citation Management using Mendeley Software</i> ” (Participants: 23)	Feb 23-24, 23	PSC, Peshawar	PSC, Peshawar
Two Days Training Workshop on “ <i>References and citation with Mendeley Desktop in MS Word</i> ” (Participants: 60)	May 7-8, 23	PFI, Peshawar	PSC, Peshawar
One Day Seminar on “ <i>Subsurface Geophysical Imaging of Solid Waste Dump Site: Implications for Soil and Ground Water</i> ” (Participants: 70)	May 26, 23	UET Peshawar	PSC, Peshawar in collaboration with NCEG &UET, Peshawar
Two Days “ <i>International Conference on Life Sciences (ICLS-23)</i> ” (Participants: 100)	May 28-29, 23	Gomal University, DIK	Gomal University DIK and Evolution Pakistan
PASTIC SUB CENTRE (QSC) QUETTA			
One Day Training Workshop on “ <i>Bio-Safety</i> ” (Participants: 52)	Sep 20, 22	SBKWU, Quetta	PSC, Quetta in collaboration with SBKWU, Quetta
One Day Training Workshop on “ <i>Research Methodology/How to write a Research Paper</i> ”(Participants: 72)	Oct 25, 22	SBK Women’s University	PSC, Quetta in collaboration with SBKWU, Quetta

Total no. of participants who benefited were 4000

3.8 Meetings / Workshops / Trainings / Seminars/ Conferences Attended by PASTIC Officials Events/ Webinars /Meetings Attended by PASTIC Officers/Officials

Director General PASTIC, Prof. Dr. Muhammad Akram Shaikh

- Held a meeting with Chief Librarian central library Quaid-e-Azam University, Mr. Anwar Ijaz on January 24, 2023. Both parties have discussed the avenues of mutual cooperation and agreed to work together for the development of National digital repository of Scientific & Technological Information.
- Held a meeting with Dr. Shafiq-ur-Rehman, Vice Chancellor, University of Balochistan, Quetta on March 10, 2023. Both sides have agreed to collaborate and organized academic events together.

- Held a meeting with Dr. Waheed Noor, Head of ORIC Department, University of Balochistan, Quetta on March 10, 2023 along with Mr. Saifullah Azeem, Senior System Analyst and Dr. Maryum Ibrar, Additional Director (STI).
- Held a meeting with Prof. Dr. Niaz Ahmed Akhtar, on assuming the charge of VC Quaid-i-Azam University, Islamabad at Vice Chancellor's Office on March 17, 2023 for greeting.
- As a chief guest in an annual mega event “*Visio Spark*” at CUI, Wah campus on March 18, 2023. “*Visio Spark*” was jointly organized by the Department of Computer Science and Department of Electrical and Computer Engineering, COMSATS University Islamabad, Wah campus in collaboration with PASTIC.
- Participated in “*Second workshop on feasibility study for establishment of National Spatial Data Infrastructure (NSDI) for Pakistan*” held on March 15, 2023 at COMSATS University, Islamabad (CUI) and delivered a keynote speech about PASTIC Services and its role for establishment of National Spatial Data Infrastructure (NSDI). The workshop was organized as a part of the feasibility study for establishment of National Spatial Data Infrastructure (NSDI) for Pakistan by Survey of Pakistan having Dr. Asmat Ali as Project Director, and Dr. Ali Tahir, CEO GIS Plus. The objective of the workshop was to get feedback and collect data from stakeholders of NSDI-Pakistan.
- Held a courtesy call meeting with Dr. Mukhtar Ahmed, for greeting him on assuming the charge of Chairman, HEC. Role and activities of PASTIC/PSF for researchers were discussed in detail.
- Held a meeting with the principals of Bolan Medical College (Quetta), Loralai Medical College (Loralai), Makran Medical, College (Turbat) and Jhalawan Medical College (Khuzdar) in compliance to the directions of Senate Standing Committee / Ministry of Science & Technology to improve and support health facilities and introduction of health science education system at the medical colleges of Balochistan.
- Held a meeting with senior management and faculty members of COMSATS, University, Wah Campus along with senior officers of PASTIC on September 9, 2022 to discuss the future collaboration between the two organizations.

- Attended a meeting with Dr. Syed Aftab Hussain Shah, Additional Director (STI), on the Implementation plan of National Science Technology Policy (NSTP), on November 11, 2022 in the Committee Room, MoST.
- Attended the world science day celebrations jointly organized by COMSTECH, UNESCO, COMSATS, PAS, PSF and ECO-SF at COMSTECH, Islamabad on November 16, 2022 with Senior PASTIC officials. The theme of world science day for peace and development this year was “Basic Science for Sustainable Development”.
- Attended annual meeting 2022 of “*KOICA Alumni Association of Pakistan (KAAP)*” at Islamabad Hotel on November 24, 2022
- Held a meeting with officers/official of PASTIC Sub Centre Karachi on December 23, 2022 to discuss about improvement of PASTIC Services, website elements & new developments of PASTIC databases.
- Held a meeting with Vice Chancellor, senior faculty and management of the Dawood University of Engineering & Technology (DUET), Karachi on December 23, 2022 to create awareness about PSF and PASTIC mandate along with its various activities and programs for future collaborations.
- Held a meeting with Vice Chancellor of Sindh Madressatul Islam University Karachi on December 23, 2022 to discuss about joint collaboration.
- Conducted interviews of 193 students of 6th Batch from Sindh region under PSF Project “Science Talent Farming Scheme (STFS)” at PASTIC Sub Centre Karachi on February 27-28, 2023 with Dr. Jamshaid Mahmood Baig, Dy. Manager (TISC), Dr. Miskatullah PSO (RS) and Mr. Waseem Ali Shaikh, Internal Auditor from PSF Islamabad. Dr. Syeda Sadaf Akbar Dean Faculty of Allied Science from Malir University of Science and Technology & Dr. Sadia Khalil, Assistant Professor, Federal Urdu University participated as an external member of interview committees.
- Held a meeting with Mr. Abdul Khaliq Sial, Officer Incharge, PSC, Quetta on March 10, 2023 to discuss issues during his visit to PASTIC Sub Centre Quetta office with Mr. Saifullah Azeem, Senior System Analyst and Dr. Maryum Ibrar, Additional Director (STI).

Dr. Syed Aftab Hussain Shah, Additional Director (STI), PASTIC

- Attended two training sessions (Webinars) on ASTM COMPASS Database held on November 8, 2022 and November 22, 2022 organized by HEC Pakistan, ASTM (American Society for Testing and Materials) International and A&J.
- Attended two-days, Second Workshop on “*Feasibility Study for Establishment of National Spatial Data Infrastructure (NSDI) for Pakistan*” at COMSATS University Islamabad (CUI) from 15 to 16 March, 2023 organized by Survey of Pakistan, and GIS Plus Ltd.
- Attended a policy dialogue entitled “*Community Engaged Service Learning in Higher Education*” as a Panel Speaker on behalf of Director General, PASTIC on June 23, 2023, at Riphah Institute of Public Policy, Riphah International University Islamabad, Evacuee Trust, Islamabad.

Mrs. Ghazala Ali Khan, Additional Director (STI), PASTIC Sub Centre, Peshawar

- Attended “*Best Project Presentation and Open House Ceremony*” on September 5, 2022 at College of Aeronautical Engineering Risalpur, Nowshera.
- Participated as guest of honor on the occasion of Grand Graduation Ceremony of DURSHAL (UST-Bannu) Start-UPS Project on September 28, 2022 at Manal Peshawar.
- Participated as guest of honor on the occasion of Khyber Pakhtunkhwa Science Agenda 2022 on Oct 11, 2022 at Manal Peshawar.
- Attended the “*6th International Conference on Sustainability in Process Industry (SPI) 2022*” on October 19-20, 2022 organized by the Department of Chemical Engineering, (UET) Peshawar.
- Held a Meeting with Malik Ashiq Awan, Chairman, Hattar Industrialist association on October 20, 2022. She briefed about the PASTIC & PSF activities and future collaboration with Hattar Industries. She also visited Mashmoom Pvt. Ltd. Industry and delivered Breast Cancer awareness seminar.
- Attended 43rd BOG meeting at NCE in Physical Chemistry, University of Peshawar on March 01, 2023.

- Participated as Guest of Honor on behalf of Chairman, Pakistan Science Foundation on two days International Conference on "*Sustainable Utilization of Natural Resource (SUN-R)*", during March 13-14, 2023 organized by NCE in Geology-University of Peshawar at NCE in Geology, Peshawar.
- Participated as Guest of Honor on behalf of PSF Islamabad on the ceremony of Farmer's Day 2023 on March 15, 2023 at Nuclear Institute for Food and Agriculture (NIFA), Peshawar.
- Attended meeting at NCE in Physical Chemistry, University of Peshawar on May 20, 2023 to look into the criteria proposed by the Centre for Promotion of Professor to Meritorious Professor at NCEP, University of Peshawar.
- Briefed about PASTIC Services & it's newly develop database and current plus upcoming activities of PSC Peshawar to Director General Pakistan Forest Institute Mr. Khalid Ilyas in a meeting held in his Office on June 6, 2023.
- Attended 44th BOG meeting at NCE in Physical Chemistry, University of Peshawar on June 13, 2023.
- Attended 59th BOG meeting at NCE in Geology, University of Peshawar on June 14, 2023.
- Briefed about PASTIC Services & it's newly develop database and library services to Mr. Hazrat Bilal (Director General R&D), HEC-Islamabad on June 14, 2023 during his visit to PASTIC Sub Centre Peshawar.

Mr. Abdul Khaliq Siyal, Incharge PASTIC Sub Centre Quetta

- Held a Meeting with Chairperson, Chemistry Department, Sardar Bahadur Khan Women's University Quetta for the arrangements of joint activities.
- Highlighted the dangers and spread of narcotics among youth during his speech at the Program against drugs "Say No to Drugs" conducted by Anti-Narcotics Force Regional Directorate Balochistan Coastal on June 26, 2023 at University of Balochistan, Quetta.

Ms. Afsheen Tariq, Additional Director (STI), PASTIC Sub Centre Karachi

- Held meeting with Mr. Syed Moin Ali (Assistant Manager, Technology Park and Technology Incubation Center) on July 19, 2022. She also visited different Business

Startups in ICCBS Technology Incubator and Industrial Park, Industrial Linkages, at International Center for Chemical and Biological Sciences, University of Karachi.

- Attended “8th Annual Neuroscience Conference” on October 5, 2022 organized by Pakistan Society of Basic & Applied Neuroscience (PASBAN) at Dow International Medical College (DIMC), Ojha Campus, Dow University of Health Sciences (DUHS), Karachi, Pakistan. She also held meetings with faculty members/organizers for Promotion of PASTIC services.
- Attended “Second International Surgical Technologist Symposium” on October 11, 2022 at Dow University of Health Sciences Karachi organized by Dow Institute of Medical Technology.
- Attended Conference on “World Pharmacist Day 2022” on October 26, 2022 at HEJ Auditorium ICCBS University of Karachi organized by Karachi University Pharmacy Science Club (KUPScC).
- Attended “26th Biennial International Pediatric Conference” on October 28, 2022 at Movenpick Hotel Karachi organized by Pakistan Paediatric Association (PPA) Sindh.
- Attended webinar on “Early Diagnosis and Management of Breast Cancer” via Zoom Meeting on October 29, 2022 organized by Sindh Health Care Commission Karachi.
- Visited “7th All Pakistan DUHS-DICE Health Innovation Exhibition” on November 4, 2022 organized by The Dow University of Health Sciences (DUHS) in collaboration with Distinguish Innovation Collaboration & Entrepreneurship (DICE) foundation along with Mr. Shahid Jamil Assistant Director (Admin). The Main objective of the Event is to bring Innovative Concepts and New Inventions in Health Industry.
- Attended Roadshow/awareness drive on the “Prime Minister's National Innovation Award (PMNIA)” on November 7, 2022 at Institute of Business Administration (IBA), City Campus Karachi organized by IBA CED in collaboration with The Higher Education Commission (HEC) alongwith Mr. Kashif Farooqui, Data Control Assistant.
- Attended Seminar on “Devastating Floods in Pakistan: Mitigations and the Way Forward” on December 22 2022 organized by Federation of Pakistan Chambers of Commerce and Industry (FPCCI) and Society of Economic Geologists and Mineral

Technologists (SEGMITE) and Pakistan Science Foundation (PSF) alongwith Mr. Shahid Jamil Assistant Director (Admin).

- Attended one day Workshop on “*Gemology Entrepreneurship*” on January 5, 2023 at ICCBS Technology Park and Incubation Center University of Karachi alongwith Mr. Shahid Jamil Assistant Director (Admin).
- Held a meeting with Engr. Prof. Dr. Ahmad Hussain Professor & Dean (EAS) & Director ORIC on January 09, 2023 at DHA Suffa University alongwith Mr. Shahid Jamil Assistant Director Admin, conducted Both sides have agreed to facilitate and work together for future cooperation.
- Attended inaugural session of Pakistan Petroleum Limited (PPL) Chemical Synthesis Laboratory & visited poster presentation contest on February 9, 2023 at the Department of Chemical Engineering, University of Karachi along with other officials.
- Attended “*Pakistan International Maritime Exhibition and Conference (PIMEC)*” on February 11, 2023 at Karachi Expo Centre. She briefed about PASTIC Services & its role towards Science & Technology to different universities, R&D organizations. The conference was organized by the Pakistan Navy with the commencement of multinational maritime exercise Aman-2023.
- Briefed about PASTIC Services & it’s newly develop database and library services especially PASTIC KOHA Cloud to Lt. Col Hammad, Chief Instructor, Gawadar Institute of Technology, Gawadar on February 15, 2023 during his visit to PASTIC Sub Centre Karachi.
- Attended World Water Day Seminar on “*Protection of Groundwater Resources*” at Pakistan Council of Research in Water Resources(PCRWR) on May 16, 2023 on behalf of Pakistan Science Foundation. The event was jointly organized by PCRWR, SEGMITE in collaboration with Pakistan Science Foundation.

3.10 Miscellaneous Activities

- Cdre Abdul Rehman, Director Finance, Karachi Shipyard & Engineering Works Ltd visited PASTIC Sub-Center Karachi on July 8, 2022 and showed keen interest to work and conduct the seminar workshop in near future.

- PASTIC National Center organized a meeting to review and discuss about PASTIC progress and to plan activities during financial year 2022-23 on August 25, 2022. The meeting was convened by DG PASTIC. The meeting was attended by PNC officials along with Sub Centers In charges. The Sub Centers joined the meeting online via zoom.
- Secretary, BISE, Lahore along with her team visited PASTIC on September 30, 2022. The Director General, PASTIC briefed the team about PASTIC services and activities. The team also visited the Reprographic Unit and showed keen interest in the state of the art machinery installed there.
- The inaugural ceremony of STEM Educational System Baluchistan was jointly organized by PSC Quetta and PSF Science Caravan Baluchistan Unit Quetta on November 11, 2022 at Government Girls Secondary Higher School Quetta. Federal Minister, Science & Technology, Mr. Agha Hassan Baloch was the chief guest of the event.
- Mr. Shahid Jamil, Assistant Director attended “*International Conference on latest trends in Electrical Engineering and Computing Technologies*” on November 16, 2022 at Karachi Institute of Economics and Technology (KIET), Main Campus, PAF Airmen Academy Korangi Creek, Karachi organized by KIET in collaboration with IEEE Karachi.
- Dr. Maryum Ibrar attended a five days Course on “*Manual for Project Development*” on December 12-16, 2022 at PPMI from. Objective of the course was capacity building of Government officers to help improve understanding, efficiency and efficacy of project management.
- Mr. Shahid Jamil, Assistant Director attended “*2nd International Industrial Chemistry Conference (IICC-2023)*” having theme of “*Industrial Chemistry towards Sustainable Future: Growing Together*” held on March 3-4, 2023 organized by the Department of Chemistry at NED University of Engineering and Technology Karachi.

III. PAKISTAN MUSEUM OF NATURAL HISTORY

Pakistan Museum of Natural History (PMNH), the only Natural History Museum in the country established in 1976 under the patronage of Pakistan Science Foundation (PSF), Ministry of Science & Technology, Government of Pakistan according to the dire need of time faced by the researchers in that time with the prime objective not only to discover the country's fossilized wealth of the country but also to preserve the natural history specimens of animals, plants, rocks, fossils and minerals discovered by the national and international researchers for further research. Structurally, Pakistan Museum of Natural History (PMNH) has following four principal divisions namely;

- i. Botanical Sciences Division (BSD) (Scientific Division engaged in collection and research on all types of lower and higher plants)
- ii. Earth Sciences Division (ESD) (Scientific Division engaged in collection and research on all types of Rocks, Fossils, Minerals and Gemstones)
- iii. Zoological Sciences Division (ZSD) (Scientific Division engaged in collection and research on all types of animal's species of birds, reptiles, amphibians, mammals, fishes, insects etc.)
- iv. Public Services Division (PSD) Non-Scientific Division dealing with public affairs including the management of PMNH displays and all types of educational activities.

Scientists of PMNH regularly execute 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 for the purpose collection, research, publication and education. Due to these collective efforts of scientific and technical staff of PMNH and collaborations with other research institutions, PMNH has 1.5 million 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. Scientific and Technical staff of PMNH also facilitate the students of BS., M. Phil./MS., and Ph. D. scholars belonging to the various universities of Pakistan and research institutes by providing help in their research in the form of information, technical assistance, specimens as a loan and guidance in their research

work. Providing informal education is one of main objectives of PMNH mandate. For this purpose, PMNH regularly organizes trainings, workshops, seminars, symposia and other educational interactive activities related to natural history, environment and biodiversity of Pakistan. International days are also observed. As per mandate “*To establish liaison with similar institutions both within and outside Pakistan for sharing of knowledge and expertise*”, PMNH established many national and international liaisons with the other research institutes in the country and abroad. PMNH is not only conducting research on Flora & Fauna, Rocks, Fossils and Minerals of Pakistan 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.

Summary of PMNH Progress 2023-24 During report period, In the report period (2023-2024) 155,943 people visited museum galleries including 52,994 students, 557 foreigners. Total 16 Technical Reports were prepared for the field surveys and baseline studies of floral and faunal diversity in the KPK merged districts. Total collections made during the year 2023-24 was 10,783 specimens including the flora, fauna, rocks and fossils from all over the country. Some 80,064 specimens/samples of plants, animals, rocks, minerals and fossils were curated during this period. Total cataloguing of 21,193 specimens was done. Total 7,695 samples were also digitized. The scientific divisions published 43 research papers in the reputed scientific journals.

Summary of PMNH Progress 2022-23

During report period, 86,587 General Public Visited Museum galleries including 161477students, 51203 foreigners and total amount of Rs. 5891460/-was generated from the visitors.

Total 16 Technical Reports were prepared for the field surveys and baseline studies of floral and faunal diversity in the KPK merged districts under the 10 BTTP component, Government of KPK.

Total collections made during the year 2022-23 was 19,629 specimens including the flora, fauna, rocks and fossils from all over the country. Some 49,857 specimens/samples of plants, animals, rocks, minerals and fossils were curated during this period. Total

cataloguing of 13,835 specimens was done. Total 4,618 samples were also digitized. The scientific divisions published 26 research papers in the reputed scientific journals.

1. Botanical Sciences Division

○ Field Works:

Researchers of Botanical Sciences Division (BSD), conducted numerous field works in the areas of Lal Suhanra National Park Bahawalpur, Pie Forest Sakrand Shaheed Benazirabad, Miani Forest Matiyari/Hyderabad, Umerkot, Mithi, Islamkot Sindh , Muzaffarabad, Potowar (Baga Sheikhan, Sukhu), Siran Valley and Kaghan Valley Reserve Forests, Ayubia National Park, Margalla Hills National park, Midh Ranjha, Kot momin , Gilgit and neighboring areas (including Naltar, Hunza, Karimabad, Khunjrab National Park Hopper, Yaseen valley, Dera Ghazi Khan and its adjoining Suleiman Range including Torghar Conservancy, Kahuta and Kalar Saidan region, Cholistan Desert and Bahawalpur, Hunza Valley (Gilgit-Baltistan), Chitral, Saiyduwali, Painiala, Sheikh Badin, Mughal Kot, Darband and Drazindaof D.I. Khan, South Waziristan and F.R. Tank, Thana Bhola Khan, Rani Kot, Meri Kot, Gawarband and adjoining localities of Dadu District, Sindh, Kanmehtarzai, Muslim Bagh, Zargoan, Khonozai, Kach, Taftan, Dalbandin Nokkundi, Khuzdar and Bela, Zhob, Baluchistan, Gwadar and adjoining areas and Coastal areas of Sindh and Baluchistan for the collection of plants, animals, insects, rocks, fossils and minerals specimens for the purpose of research and public education. BSD scientist organized an orientation field visit to Kalar Kahar and nearby area for junior BSD researchers. BSD officer conducted two days field tour with NARC officers 13th–14th June 2022 in Abbottabad and 20 Mushrooms specimens.

1.1 Collection, Cataloguing, Digitization of Natural History Specimens

Collection & identification	13,212
Plant samples collected = Curation/ Preservation/ Poisoning / Mounting / Arrangement	15,500
Higher/Lower Plants Herbarium = Cataloguing	13,500

Cataloguing (Higher and Lower Plants) =

Digitization/Database 4500

Lower/Higher Plants =

Photography of specimens 1100

Lower and Higher Plants =

1.2 Research Projects

National Collaborative Projects:

Three scientific research proposals submitted by the BSD/PMNH scientist to the PSF/NSLP for funding and the Screening Committee for Research Proposals have Approved the following:

1. PSF/NSLP/C-PMNH (990) Entitled Formulation of Eco-Friendly Trichoderma Based Indigenous Bio-Fertilizer for Management of Plant Diseases. (As PI, awarded)
2. PSF/NSLP/C-PMNH (1000) Entitled “Conservation, Propagation and Research on Native Desert Plants in PMNH Islamabad.” (As PI, under review)
3. PROJECT NO. PSF/RES/CP/KPK-SBBU/AGR (29)

Project Title: Cultivation/ Processing of Mushrooms at High Altitude Research Centre at Sheringal, Dir Upper under the Shaheed Benazir Bhutto University, Sheringal, Dir Upper (Technology Transfer). (As Co. PI under review process)

1.3 International Collaborative Projects/Research Work

PMNH established liaison with similar institutions both within and outside Pakistan for sharing of Knowledge and expertise. PMNH is already developed liaison with the following National and International Institution for joint venture;

- a. Ozone Cell, Ministry of Climate Change, Government of Pakistan
- b. National Institute of Folk & Traditional Heritage (Lok Virsa)
- c. University of Sindh, Jamshoro
- d. University of Haripur, Hazara
- e. National Museum of Natural History, Paris, France
- f. Beijing Museum of Natural History, Beijing China
- g. Kohat University, Kohat

h. Organizations MPCEN & PIWEFF

1.4 Research Publications

1. **Hasnain S., Jamil S., Gilani S.A. and Khan Amir M. 2023. “Plant Community Structure and Species Diversity in Balkassar, District Chakwal Pakistan”. *Ravian Journal of Plant Sciences (RJPS)*. Volume 1, Issue 2, December-2023, pp.63-71.**
2. Koponen, T., Khan, A.S. & Gilani, S. A. G. 2022. Contribution to Mniaceae: Revision of Mniaceae (Bryophyta) in Pakistan. -*Acta Bryolichenologica Asiatica* 10: 31-38. Finish-Chinese Botanical Foundation.
3. Ilyas N, Akhtar N, yasmin S, Sahreen Sumaira, Hasnain Z, Khaushik P, Ahmend A, Ahmed P (2022) Efficiency of citric acid chalet and *Bacillus* sp. In amelioration of cadmium and chromium toxicity in wheat. *Chemosphere Pub Date: 2021-12-16 DOI: [10.1016/j.chemosphere.2021.133342](https://doi.org/10.1016/j.chemosphere.2021.133342)*
4. Narejo, G.A., Mirbahar, A.A., Yasin, S. Sirohi, M.H., Saeed, R (2022) Effect of Hydro and KNO₃ Priming on Seed Germination of Cotton (*Gossypium hirsutum* L.) Under Gnotobiotic Conditions. *J Plant Growth Regul.* <https://doi.org/10.1007/s00344-022-10644-y>
5. Uzma Sitara, Parwaiz Ahmed Baloch, Atta Ullah Khan Pathan, Muhammad Ismail Bhatti, Mohammad Abbas Bhutto, Qazi Mehmood Ali, Abid Ali and Mehwish Iqbal (2022). *In vitro* studies to determine antibacterial and antifungal properties of three *Pleurotus* species (Oyster mushroom). *Pakistan Journal of Botany* DOI: 10.30848/PJB2023-1(14)
6. Uzma Sitara, Parwaiz Ahmed Baloch, Atta Ullah Khan Pathan and Muhammad Ismail Bhatti (2022). Optimization and Effect of Different Grain Sources on Production of Liquid Spawn and Fruiting Body of *Cordyceps militaris*. *Internal Journal of Agriculture and Biology* DOI: 10.17957/IJAB/15.1953
7. Fatima-tuz-Zuhra, Shariqa Khawaja, Bina Shaheen Siddiqui, Shabana Usman Simjee, Muhammad Ismail Bhatti, S. T. Ali, Sobiya Perwaiz and Sabira Begum (2022). *Chemical*

diversity and Cytotoxicity of *Ganoderma lucidum* from two different localities of Pakistan in Chemical Society of Pakistan, Volume 44, No. 02, April issue, 2022. doi.org/10.52568/001002/JCSP/44.02.2022.

Research Papers Submitted

Amir Hussain, Muhammad Zafar, Mushtaq Ahmed, Shazia Sultana, Ghulam Yaseen, Salman Majeed, Jameel Raza, Syed Aneel A. Gilani, Muhammad Ismail Bhatti, Ghulam Abbas, Zil-E-Haleefa, 2022. Ethnobotanical exploration of medicinal plants diversity in southern desert of Sindh, Pakistan. Journal of Ethno biology and Ethno medicine.

Research Papers Reviewed

Reviewed an article entitled “Antimicrobial activity of silver nanoparticles synthesis from *Aegle marmelos* LEAF EXTRACT” Uttar Pradesh Journal of Zoology.

Book Published

Published a book by Dr. Syed Aneel Ahmad Gilani as Contributor Author entitled “Some Amazing Gymnosperms” 2021, with ISBN Number: 978-969-7859-22-1 (P.B) publishers Bazm-e-Takhleeq-Adab, Pakistan P/O box, 17667, Karachi-75300.

1.5 Conference abstracts/Proceedings

1. Ghulam Abbas, Zil-e-Haleefa, Amir Hussain (2022) Molecular Mechanism behind the seed priming in cotton (*Gossypium hirsutum* L.). International Plant Genomics Webinar, Feb 17, 2022.
2. Ghulam Abbas, H. U Khan, Ameer Ahmed Mirbahar, Sanaullah Yasin (2022) Effect of seed priming on growth yield and biochemical parameters of cotton (*Gossypium hirsutum* L.). under field conditions. International Congress of Soil Science "Soil Health and Sustainable Development Goals".

1.6 Presentations/Lectures

BSD scientists delivered 12 different lectures to students/researchers of different universities.

1.7 Popular Science Articles / Book Published

1. A Book published entitled “Wonders of Some Plants and Spices”, with contribution of Dr. Aneel Gilani, Curator BSD, ISBN Number: 979-969-7985-28-8 publishers Bazm-e-Takhleeq-Adab, Karachi-75300. Pakistan
2. Ghulam Abbas Narejo (2022) Treatment of COVID-19 pandemic with indigenous knowledge of medicinal plants: A Folklore. The Global Plant Council, (Blog post).
3. Ghulam Abbas Narejo*, H. U Khan, Muhammad Ismail Bhatti, Zil-E-Haleefa, Amir Hussain (2022), Medicinal Plants in the prevention and Treatment of COVID-19 Pandemic: From folklore to pharmacy lab. Technology times, (Weekly E-Magazine).
4. Ghulam Abbas Narejo (2022), Treatment of COVID-19 pandemic with indigenous knowledge of medicinal plants: A Folklore. The Global Plant Council, (Blog post).
5. Amir Hussain, H. U. Khan Muhammad Ismail Bhatti, Ghulam Abbas Narejo, Zil-E-Haleefa (2022) *Senna italica* Plant Used for Various Human Disorder Ailments. Technology times, (Weekly E-Magazine).
6. Sadia Munir, (2022) “*Trametes versicolor* used in medicinal mushroom.” submitted in IMA (International Mycological Association).
7. Sadia Munir, (2022) Covid -19 effects on the Human body”. Technology times, (Weekly E-Magazine).
8. Amir Hussain, H. U. Khan, Muhammad Ismail Bhatti, Saadia Munir, Zil-E-Haleefa, Ghulam Abbas (2022) Use of Indigenous Knowledge of Medicinal Plants for Veterinary Practices in Thar Desert, Sindh. Technology times, (Weekly E-Magazine).

1.8 Training Courses/Workshops Held/Attended

1. Officers of BSD attended two days training entitled “Plant Nutrition and Its management” jointly organized by University of Agriculture and NIAB, Faisalabad.
2. BSD scientists attended a lecture entitled “Nitric Oxide Nasal Spray for COVID-19 Treatment and Breath Test for COVID-19 Diagnosis” by Dr. Isaac John from University of London on 11th May 2022 at PSF Auditorium.

1.9 Trainings Courses / Workshops Conducted

BSD scientist conducted 05 days training in collaboration with Shaheed Zulfiqar Ali Bhutto Agricultural College, Dokri Larkana on mushroom cultivation. 30 students of college trained. Vice Chancellor of SAU Tando jam attended closing session of the training.

1.10 Services to Other Organizations

BSD scientists provided the services to the students of BS, MS, M. Phil. belonging to the various universities of Pakistan in their research and thesis work and also supervised their research activities. Students from the following universities were provided assistance as a co-supervisor in their research work including Quaid-e-Azam International University, Islamabad, University of Haripur, Hazara, Bahria University, Islamabad, and National Center of Excellence in Geology, University of Peshawar, National University of Science and Technology, Islamabad, Pakistan Institute of Engineering & Applied Sciences (PIEAS), Islamabad

2. Earth Sciences Division

2.1 Field Works

Mr. Aamir Yaseen, Curator and Mr. Khalili-ur-Rehman, Associate Curator, ESD along with staff member carried out 11 days field work from 30.11.2022 to 10.12.2022 in Kathore, Sonhri, aqua and Sona Pass along with coastal line of Karachi near Mubarak village and its adjoining areas to study the lithological and paleontological studies of the Gaj formation and for the collection of rocks, invertebrate fossils especially foraminifers, gastropods and fossil corals for scientific and reference collection of ESD repository and for new dioramas. Dr. Muhammad Murtaza, Associate Curator, ESD conducted geological fieldwork for the SRGP-Project entitled “Assessment of Shale Gas Potential of the Cretaceous Chichali Formation, Hazara Basin, and Lesser Himalaya, Pakistan”. Samples belonging to Chichali Formation were collected from Abbottabad area. For comparison, samples from other shale formations were also taken from different areas of Hazara region. Mr. Tasswar Hayat, Research Associate, ESD conducted three days geological field excursion in Kohistan (Jijal, Pattan and Duber) for the collection of ultramafic rock specimen from the area.

1.1. Geological field work in Abbottabad area:

Dr. M. Murtaza along with Dr. Anwar Qadir (University of Haripur) went for Fieldwork for the SRGP-Project entitled “Assessment of Shale Gas Potential of the Cretaceous Chichali Formation, Hazara Basin, Lesser Himalaya, Pakistan”. Different successions belonging to the Chichali Formation were studied. For geochemical analysis, different samples belonging to Chichali Formation were taken from Abbottabad area. For comparison, samples from other shale formations were also taken from different areas of Hazara region. 32 samples belonging to Chichali Formation were taken from Abbottabad area and subjected to different geochemical analysis. Dr. M. Murtaza along with Dr. Anwar Qadir (University of Haripur) went for Fieldwork for the SRGP-Project entitled “Assessment of Shale Gas Potential of the Cretaceous Chichali Formation, Hazara Basin, Lesser Himalaya, Pakistan”. Different successions belonging to the Chichali Formation were studied. For geochemical analysis, different samples belonging to Chichali Formation were taken from Abbottabad area. For comparison, samples from other shale formations were also taken from different areas of Hazara region. 32 samples belonging to Chichali Formation were taken from Abbottabad area and subjected to different geochemical analysis.

2.2 Research Publications

- Muhammad Ahmed Farooqui, Khalil-Ur-Rehman, **Aamir Yaseen**, Ghazala Roohi, Muhammad Umar. “Petrography, Geochemistry and depositional model of Ispikan conglomerate, Makran Accretionary Prism, Southwest Pakistan”. *Kuwait J. Sci.*, Vol.49, No. (1), 2022, pp (1-25)
- Anek Ram Sankhyan, Sayyed Ghyour Abbas, Muhammad Akbar Khan, Muhammad Adeeb Babar, Amir Yasin. Diversity of hipparionines (Perissodactyla: Equidae) from the late Miocene–Pliocene Siwalik deposits at Haritalyangar, India. *Annales De Paleontologie*, Volume 29, Issue 2, 2023.
- Farooqui, M. A., Rehman, K. U., Yaseen, A., Roohi, G., & Umar, M. (2022). Petrography, geochemistry and depositional model of Ispikan Conglomerate, Makran Accretionary Prism, Southwest Pakistan. *Kuwait Journal of Science*, 49(1).
- **Hamad ur Rahim**, Shazia Qamar, Mumtaz Shah, Merce Corbella, Jaun Diego Martín-Martín, Hammad Tariq Janjuhah, Didac Navarro-Ciurana, V. Lianou, Gorge Kontakiotis, (2022) “Processes Association with Multiphase Dolomitization and Other Related

Diagenetic Events in the Jurassic Samana Suk Formation, Himalayan Foreland Basin, NW Pakistan”. *Minerals* 2022 (IF: 2.818), 12, 1320. <https://doi.org/10.3390/min12101320>

- Yaqub, S., Ko, H. T. K., **Murtaza, M.**, & Bavoh, C. B. (2022). Effect of biopolymers and their mixtures with glycine on the formation kinetics of methane hydrates. *Journal of Molecular Liquids*, 366, 120345.
- A poster titled ‘An Improved Seismic Interpretation Approach for Reservoir Modeling, comparison of Sequential Gaussian Simulation Property Modeling with Model Based Inversion for Porosity Computation in Structurally Complex Fold Belt area of Southern Indus Basin, Pakistan’ published in **Geological Society of America CONNECTS 2022**.
- Two (2) Posters accepted in AAPG European Regional Conference Budapest, Hungary. Reference Number 59007489 and 59024362. The conference was held in Budapest 3, 4 May 2022.
 - i. ‘Facies Analysis, Sequence Stratigraphy and Reservoir Evaluation of the Lower Goru Sand Interval, Miano Gas Field, South Pakistan’
 - ii. ‘3D Facies Modeling and Structural Style Evaluation for the Reservoir Quality Prediction of Regressive Sands of Early Cretaceous Lower Goru Formation, Middle Indus Basin, Pakistan’<https://erc.aapg.org/2022/Technical-Program/Program/Poster>.

Submitted: Two research papers submitted in international journals for publication.

2.3 LABORATORY WORK

Collection status of Rocks, Minerals & Fossils

• Invertebrate fossils	840
• Rocks	440
• Minerals	450
• Wood fossils	65

1.2. Cataloguing of Rocks & Fossils

• Invertebrate fossils	5985
• Vertebrate fossils	170
• Rocks	280
• Wood Fossils	

1.3. Digitization of Rocks & Fossils

• Invertebrate fossils	1550
• Vertebrate fossils	
• Wood fossils	630
• Rocks	45
	450

2.4 Services to other Organizations

In 2022-23, services were provided to the students of BS, MS, M. Phil. and Ph.D. belonging to the various universities of Pakistan in their research and thesis work and supervised their research activities. Students from the following universities were provided assistance as a co-supervisor in their research work;

- Quaid-e-Azam International University, Islamabad
- University of Sargodha, Sargodha
- Abbottabad University of Science & Technology, Abbottabad
- University of Haripur, Hazara
- Bahria University, Islamabad
- National Center of Excellence in Geology, University of Peshawar

2.5 Summary of Students Provided Assistance

- **Co-supervised 03** students from University of Haripur, Haripur and Bahria University (Islamabad campus)
- **Evaluated 02 MS (Geology) thesis** from Bahria University, (Islamabad campus)
- **Examined 01 M. Phil. (Geology) thesis** from University of Peshawar
- **Internship provided to 26 BS (Geology)** students from University of Haripur, Haripur, Bahria University (Islamabad Campus), Quaid-e-Azam University and University of Sargodha.

2.6 Design and Display Activities of PMNH for Informal Education

i. “Up- gradation of Paleo Gallery”

Following two new displays added into the display galleries of PMNH for public;

- Invertebrate Fossils of Pakistan
- Display of Volcano

Approximately 1500 invertebrate fossils and seashells belong to the various species displayed in “Invertebrate Fossils of Pakistan” display collected from various regions and coastal areas of Pakistan and provide valuable information about paleo-environment and present marine life. Newly established Display of “Volcano” is the source of information related to the natural phenomenon of igneous activities which are source of beautiful dimension stones, construction materials, gemstones, precious metals and fertile soils etc.

ii. **Construction of “Invertebrate Fossils of Pakistan” Diorama**

Earth Sciences Division has started construction of “Invertebrate Fossils of Pakistan” diorama to replace the existing Earthquake exhibit. Earth Sciences Division has collection of rare specimens of invertebrate fossils from different areas of Pakistan. These specimens are the important aspects of national and natural wealth which will be displayed properly in Invertebrate fossils of Pakistan Diorama to educate the public and motivate students.

2.7 Seminars/Trainings attended

- Mr. Jawad Ahmed Jan, Research Associate, ESD participated in Pakistan’s second national communication on CLIMATE CHANGE TO UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE (UNFCCC) on August 5, 2022, held in Serena Hotel, Islamabad.
- Dr. Hamad-ur-Rahim, Associate Curator, ESD attended 5 days training on “**Project Life Cycle Management**” held on 12-16 Sep 2022 at PPMI office Islamabad.
- Dr. Muhammad Murtaza, Associate Curator, ESD participated in Universiti Teknologi PETRONAS (UTP) Energizing Futures Webinar Series 2022 with the United Kingdom’s edition. “Future Playbook of Complementary University-Industry Linkages”.

2.8 Research Project (National & International)

National Projects

- One research project titled **“Conservation/Restoration of the Reference Collection of Earth Science Division, Pakistan Museum of Natural History by Utilizing the Modern Techniques”** submitted by Dr. Hamad-ur-Rahim, Associate Curator and Mr. Aamir Yaseen, Curator, as P.I. and Co. PI. is recommended by screening committee of Pakistan Science Foundation.
- Dr. Hamad-ur-Rahim, Associate Curator and Mr. Jawad Ahmed Jan, Research Associate, ESD submitted a concept proposal entitled **“Exploration of Sediment-Hosted Zinc-Lead Mineral Deposits in the Lasbela and Khuzdar Area, Baluchistan, using Geological and Geochemical Techniques”** for financial assistance at Pakistan Science Foundation. The concept paper has received a positive recommendation from the PSF screening committee for further development into a full-length proposal.
- Dr. Muhammad Murtaza, Associate Curator, ESD has worked on PC-I of proposed project **“Extension of display galleries, collection repositories improvement and research facilities enhancement at Pakistan Museum of Natural History.**
- As per DG PMNH instruction, Dr. Muhammad Murtaza, Associate Curator, ESD has submitted timelines for PC-I **“STEM Education through Establishment of Space Museum / Planetarium / Observatory in Islamabad”** and PC-1 of **“Extension of Display Galleries, Collection Repositories Improvement and Research Facilities Enhancement at Pakistan Museum of Natural History, Islamabad”**. Regarding preparation, he conducted multiple meetings with the architect of the proposed building.
- As part of the PSF PSDP project STEM (Science, Technology, Engineering, and Mathematics) initiative, Mr. Jawad Ahmed Jan, Research Associate, ESD involved in reviewing experiment modules designed for matriculation and intermediate levels. The project aimed to enhance the quality and effectiveness of science education, focusing on subjects related to science, technology, engineering, and mathematics.

International Projects

- An international project entitled ‘Evolution of convergent plate margin from Subduction to collision. A case study of Kohistan Island Arc’ between Earth Sciences Division, PMNH and Dr. Horst Marshall from GEOTHE UNIVERSITAT FRANFURT AM MAIN (Director, Frankfurt Isotope and Element Research Center (FIERCE) is in progress.

2.9 National & International Liaison

In 2022-23, following activities were performed for research and cooperation;

- Dr. Hamad-ur-Rahim, Associate Curator, Mr. Jawad Ahmed Jan and Mr. Tassawar Hayat, Research Associate, ESD guided Dr. Faye Davis, a geologist from Glasgow University, UK. Faye visited ESD laboratories and held meeting with the scientists of ESD for mutual collaborative opportunities in the field of Earth Sciences.
- Discussion for collaborative research work is in progress between ESD, PMNH and Department of Earth & Environmental Sciences Hazara University, Mansehra and with the Department of Earth Sciences, The University of Haripur regarding renewal of existing MoU.

3 Zoological Sciences Division

3.1 Field Works

1. Visit of the ZSD PMNH (Zoological Sciences Division, Pakistan Museum of Natural History) team to Gawadar, Baluchistan, was carried out to seek their specialized expertise and services in the preservation and collection of a Blue Whale specimen. The visit was undertaken in response to a special request made by the GDA (Gawadar Development Authority) and the Baluchistan Wildlife Department.
2. Dr. Shabir Ali Amir, the Associate Curator, embarked on a field survey from 30th November 2022 to 10th December 2022. This survey focused on the collection of marine fishes from specific locations, including the Hub River estuary, Ibrahim Haidri Creek, and Hawaksbay areas. Dr. Amir collected 300 specimens of marine fishes belonging to families Solindae, Sparidae. The description of new species in the family Soliedae is in progress.

3. A comprehensive report on the 'Birds Diversity in Shakarparyian, Islamabad' was diligently compiled and completed. This report was the result of five days of local field visits, during which pertinent data was gathered and analyzed."

- | | |
|--|-------|
| 4. Collection of Natural History specimens: | 2,751 |
| 5. Cataloguing of Natural History specimens: | 2,628 |
| 6. Digitization of Natural History specimens: | 2,479 |

3.2 LABORATORY WORK

- Curated 18,611 zoological specimens
- Stuffed 3 animals
- Study skins prepared 31 animals

Preparation of skulls: **20 nos.**

- Skeleton prepared 23
- Rearranged and replaced naphthalene balls in 98 insect drawers
- Identified and catalogued 18 mammals' specimens collected/ Donated from different areas/Institutions of Pakistan.

3.3 RESEARCH PAPERS

1.1. International Research Papers

- Lee JL, Yushchenko PV, Milto KD, Rajabizadeh M, Rastegar Pouyani E, Jablonski D, Masroor R, Karunarathna S, Mallik AK, Dsouza P, Orlov N, Nazarov R, Poyarkov NA. 2023. Kukri snakes *Oligodon Fitzinger, 1826* of the Western Palearctic with the resurrection of *Contia transcaspica* Nikolsky, 1902 (Reptilia, Squamata, Colubridae).
- Jablonski, Daniel & Khalili, Faizurrahman & Masroor, Rafaqat. (2023). The herpetofaunal diversity of Takhar Province, Afghanistan. *Herpetozoa*. 36. 73-90. 10.3897/herpetozoa.36.e98319.
- Hofmann, Sylvia & Schmidt, Joachim & Masroor, Rafaqat & Borkin, Leo & Litvinchuk, Spartak & Rödder, Dennis & Vershinin, Vladimir & Jablonski, Daniel. (2023). Endemic lineages of spiny frogs demonstrate the biogeographic importance and conservational needs of the Hindu Kush–Himalaya region. *Zoological Journal of the Linnean Society*. 198. 310-325.
- Jablonski, Daniel & Masroor, Rafaqat. (2023). Geographic distribution: *Dendrelaphis tristis*, Azad Jammu-Kashmir, Pakistan. *Herpetological Review*. 54. 74.
- Reshetnikov, A. & Zibrova, Marina & Ayaz, Dinçer & Borodin, Oleg & Borzée, Amaël & Brejcha, Jindrich & Çiçek, Kerim & Dimaki, Maria & Doronin, Igor & Drobenkov, Sergey & Gichikhanova, Uzlipat & Gladkova, Anastasia & Gordeev, Dmitry & Ioannidis, Yiannis & Ilyukh, Mikhail & Interestova, Elena & Jadhav, Trupti & Karabanov, Dmitry & Khabibullin, Viner & Bhattarai, Santosh. (2023). Rarely naturalized, but widespread and even invasive: the paradox of a popular pet terrapin expansion in Eurasia. *NeoBiota*. 81. 91-127.
- Masroor, Rafaqat & Khan, Muazzam & Nadeem, Muhammad & Amir, Shabir & Khisroon, Muhammad & Jablonski, Daniel. (2022). Appearances often deceive in racerunners: integrative approach reveals two new species of *Eremias* (Squamata: Lacertidae) from Pakistan. *Zootaxa*. 5175. 55-87.10

- Amir, Shabir & Zhang, Baidong & Masroor, Rafaqat & Li, Yulong & Xue, Dongxiu & Rashid, Shahnaz & Ahmad, Naveed & Mushtaq, Safia & Durand, Jean-Dominique & Liu, Jinxian. (2022). Deeper in the blues: DNA barcoding of fishes from Pakistani coast of the Arabian Sea reveals overlooked genetic diversity. *Marine Biodiversity*. 52. 10.1007/s12526-022-01272-6.
- Dufresnes, Christophe & Mahony, Stephen & Prasad, Vishal & G. Kamei, Rachunliu & Masroor, Rafaqat & Khan, Muazzam & Al-Johany, Awadh & Gautam, Kumudani & Gupta, s & Borkin, Leo & Melnikov, Daniel & Rosanov, Jury & Skorinov, Dmitriy & Borzée, Amaël & Jablonski, Daniel & Litvinchuk, Spartak. (2022). Shedding light on taxonomic chaos: Diversity and distribution of South Asian skipper frogs (Anura, Dicroglossidae, Euphlyctis). *Systematics and Biodiversity*. 20. 2102686. 10.1080/14772000.2022.2102686.
- Jablonski, Daniel & Masroor, Rafaqat & Hofmann, Sylvia. (2022). On the edge of the Shivaliks: An insight into the origin and taxonomic position of Pakistani toads from the *Duttaphrynus melanostictus* complex (Amphibia, Bufonidae). *Zoosystematics and Evolution*. 98. 275-284. 10.3897/zse.98.79213.
- Muhammad Umar, Saima Muzammil, Muhammad Asif Zahoor, Shama Mustafa, Asma Ashraf, Sumreen Hayat, Muhammad Umar Ijaz, "Fisetin Attenuates Arsenic-Induced Hepatic Damage by Improving Biochemical, Inflammatory, Apoptotic, and Histological Profile: In Vivo and In Silico Approach", *Evidence-Based Complementary and Alternative Medicine*, vol. 2022, Article ID 1005255, 9 pages, 2022.
- Agarwal I., Bauer A.M., Gamble T., Giri V.B., Jablonski D., Khandekar A., Mohapatra P.P., Masroor R., Mishra A. & Ramakrishnan U. 2022. The evolutionary history of an accidental model organism, the leopard gecko *Eublepharis macularius* (Squamata: Eublepharidae). *Molecular Phylogenetics and Evolution*, 168: 107414.
- Jablonski D., Basit A., Farooqi J. & Masroor R. 2022. First record of the colubrid snake *Platyceps ventromaculatus* (Reptilia: Colubridae) for Afghanistan. *Zoology in the Middle East*, 68 (2): 186–188.
- Jablonski D., Masroor R. & Hofmann S. 2022. On the edge of the Shivaliks: An insight into the origin and taxonomic position of Pakistani toads from the *Duttaphrynus*

melanostictus complex (Amphibia, Bufonidae). *Zoosystematics and Evolution*, 98 (2): 275–284. <https://doi.org/10.3897/zse.98.79213>.

- Ayobi, A.S., Masroor R., Basit A. & Jablonski D. 2022. The distribution of the critically endangered salamander *Paradactylodon (Afghanodon) mustersi* (Smith, 1940) in Afghanistan. *Herpetozoa*, 35: 133–139.
- Amir S.A., Zhang B., Masroor R., Li Y., Xue D-X., Rshiad S., Ahmad N., Mushtaq S., Durand J-D . & Liu J. 2022. Deeper in the blues: DNA barcoding of fishes from Pakistani coast of the Arabian Sea reveals overlooked genetic diversity. *Marine Biodiversity*, 52, 37.
- Amir Said, Muhammad Imran, Muhammad Tahir Waseem, Abdul Majid Khan, Noman Khaliq, Ghulam Sarwar, Rana Manzoor Ahmad. 2022 Feeding Niche Overlap between Native and Alien Fishes in River Swat, Khyber Pakhtunkhwa, Pakistan. *Environmental Biology of Fishes*. (IF: 2.1)
- Muhammad Imran, Abdul Majid Khan, Muhammad Altaf, Muhammad Ameen, Rana Manzoor Ahmad, Muhammad Tahir Waseem and Ghulam Sarwar (2022). Impact of alien fishes on the distribution pattern of indigenous freshwater fishes of Punjab, Pakistan. 82: e238096 *Brazilian Journal of Biology* (IF: 1.65).

3.4 On-Going Research Projects

International Projects

- A bilateral research project proposal selected for funding under PSF-NSFC programme. The project title is “Cooperative development of an innovative auto-ID platform for the beetles from China and Pakistan”.

Under this project:

- Beetle images prepared.
- Appointed Research Associate in the Project.
- Two fieldworks (Arranged PSF-NSFC project tour for sampling from 24th May to 10th June 2022 from Gilgit Biltistan; and 19th to 29th June from Peshawar and adjoining areas.).
- Held 02 Zoom meetings with Chinese collaborator regarding project activities.

- Total 13 students of PMAS Arid agriculture and COMSATS University completed their BSc (Hons) degree under PSF-NSFC project.

1. National Projects (submitted)

- Project proposal entitled: Birds / Wildlife Aircraft Strike Hazards & Preventions approved by PSF on 1st April 2022.
- Research Project entitled: “Establishment of DNA barcode reference Bank for the marine and freshwater fishes of Pakistan submitted to PSF on 20 June 2022.

2. Programme Initiated and completed

- Stuffing of Ibex specimen has been completed and shifted to Ungulate Carnivore Diorama.
- Maintenance and repairing of Birds Diorama was completed.
- Stuffing of Markhor and chukar partridge was completed and shifted to National symbols of Pakistan Diorama of display Gallery of PMNH.
- Recovered Elephant Skeleton from Margzar Zoo, under Islamabad Wildlife Management Board, Islamabad, for the establishment of new diorama at PMNH.

3.5 Workshops Organized

- Organized Taxidermy Training Workshop in collaboration with KPK Wildlife Department under 10BTTP, from 20th to 24th June 2022.

3.6 Trainings

Provided/organized

- Training entitled “Pinning and preservation of different groups of Beetles (Coleoptera)” provided to 11 students of B.Sc. (Hons) Agriculture Entomology, PMAS Arid Agriculture University, Rawalpindi, at Insect repository, ZSD, PMNH.

3.7 Internships

- One student of BS (Hons), Department of Forestry and Wildlife Management, from University of Haripur completed one-month Taxidermy internship, from 1st August 2021 to 2nd September 2021, at ZSD, PMNH, Islamabad.

3.8 Services Rendered to other Organizations

- 4 Dr. Shabir Ali Amir, Associate Curator, ZSD, is working on fish taxonomy with the collaboration of MARBEC, Université de Montpellier, France.
- 5 Dr. Rafaqat Masroor, Associate Curator, ZSD, is working on herpetofaunal taxonomy with the collaboration of COMENIUS University, Czech Republic.
- 6 Development of ToRs regarding Red Data Book of Pakistan in connection with meeting with NSSU/MoCC.
- 7 Representation of PMNH at Kohsar Innovation, Tourism and Entrepreneurship Festival, Murree.
 - Delivered presentation and briefing to the faculty representative of Zoology Department, Agriculture University, Faisalabad on the preparation and maintenance of catalogue register on 20th May 2022.

3.9 NO of Students Supervised: 09 (3 PHD AND 06 M. PHIL)

- Facilitated Dr. Muhammad Ather Rafi (Ex-Director, National Insect Museum, NARC) regarding his work on identification of Butterflies.
- Facilitated M.Phil. student from Arid Agricultural University, Rawalpindi, working on hair analysis of mammalian species.
- Mrs. Misbah Kausar, PhD student /Internee from Department of Zoology, PMAS Arid Agriculture University, Rawalpindi; supported in identification of her research specimens.
- Khan, H.U. M.Phil. student, from University of Science and Technology, Kohat; supervised in his thesis work.
- Shah, S.M. M.Phil. student, from University of Science and Technology, Kohat; supervised in his thesis work.

3.10 Workshops/Trainings/Seminars Attended

- Attended the workshop from 23rd-25th May 2022 on “UNEP’s Capacity Building Workshop through Data Reporting Tool (DaRT)” under Ministry of Climate Change, Islamabad.
- Attended Indus Dolphin Field Survey training session, under WWF Pakistan, from 25th March to 16th April 2022.

3.11 National/International Collaboration/ Liaison

- International collaboration developed in the Project entitled Taxonomic studies of sparid fishes (genus: *Rhabdosargus*) are in progress in collaboration with Karachi University and University of France (MARBEC).
- Attended meetings at Planning commission regarding preparation of PMNH PC-I compliance report with Chief Science & Technology and Chief Economic Appraisal on 18th February 2022
- Attended meeting with Deputy Chief Power regarding discussing Solar energy potential for PMNH PC-I on 21st February 2022
- Arranged Stakeholder Consultation Session regarding PMNH PC-I on 25th February 2022.
- Attended meeting at SUPARCO regarding preparation of PC-1 entitled “establishment of space museum/planetarium observatory at Fountain, Shakarparian, Islamabad on 16th June, 2022.
- Facilitated repositories and labs visits of different delegations from different institutes and foreigners.
- Facilitated and delivered the lectures to students from different 20 universities/colleges/schools.
-

4. PUBLIC SERVICES DIVISION

4.1 Educational Activities

- PMNH organized one day Seminar and Art competition, on the theme/slogan “Building a shared future for all life” during celebration of International Biodiversity Day on 22nd May, 2022.
- PMNH celebrated “World Environment Day” A Panel Discussion was held on the theme “Only one Earth”. Photography Contest among different schools of Rawalpindi and Islamabad inside PMNH premises to give awareness to school children about the importance of this day.

- Stakeholders Consultation Meeting regarding PSDP Project; Extension of Display Galleries, Collection Repositories Improvement, and Research activities was held in PMNH.

4.2 Internships

Two Students completed their Internship from National Textile University, Faisalabad

4.3 Visitors Data

PMNH display galleries remained opened in two shifts to facilitate the visitors, National and International delegates, student groups of schools, colleges and universities. A sizeable number of visitors, across Pakistan visited display galleries of PMNH. Detail is given below:

Year	Students	General Public	Foreigners	Children under 05 years	Total	Amount
2022-23	51203	97749	621	11904	161477	5891460/-

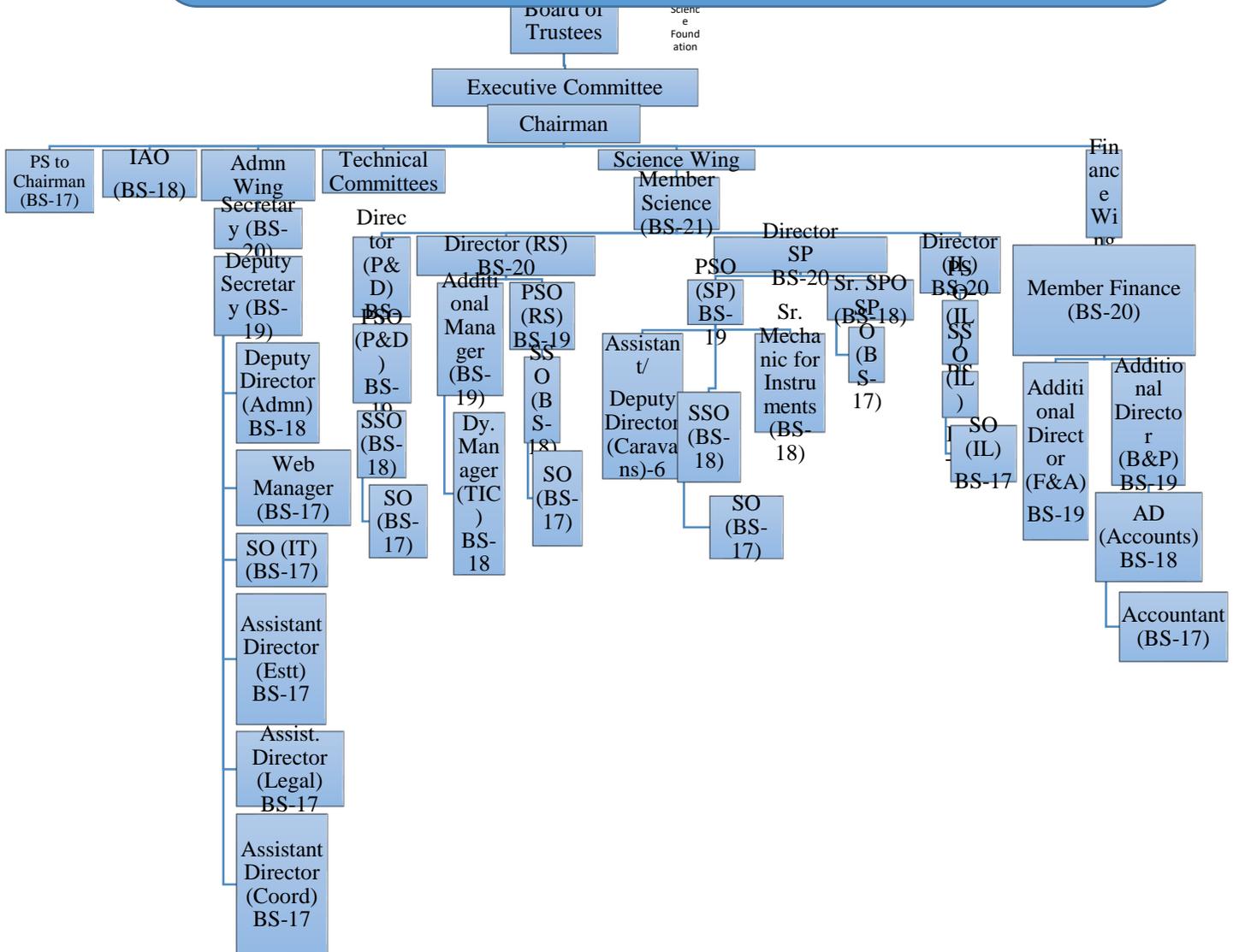
4.4 Other Display Activities

- Renovation of Paleo Gallery
- Wallpaper pasted on the PMNH boundary
- Renovation and Up-gradation of Eco Gallery
- Restoration of Rocks Garden.

IV. Organization and Administration

i. PSF Organizational Chart and Sanctioned Posts

Organogram of Pakistan Science Foundation



Actual Working Strength 2022-23

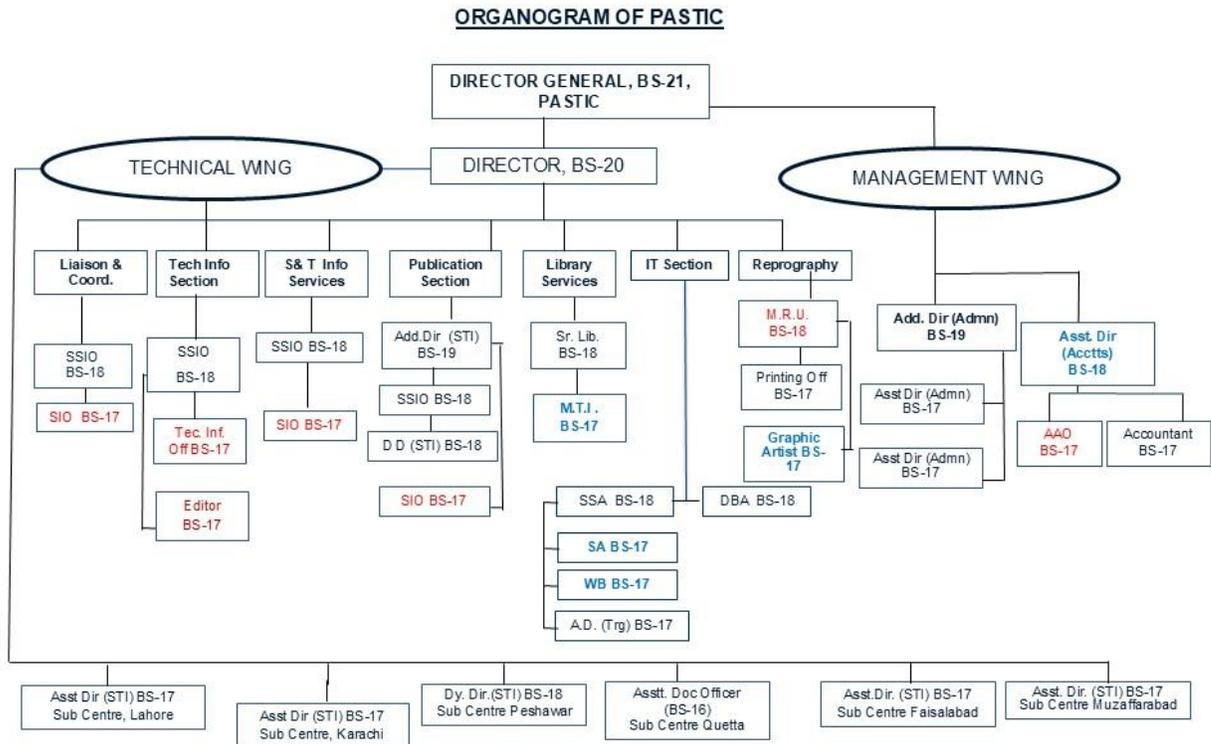
Sr. No	Post Nomenclature	BPS	Total	Filled	Vacant
1	Chairman	MP-1	1	-	1
2	Member Science	21	1	-	1
3	Member Finance	20	1	-	1
4	Secretary	20	1	1	-
5	Director (Research Support)	20	1	1	-
6	Director (Planning & Development)	20	1	1	-
7	Director (Science Popularization)	20	1	1	-
8	Director (International Linkages)	20	1	1	-
9	Deputy Secretary	19	1	-	1
10	Additional Director (F&A)	19	1	1	-
11	Principal Scientific Officer	19	5	2	3
12	Principal Science Promotion Officer	19	1	1	-
13	Additional Manager TIC	19	1	1	-
14	Additional Director (B&P)	19	1	1	-
15	Deputy Director (F&A)	18	1	-	1
16	Deputy Manager TIC	18	1	1	-
17	Deputy Director (Admin)	18	1	1	-
18	Deputy Director (Caravan)	18	3	3	-
19	Senior Scientific Officer	18	7	5	2
20	Internal Audit Officer	18	1	1	-
21	Sr. Mechanic for Instruments	18	1	1	-
22	Assistant Director (Accounts)	18	1	1	-

23	Assistant Director (Cord.)	17	1	-	1
24	Assistant Director (Estt)	17	1	-	1
25	Assistant Director (Legal)	17	1	-	1
26	Assistant Director (Caravan)	17	3	1	2
27	Scientific Officer	17	8	8	-
28	Scientific Officer (IT)	17	1	1	-
29	Science Promotion Officer	17	1	-	1
30	Web Manager	17	1	1	-
31	Accountant	17	1	1	-
32	PS to Chairman	17	1	1	-
33	Private Secretary	17	3	3	-
34	Sr. Photographer	17	1	1	-
35	Sr. Planetarium Assistant	17	3	3	-
Sub-Total (BS-17 & above)		-	60	44	16
Sr. No	Post Nomenclature	BPS	Total	Filled	Vacant
36	Assistant Scientific Officer (HQ)	16	2	-	2
37	Audit & Accounts Assistant	16	2	1	1
38	Science Assistant (Caravan)	16	16	16	-
39	Assistant Private Secretary	16	4	3	1
40	Sr. Driver-Cum-Mechanic	16	6	6	-
41	Sr. Planetarium Assistant	16	4	4	-
42	Science Assistant (HQ)	16	5	5	-
43	Assistant Programmer	16	2	-	2
44	Assistant Admin	16	2	2	-

45	PA to Chairman	16	1	1	-
46	Superintendent	16	2	1	1
47	Graphic Artist	16	1	1	-
48	Cashier	16	1	-	1
49	Technical Assistant (IT)	16	1	1	-
50	Science Assistant Caravan	15	1	-	1
51	Science Assistant (HQ)	15	1	-	1
52	Assistant Admin	15	2	2	-
53	Storekeeper	15	1	1	-
54	Stenotypist	15	1	1	-
55	Stenotypist	14	2	-	2
56	Upper Division Clerk	13	10	9	1
57	Driver-Cum-Mechanic	12	1	1	-
58	Driver-Cum-Mechanic	11	2	1	1
59	Planetarium Assistant	11	2	2	-
60	Lower Division Clerk	11	8	6	2
61	Carpenter	9	1	-	1
62	Electrician	8	1	1	-
63	DMO	6	1	1	-
64	Driver/D.R	7	7	7	-
65	Driver	6	6	6	-
66	Driver	5	2	2	-
67	Driver	4	3	2	1
68	Mali	6	1	1	-

69	Mali	5	1	1	-
70	Mali	3	1	1	-
71	Qasid	6	3	3	-
72	Qasid	5	4	4	-
73	Qasid	4	3	3	-
74	Qasid	3	8	8	-
75	Naib Qasid	1	1	1	-
Sr. No	Post Nomenclature	BPS	Total	Filled	Vacant
76	Security Guard	6	1	1	-
77	Security Guard	4	4	4	-
78	Security Guard	3	8	8	-
79	Security Guard	2	1	1	-
80	Security Guard	1	2	-	2
81	Caravan Attendant	6	1	1	-
82	Caravan Attendant	4	5	5	-
83	Caravan Attendant	3	3	3	-
84	Sanitary Worker	4	2	2	-
85	Sanitary Worker	3	1	1	-
86	Sanitary Worker	2	1	1	-
	Sub-Total (BS-16 & below)	-	152	132	20
	Grand Total	-	212	176	36

i. PASTIC Organizational Chart and Sanctioned Posts



Pakistan Scientific and Technological Information Centre, Islamabad
Detail Sanctioned Strength of BS-16 and above

Sr.#	BS	Designation	Number of Posts			Remarks
			Total	Filled in	Vacant	
1	21	Director General	1	1	0	
2	20	Director	1	1	0	
3	19	Additional Director (STI)	1	1	0	
4	19	Additional Director (Admin)	1	1	0	
5	18	Deputy Director (STI)	2	2	0	
6	18	Sr. System Analyst	1	1	0	
7	18	Senior Librarian	1	1	0	
8	18	Manager Reprographic Unit	1	0	1	Sindh-U
9	18	Database Administrator	1	1	0	
10	18	Senior Scientific Information Officer	4	4	0	
11	18	Assistant Director (Accounts)	1	1	0	
20	17	Assistant Director (Admn)	2	2	0	
12	17	Manager Technology Information	1	1	0	
13	17	Assistant Director (Training)	1	1	0	
14	17	Scientific Information Officer	4	1	3	Punjab, Punjab, KPK
15	17	Assistant Director (STI)	4	4	0	
16	17	System Analyst	1	1	0	
17	17	Web Manager	1	1	0	
18	17	Printing Officer	1	1	0	
19	17	Graphic Designer	1	1	0	
21	17	Technology Information Officer (Marketing)	1	0	1	Sindh-U
22	17	Editor	1	0	1	Punjab
23	17	Assistant Accounts Officer	1	0	1	Punjab
24	17	Accountant	1	1	0	
25	16	Superintendent (Admin)	2	2	0	
26	16	Assistant Scientific Information Officer	4	2	2	Merit, Punjab
27	16	Assistant Documentation Officer	1	1	0	
28	16	Assistant Programmer	2	2	0	
29	16	Assistant Web Manager	1	1		
30	16	Assistant Manager Reprographic Unit	1	1	0	
31	16	Assistant Printing Officer	3	2	1	Sindh-R
32	16	PA to D.G	1	1	0	
33	16	Assistant Accounts	1	1	0	
Sub Total			51	41	10	

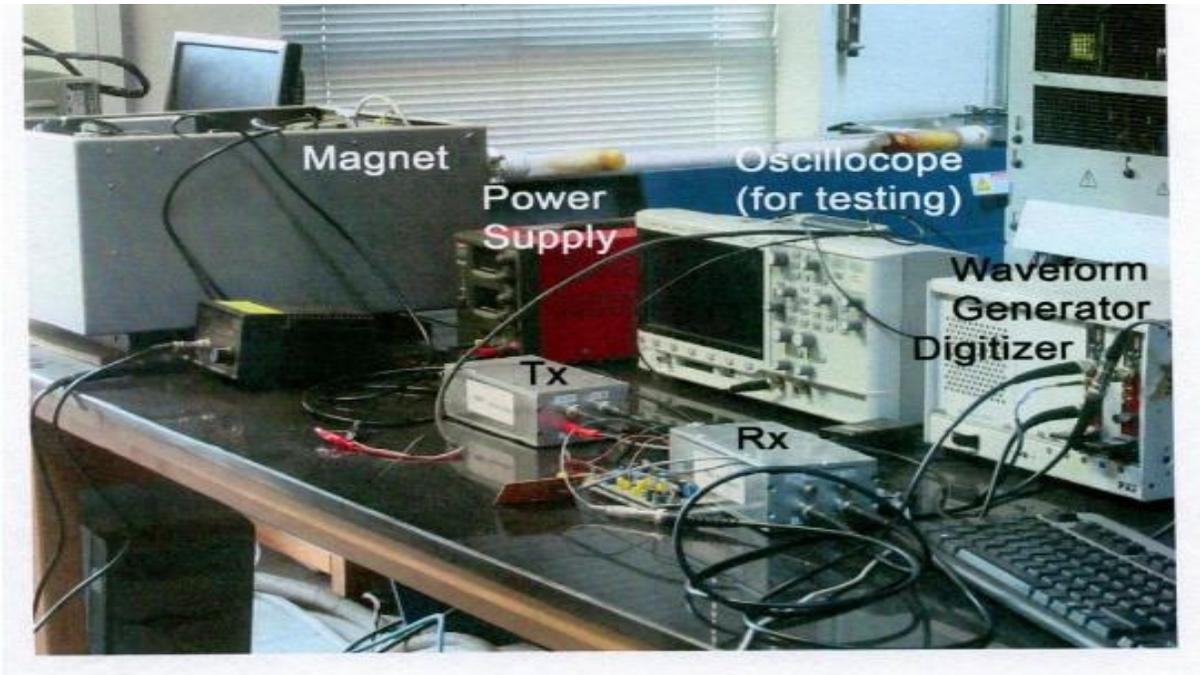
Pakistan Scientific and Technological Information Centre, Islamabad

Detail Sanctioned Strength of BS-15 and below

Sr.#	BS	Designation	Number of Posts			Remarks
			Total	Filled in	Vacant	
1	15	Assistant (Admn)	7	7	0	
2	15	Data Control Assistant	7	5	2	Punjab, Promotion
3	14	Marketing/Field Assistant	1	1	0	
4	15	Graphic Assistant	1	1	0	
5	14	Layout Artist	1	1	0	
6	14	Mechanical Supervisor	1	1	0	
7	14	Senior Offset Printer	2	1	1	Promotion
8	14	Stenotypist	4	3	1	Punjab
9	14	Data Entry Operator	4	3	1	Punjab
10	12	Library Assistant	1	1	0	
11	11	Technician	1	1	0	
12	11	Photo Assistant	1	0	1	
13	11	Offset Printer	1	1	0	
14	15	Technical Assistant	1	1	0	
15	11	Upper Division Clerk	10	10	0	
16	9	Lower Division Clerk	11	11	0	
17	9	Carpenter	1	0	1	Merit
18	7	Electrician	1	1	0	
19	7	Assistant Offset Printer	1	1	0	
20	5	Bindery Assistant	2	2	0	
21	5	Offset Machine Assistant	2	2	0	
22	4	Drivers	8	8	0	
23	4	Dispatch Rider	1	1	0	
24	4	Duplicating Machine Operator	1	1	0	
25	3	Head Mali	1	1	0	
26	2	Record Sorter	1	0	1	Promotion
27	2	Photo Attendant	2	2	0	
28	2	Qasid	1	1	0	
29	2	Patent Attendant	2	1	1	Promotion
30	2	Library Attendant	2	2	0	
31	1	Sanitary Workers	3	3	0	
32	1	Bindery Helper	3	3	0	
33	1	Mali	2	2	0	
34	1	Security Guard	8	8	0	
35	1	Naib Qasid	17	15	2	Local
Sub Total			113	102	11	
GRAND TOTAL			164	143	21	

V. Photo Gallery and Press Clipping

1. PSF Photo Gallery



A PSF funded project

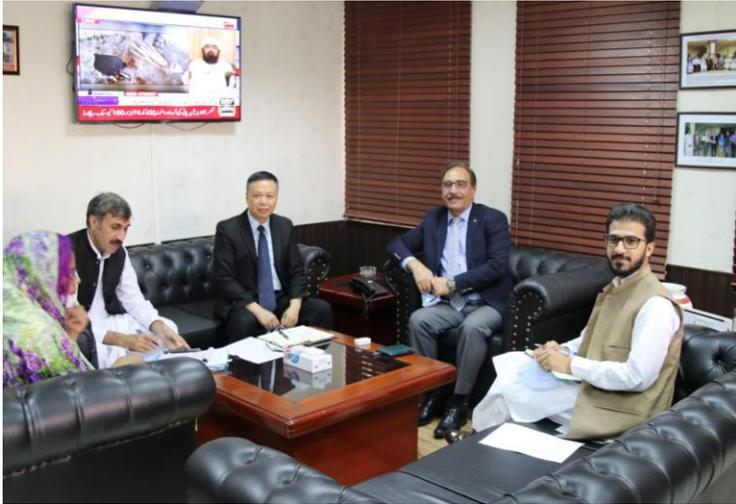




PSF Screening Committees Meetings for shortlisting of Projects received under JSEP



Dr. Muhammad Tahir Waseem, Associate Curator/Deputy Director-STEM, PSF attending "E-Waste Policy Conclave" on 4th August, 2022 at COMSATS University , Islamabad



Chairman, PSF Prof. Dr. Shahid Mahmood Baig alongwith during meeting with Mr. CAO Zhouhua, First Secretary, Embassy of China in Pakistan along with PSF and MoST Officer on 26th August, 2022



Prof. Dr. Shahid Mahmood Baig, Chairman, PSF presenting PSF Crest to Mr. CAO Zhouhua, First Secretary, Embassy of China in Pakistan



Group Photo of Participants of Science Diplomacy Course with Distinguished Guests and Speakers at COMSTECH



PSF-NSFC Joint Technical Committee Meeting (Online) for Finalization of Projects under JSEP Call

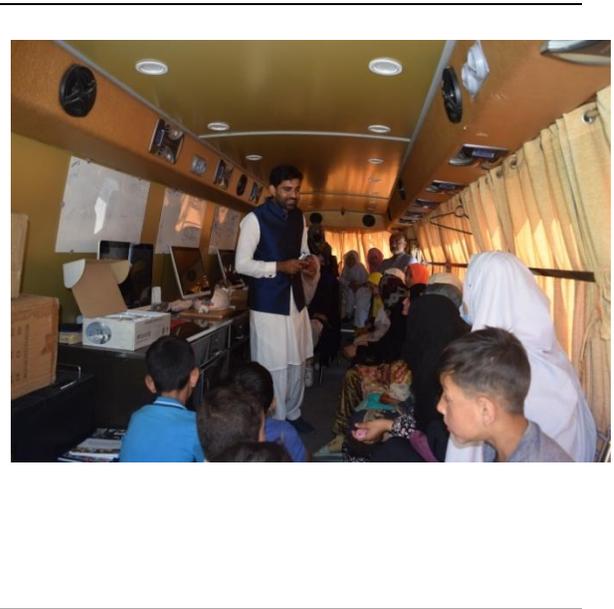




World Science Day for Peace and Development (WSDPD) 2022



Memorandum of Understanding (MOU) was signed between Pakistan Science Foundation (PSF) and Institute of Space Technology (IST).





Glimpses of Science Caravan Federal Unit, during Exhibitions



Activity Glimpses of Peshawar Unit



Visitors briefed by Mr. Khalid Hussain Soomro



Science Exhibition by Quetta Unit



Mr. Maqbool Ahmad delivering lecture on Eye Model



Mr. Muzaffar Ali Sial brief the students in STFS Bus



Mr. Rana Saeed giving instructions about exhibition to students

Annexure I

PAKISTAN SCIENCE FOUNDATION ACT 1973

National Assembly of Pakistan Islamabad, the 2nd February 1973

The following Acts of the National Assembly received the assent of the President on the 31st January 1973 and hereby published for general information.

Act No. III of 1973

An Act to provide for the establishment of the Pakistan Science Foundation.

Whereas it is expedient to provide for the establishment of the Pakistan Science Foundation and for matters ancillary there to,

It is hereby enacted as follows:-

- 1) **Short title, extent and commencement.** (1) This Act may be called the Pakistan Science Foundation Act, 1973.
 - 2) It extends to the whole of Pakistan
 - 3) It shall come into force at once.
1. **Definitions.** In this Act, unless there is anything repugnant in the subject or context.
- a) “Board” means the Board of Trustees of the Foundation;
 - b) “Chairman”: means the Chairman of the Foundation; and
 - c) “Foundation” means the Pakistan Science Foundation established under this Act.
3. **Establishment of the Foundation.** (1) As soon as may be after the commencement of this Act, the Federal Government may, by notification in the official Gazette, establish a Pakistan Science Foundation to promote and finance scientific activities having a bearing on the socio-economic needs of the country.
- (2) The Foundation shall be a body corporate by the name of the Pakistan Science Foundation, having perpetual succession and a common seal, with power, subject to the provision of this Act, to acquire, hold and dispose of property, both movable and immovable, and shall be the said name sue and be sued.
- (3) The Head Office of the Foundation shall be at Islamabad.

4. Functions of the Foundation: The Foundation shall function as a financing agency for

- i) The establishment of comprehensive scientific and technological information and dissemination centers;
 - ii) 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;
 - iii) The utilization of the results of scientific and technological research including pilot plant studies to prove the technical and economic feasibility of processes found to be promising on a laboratory scale;
 - iv) The establishment of science centers, clubs, museums, herbaria and planetaria,
 - v) The 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;
 - vi) The organization of periodical science conferences, symposia and seminars;
 - vii) The exchange of visits of scientists and technologists with other countries;
 - viii) The grant of awards, prizes and fellowships to individuals engaged in developing processes, products and inventions of consequence to the economy of the country;
and
 - ix) Special scientific surveys not undertaken by any other organization and collection of scientific statistics related to the scientific effort of the country.
- (2) The Foundation shall also:
- i) Review the progress of scientific research sponsored by it and evaluate the results of such research;
 - ii) Maintain a National Register of highly qualified and talented scientists of Pakistan including engineers and doctors, in or outside the country and to assist them, in collaboration with the concerned agencies in finding appropriate employment; and
 - iii) Establish liaison with similar bodies in other countries.

(3) In the performance of its functions, the Foundation shall be guided on questions of policy by the instructions, if any, given to it by the Federal Government, which shall be the sole judge as to whether a question is a question of policy.

5. Board of Trustees. (1) The general direction, conduct and management of the affairs of the Foundation, including administration of its funds, shall vest in a Board of Trustees consisting of the following members namely;

Whole-time members

- i) the Chairman;
- ii) one eminent scientist;
- iii) the Director of Finance; to be appointed by the President;

Part-time members

- iv) the Chairman of the National Science Council;
- v) four scientists to be nominated by the National Science Council; and
- vi) eleven eminent scientists to be nominated by the President

(2) The remuneration and other terms and conditions of service of the Chairman and the two other whole-time members of the Board shall be such as may be determined by the President.

6. Chairman of the Board

- (1) The Chairman of the Board shall be the Chairman of the Foundation and shall be appointed from amongst the eminent scientists of the country having experience of research and scientific administration.
- (2) The Chairman shall, subject to sub-section (3), hold office for a term not exceeding three years and shall be eligible for re-appointment.
- (3) The President may at any time terminate the appointment of the Chairman without notice and without assigning any reason.

7. Term of Members of the Board.

- (1) The members of the Board, other than the ex-officio member, shall subject to sub-section (3), hold office for a term not exceeding three years and shall be eligible for re-appointment or re-nomination, as the case may be.

(2) A member, other than an ex-officio member, may at any time resign his office by writing under his hand addressed to the President but shall continue to perform his functions until his resignation has been accepted.

(3) The President may at any time terminate the appointment or, as the case may be, nomination of any member of the Board without notice and without assigning any reason.

8. Meetings of the Board.

(1) The meeting of the Board shall be held at least twice a year and shall be presided over by the Chairman or, in his absence, by its whole-time scientist member.

(2) All decisions at a meeting of the Board shall be taken by a majority of the votes of the members present and voting.

9. **Quorum at the Meeting of the Board.** To constitute a quorum at a meeting of the Board not less than nine members shall be present.

10. **Executive Committee.** There shall be an Executive Committee consisting of the Chairman and the two whole-time members of the Board.

11. **Delegation of Powers.** The Board may, from time to time, delegate the Chairman or the Executive Committee such of its power and functions as it may consider necessary.

12. **Adhoc Committees.** The Foundation may set up adhoc committees consisting of university professors and other leading scientists and experts to scrutinize applications for financial assistance for carrying out scientific research submitted to the Foundation by the universities or other institutions or by individual scientific workers or groups of scientific workers and to review and evaluate the results of research sponsored by the Foundation.

13. **Funds.** The funds of the Foundation shall consist of:

- a) Grants made by the Federal Government and the Provincial Governments;
- b) Donation and endowments; and
- c) Income from other sources

(As amended vide Ordinance No XIII of 1979, Published in the Gazette of Pakistan Extra, Feb 24, 1979) Part I,

14. **Budget.** The Foundation shall cause to be prepared and approve a statement of its receipt and expenditure for each financial year.
15. **Accounts and Audit.**
 - (1) The funds of the Foundation shall be kept in a personal ledger account of the Foundation with the State Bank of Pakistan or with any Branch of the National Bank of Pakistan acting as an agent of the State Bank.
 - (2) The accounts of the Foundation shall be maintained in such form and manner as the Auditor-General of Pakistan may determine in consultation with the Federal Government.
 - (3) The accounts of the Foundation shall be audited by one or more auditors who are chartered accountants within the meaning of the Chartered Accountants Ordinance, 1961 (X of 1961) and are appointed by the Foundation in consultation with the Auditor-General of Pakistan.
16. **Appointment of Officers and Servants.**
 - (1) The Foundation may appoint such officers and servants and engage such consultants or experts, as it may consider necessary for the efficient performance of its functions, on such terms and conditions as it may deem fit.
 - (2) In fixing the terms and conditions of service of its officers and servants, the Foundation shall, as nearly as may be, conform to the scales of pay, allowances and conditions of service applicable to the corresponding class of employees of the Federal Government.
17. **Annual Reports.**
 - (1) The annual report of the Foundation, which shall among other things, clearly bring out the benefits accruing to the nation as a result of the activities sponsored by the Foundation, shall be prepared by the Chairman and submitted through the Board to the Federal Government along with the audited accounts of the Foundation.
 - (2) The annual report along with the audited accounts of the Foundation shall be laid before the National Assembly.
18. **Regulations.** The Foundation may make regulations for the efficient conduct of its affairs.
19. **Repeal.** The Pakistan Science Foundation Ordinance, 1972 (LII of 1972), is hereby repealed.

LIST OF PROJECTS APPROVED BY EXECUTIVE COMMITTEE 2022-23

Sr. #	Project Title & No.	P.I. Name, Designation & Address	Total Cost in Pak. Rs.
1.	PSF/Res/P-UMT/Agr (502) Whey Proteins as an Encapsulating Material for Stabilizing Polyphenols in Water-in-oil Emulsions	Prof. Dr. Nouman Khalid Dean School of Food and Agricultural Sciences University of Management and Technology (UMT) Lahore	3,234,800/-
2.	PSF/Res/B-BAC/Agr (505) Mediation of R Genes Regarding Abiotic Stresses (Drought) in Tomato Crop through Molecular Techniques in Balochistan	Dr. Ghulam Rasool Lashari, Associate Professor Department of Plant Breeding and Genetics Balochistan Agriculture Collage (BAC) Quetta	2,288,220/-
3.	PSF/Res/P-PU/Bio (677) Investigation on Identification of Phosphine Resistance Gene for Effective Control of Stored Grain Pest, <i>Trogoderma granarium</i>	Prof. Dr. Farah Rauf Shakoori Department of Zoology The University of Punjab (PU) Lahore	2,060,910/-
4.	PSF/Res/S-KU/Bio (679) Molecular Identification of Xanthid Crabs Found along Pakistan Coast	Dr. Faiz Muhammad Assistant Professor Centre of Excellence in Marine Biology, (CEMB) University of Karachi Karachi	1,185,954/-
5.	PSF/Res/KPK-PU/Bio (680) Development of Passive Immunotherapy and Chemotherapy against Enterotoxemia for Effective Prevention and Control in Small Ruminants	Dr. Haq Aman Ullah Assistant Professor Department of Animal Health The University of Agriculture Peshawar	2,245,235/-

6.	PSF/Res/AJK-PU/Bio (682) Assessment of Diversity, Distribution and Community Structure of Native Vegetation of District Neelum, Azad Kashmir	Dr. Kh. Shafique Ahmad Assistant Professor Department of Botany University of Poonch (PU) Rawalakot	1,723,800/-
7.	PSF/Res/S-KU/Bio (683) Culture of Marine Ornamental Organisms with Special Emphasis on Soft Corals to the Promotion of Marine Aquarium Trade and Technology Transfer	Dr. Amjad Ali Assistant Professor Centre of Excellence in Marine Biology (CEMB) University of Karachi (KU) Karachi	2,627,800/-
8.	PSF/Res/S-BU/Bio (684) Development of Cage Aquaculture Techniques, Assessment of Finfish Growth Performance and Technology Transfer to the Coastal Communities of Pakistan	Dr. Naveed Ahmad Head/Assistant Professor Aquatic Diagnostic & Research Centre (ADRC) Department of Maritime Sciences Bahria University Karachi Campus	3,096,800/-
9.	PSF/Res/P-CUI/Chem (613) Development and Characterization of Lornoxicam Loaded Nano-Sponges for Topical Applications in Rheumatoid Arthritis	Dr. Yasser Shahzad Assistant Professor Department of Pharmacy COMSATS University Islamabad (CUI) Lahore Campus	3,824,000/-
10.	PSF/Res/P-CUI/Chem (615) Setting up the Disposable Electrode Printing Work Station and Fabrication of Printable Electrodes for Efficient Detection Glucose	Dr. Mian Hasnain Nawaz, Associate Professor, Interdisciplinary Research Centre in Biomedical Materials (IRCBM) COMSATS University Islamabad (CUI) Lahore Campus	2,230,000/-
11.	PSF/Res/B-UoB/Chem (619) Portable Hybrid Solar Essential Oil Distillation Unit	Prof. Dr. Ashif Sajjad Institute of Biochemistry University of Balochistan (BU) Quetta	866,474/-

12.	PSF/Res/P-FJWU/Maths (69) A Mathematical Interpretation of Chaotic Framework and its Application to Efficient Image Encryption”	Dr. Shamsa Kanwal Assistant Professor Department of Mathematical Sciences Fatima Jinnah Women University Rawalpindi	984,300/-
13.	PSF/Res/P-GCU/Earth (101) Glacial and Hydrological Dynamics in the Hindukush-Karakorum-Himalayan Region and its Impact on Transboundary Indus Basin Water Security	Dr. Fazlul Haq Assistant Professor Department of Geography Govt. Collage University Faisalabad	4,465,000/-
14.	PSF/Res/KPK-PU/ Earth (102) Vulnerability Assessment of Swat, Dir and Chitral with respect to Earthquakes of PAMIR-Hindu Kush Region	Dr. Khaista Rehman Associate Professor National Centre of Excellence in Geology University of Peshawar Peshawar	3,060,000/-
15.	PSF/Res/S-NED/Engg (195) Cost-Effective Synthesis of Tetra Ethylene Glycol Dimethyl Ether (TEGDME) for the Development of Highly Efficient Energy Storage Devices	Prof. Dr. Zahoor ul Hussain Awan Department of Polymer and Petrochemical Engineering NED University of Engineering and Technology Karachi	2,690,000/-
16.	PSF/Res/C-IBGE/Med (530) To Screen HFE, HJV, HAMP, TFR2 and SLC40A1 Genes to Characterize the Molecular Basis of Hereditary Hemochromatosis in Pakistani Hemochromatosis Patients	Dr. Saeeda Munir Principal Scientific Officer Institute of Biomedical and Genetic Engineering (IBGE) Islamabad	2,536,000/-
17.	PSF/Res/C-PINSTECH/Med (531) Development of Novel Early Cancer Biosignatures in Breast and Stomach Cancers	Dr. Faisal Rasheed Senior Scientist Life Science Group, Isotope Application Division (IAD) Pakistan Institute of Nuclear Science and Technology (PINSTECH) Islamabad	6,000,000/-

18.	PSF/Res/C-NILOP/Med (532) Development of Laser Devices at 405 & 1064 nm along with Optical Fiber Based Light Delivery Probes for the Diagnosis and Treatment of Gastrointestinal, Rectal and Diabetic Disease Disorders	Dr. Muhammad Saleem Deputy Chief Scientist National Institute of Lasers and Optronics (NILOP) Islamabad	4,753,040/-
19.	PSF/Res/C-NUMS/Med (533) Molecular Lesions in Aplastic Anemia and their Role in Tailoring Treatment in Post-genomic Era	Dr. Hamayoon Shafique Assistant Professor Department of Biological Sciences National University of Medical Sciences (NUMS) Islamabad	2,958,000/-
20.	PSF/Res/S-AKU/Med (534) Mobile Health (m-Health) Intervention to Reduce the Epigenetic Signature of Advance Glycation end Products (AGE) as a Risk Biomarker in Metabolically Healthy and Unhealthy Obese Adults	Dr. Syeda Sadia Fatima Associate Professor Department of Biological and Biomedical Sciences The Aga Khan University (AKU) Karachi	1,126,983/-
21.	PSF/Res/P-UCP/Med (536) Harnessing the Untapped Therapeutic Potential of Phthalazine scaffold as Small-molecule Inhibitors of Ectonucleotidases for the Treatment of Diabetic Complications	Dr. Sumera Zaib Head Department of Basic & Applied Chemistry University of Central Punjab Lahore	4,650,000/-
22.	PSF/Res/S-AKU/Med (537) Efficacy of Vitamin D Supplementation in Females with Polycystic Ovary Syndrome: a Randomized Open Label Delayed-Start Design	Dr. Rehana Rehman Associate Professor Department of Biological and Biomedical Sciences The Aga Khan University Karachi	3,968,125/-
23.	PSF/Res/S-AKU/Med (538) Treatment of Epilepsy and Associated Memory Loss with Herbal Extracts and their Mechanisms of Action	Dr. Fazal Manzoor Arain Assistant Professor Department of Biological and Biomedical Sciences The Aga Khan University Karachi	5,268,702/-

24.	PSF/Res/KPK-KUST/Med (542) Identification of Casual Genetic Variants for Anphthemia/Microphthemia in Pakistani Families	Dr. Bibi Shamim Saleha Associate Professor Department of Biotechnology and Genetic Engineering Kohat University of Science and Technology Kohat	2,384,210/-
25.	PSF/Res/S-DUHS/Med (543) In Vitro Modulation of Wet Signaling Pathway and Its Associated Molecules in Glioblastoma Stem Cells to Combat Therapeutic Resistance and Tumor Relapse	Dr. Farina Hanif Assistant Professor Department of Biochemistry Institute of Biomedical Sciences Dow University of Health Sciences (DUHS) Karachi	3,520,000/-
26.	PSF/Res/P-UVAS/Med (549) Formulation Development and Non-Invasive In-Vivo Evaluation of Dermatological Creams containing Plant Extracts in the Treatment of Various Dermatological Disorders	Dr. Muhammad Khurram Waqas Assistant Professor Institute of Pharmaceutical Sciences University of Veterinary and Animal Sciences Lahore	2,677,682/-
27.	PSF/Res/C-NUST/Med (550) Development of Self-responsive Glucose Dependent Insulin Patch (Insupatch)	Dr. Adeeb Shehzad Assistant Professor Department of Biomedical Engineering and Sciences National University of Sciences and Technology (NUST) Islamabad	5,620,000/-
28.	PSF/Res/P-BZU/Med (551) Pharmacological Effects of Zn-Oxide Flavonoids Nanopartciles on D-galactose Induced Aging in Rats	Dr. Noreen Samad Chairperson Department of Biochemistry Bahauddin Zakariya University (BZU) Multan	4,151,500/-
29.	PSF/Res/C-PIEAS/Phys (218) Controlled Synthesis of Drug Encapsulated Metallopolymer Nanocomposites Using Microfluidic Platform for Targeted Cancer Therapy	Dr. Shazia Bashir Associate Professor Department of Physics and Applied Mathematics Pakistan Institute of Engineering and Applied Sciences (PIEAS) Islamabad	3,004,450/-
163			Total (Rs.): 89,201,985/-

**DETAILS OF MONITORING AND EVALUATION OF ON GOING PROJECTS DURING
2022-2023**

Non Development Budget

a. Semi Annual Technical Reports

S #	Project No.	Project title	Report
1.	PSF/Res/KPK-PU/Earth (96)	Shale Gas Potential of the Kohat Sub-basin, Indus Basin, Pakistan	3 rd semi annual
2.	PSF/Res/P-CUI/Chem (600)	Fabrication of Bio-mimic Photosensitive thin Film for Efficient Tissue Adhesion	1 st semi annual
3.	PSF/Res/S-ICCBS/Chem (609)	Investigating Interaction of Hydrophobic Gentamicin with Polymeric Nanomaterials to form a Drug Delivery System for Brucellosis	1 st semi annual
4.	PSF/Res/S-ICCBS/Chem (598)	Anti-obesity Effects of Medicinal Plants Extracts, Natural and Synthetic Compounds- A Strategy to Control the Epidemic of Metabolic Disorders	1 nd semi annual
5.	PSF/Res/S-MUET/Engg (187)	Computational Investigations on Novel 2D Monatomic Hexagonal Boron Nitride (h-BN) and Transition Metal Nitride (TMN) Materials for Hydrogen Storage Applications	1 st semi annual
6.	PSF/Res/KPKNUST/Engg (188)	Design, Development and Wind Tunnel Testing of a	1 st semi annual

		Low Aspect Ratio Wing to Study Wing Rock Phenomenon at Low Reynolds Number for Micro Aerial Vehicle Applications	
7.	PSF/Res/P-PU/Biotech (239)	Gene Discovery for Skeletal Dysplasia, Protein Localization and in-vitro Variant Pathogenic Analyses	1 st semi annual
8.	PSF/Res/KPK-KUST/Med (523)	Improvement and Upgradation of Pakistan Genetic Mutation Database (PGMD): a Step Towards Effectiveness	1 st semi annual
9.	PSF/Res/P-CUI/Med (520)	Use of RNA Nanoparticles for Regression of Cancer	1 st semi annual
10.	PSF/Res/C-NUST/Med (521)	Development of Biodegradable Sutures for Surgical Incisions and Wounds	1 st semi annual
11.	PSF/Res/S-AKU/Med (525)	Identification of Serum miRNA as a Potential cost-effective Biomarker of Glioblastoma	1 st semi annual

b. First Annual Technical Reports

S.#	Project No.	Project title
1.	PSF/Res/P-CUI/Chem (600)	Fabrication of Bio-mimic Photosensitive thin Film for Efficient Tissue Adhesion

2.	PSF/Res/KPK-NUST/Engg (188)	Design, Development and Wind Tunnel Testing of a Low Aspect Ratio Wing to Study Wing Rock Phenomenon at Low Reynolds Number for Micro Aerial Vehicle Applications
3.	PSF/Res/KPK-HU/Biotech (238)	Development of an Optical Aptasensor for the Detection of Microbial Agents from Food Samples
4.	PSF/Res/P-LCWU/Phys (214)	To Investigate the Various Instabilities as Energy Source in Quantum and Classical Plasmas
5.	PSF/Res/S-AKU/Med (525)	Identification of Serum miRNA as a Potential cost-effective Biomarker of Glioblastoma

c. Second Annual Technical Reports

S.#	Project No.	Project title
1.	PSF/Res/C-RIU/Chem (583)	Design, synthesis and pharmacological screening of Novel 2-mercapto benzimidazole derivatives as potential anti ulcer agents

d. Final Technical Reports

S.#	Project No.	Project Title
3.	PSF/Res/C-NESCOM/Agr (497)	Wild Olive (<i>OleaCuspedata</i>) utilization as Root Stock for Oil Plants through Different Top working Techniques
4.	PSF/Res/KPK-PU/Earth (96)	Shale Gas Potential of the Kohat Sub-basin, Indus Basin, Pakistan
5.	PSF/Res/P-NUST/Med (453)	EMG Powered Active Ankle Lower Limb Prosthetic Foot

6.	PSF/Res/P-UHS/Med (478)	Comparison of Salivary Aquaporin-5 Levels in Patients with Type-II Diabetes mellitus and Healthy Individuals
7.	PSF/Res/S-AKU/Med (506)	Development of Mouse Model of Heart Fibrosis after Myocardial Infarction to Study the Molecular Contributions of Wnt signaling Proteins and Galectin-3.
8.	PSF/Res/C-IBGE/Med (509)	Exploring Predictive biomarker for Aplastic anemia: An appropriate tool for diagnosis and Treatment

e. Technical Reports Adopted by Technical Committee

S. #	Project No.	Project title	Report
1	PSF/Res/C-NESCOM/Agr (497)	Wild Olive (OleaCuspedata) utilization as Root Stock for Oil Plants through Different Top working Techniques	Second Annual Technical Report
2	PSF/Res/B-ARI/Agr (492)	Screening of Indeterminate Tomatoes hybrids/varieties under the High Tunnels in Balochistan	Final Technical Report
3	PSF/Res/C-NESCOM/Agr (497)	Wild Olive (OleaCuspedata) utilization as Root Stock for Oil Plants through Different Topworking Techniques	Final Technical Report
4	PSF/Res/KPK-PU/Earth (96)	Shale Gas Potential of the Kohat Sub-basin, Indus Basin, Pakistan	Second Annual Technical Report

5	PSF/Res/KPK-PU/Earth (96)	Shale Gas Potential of the Kohat Sub-basin, Indus Basin, Pakistan	Final Technical Report
6	PSF/Res/KPK-PU/Bio (661)	Molecular Characterization of Clostridium perfringens and development of Toxide Vaccine	Final Technical Report
7	PSF/Res/C-RIU/Chem (583)	Design, Synthesis and Pharmacological Screening of Novel 2-mercapto Benzimidazole derivatives as Potential Anti ulcer Agents	1 st Annual Technical Report
8	PSF/Res/P-MNS-UET/Chem (587)	Titanium Dioxide Based Self-Cleaning Textiles: Comparative study of Degradation of Different Dyes using Visible-light active Self-Cleaning Cotton, Wool and Polyester	1 st Annual Technical Report
9	PSF/Res/P-MNS-UET/Chem (587)	Titanium Dioxide Based Self-Cleaning Textiles: Comparative study of Degradation of Different Dyes using Visible-light active Self-Cleaning Cotton, Wool and Polyester	2 nd Annual Technical Report
10	PSF/Res/P-MNS-UET/Chem (587)	Titanium Dioxide Based Self-Cleaning Textiles: Comparative study of Degradation of Different Dyes using Visible-light active Self-Cleaning	Final Technical Report

11	PSF/Res/S-ICCBS/Chem (596)	Structural and Function Study of Metabolites of Fluorinated Drugs Produced by Fungal Transformation of Fluorinated Steroids	Final Technical Report
12	PSF/Res/P-UET.TX/Engg (152)	Design and Implementation of real time Cooperative MIMO Communication Platform for Next Generation Wireless Communications	Final Technical Report
13	PSF/Res/S-MUET/Engg (155)	Dyeing of Synthetic Polyester Fabric with Natural Dye using Radcure Techniques	Final Technical Report
14	PSF/Res/C-SEECS-NUST/Engg (164)	iDOC: A Portable, Cost Effective Diagnostic Screening Device for Early Dengue Fever Detection	Final Technical Report
15	PSF/Res/KPK-GIKI/Engg (170)	Development of Natural Fiber (wool/cane fiber) Reinforced Polymer Matrix Composites	Final Technical Report
16	PSF/Res/P-CUI/Engg (124)	Synthesis of Chemically Modified Polymeric Membranes for Biogas Purification and Natural Gas Sweetening	Final Technical Report
18	PSF/Res/B-BUITEMS/Comp (61)	Extended Classroom Learning via Online Social Networking: Male-Female Learning Comparative Impact	Final Technical Report

19	PSF/Res/KPK-HU/Biotech (238)	Development of an Optical Aptasensor for the Detection of Microbial Agents from Food Samples	1 st Annual Technical Report
20	PSF/Res/P-LUMS/ Phys(159)	Development of Low Field, Low Cost, Reconfigurable NMR and MRI	Final Technical Report
21	PSF/Res/P-IUB/Phys(189)	Synthesis and Characterization of Nano-ferities for Thermoelectric Power Generation	Final Technical Report
22	PSF/Res/P-FCC/Phys(202)	Quasilinear Theory of Electromagnetic Instabilities with Non-Maxwellian Distribution Functions	Final Technical Report
23	PSF/Res/P-GCUF/Phys (203)	Fabrication of Metal Semiconductor Diodes by Home Developed Thermal Evaporation System	Final Technical Report
24	PSF/Res/P-AMC/Med (519)	Genomic Landscape of Myelodysplastic Syndrome Patients in Pakistan	First Annual Technical Report
25	PSF/Res/C-IBGE/Med (509)	Exploring Predictive biomarker for Aplastic anemia: An appropriate tool for diagnosis and Treatment	First Annual Technical Report
26	PSF/Res/C-IBGE/Med (509)	Exploring Predictive biomarker for Aplastic anemia: An appropriate tool for diagnosis and Treatment	Final technical report

27	PSF/Res/S-AKU/Med (506)	Development of Mouse Model of Heart Fibrosis after Myocardial Infarction to Study the Molecular Contributions of Wnt-signaling Proteins and Galectin-3.	First annual technical report
28	PSF/Res/S-AKU/Med (506)	Development of Mouse Model of Heart Fibrosis after Myocardial Infarction to Study the Molecular Contributions of Wnt-signaling Proteins and Galectin-3.	Second Annual Technical Report
29	PSF/Res//P-GCU/Med(485)	Bioassay Guided Screening and Purification of Medicinal Plant against Hepatitis C Virus	First Annual Technical Report
30	PSF/Res//P-GCU/Med (485)	Bioassay Guided Screening and Purification of Medicinal Plant against Hepatitis C Virus	Final Technical Report
31	PSF/Res/KPK-IBMS/Med (493)	The Role of Circulating Tumor DNA in Monitoring Treatment Response in Patients with Breast Cancer	First Annual Technical Report
32	PSF/Res/KPK-IBMS/Med (493)	The Role of Circulating Tumor DNA in Monitoring Treatment Response in Patients with Breast Cancer	Second Annual Technical Report
33	PSF/Res/KPK-IBMS/Med (493)	The Role of Circulating 17 Tumor DNA in Monitoring	Final Technical Report

		Treatment Response in Patients with Breast Cancer	
34	PSF/Res/CP/S-AKU/Med (488)	Analysis of Population-Specific Epitope and Drug-resistance Mutations in HIV-1 in Pakistan	Final Technical Report
35	PSF/Res/P-UHS/Med(492)	Biochemical and Molecular Analysis of Oculocutaneous Albinism in Families from Pakistan	Final Technical Report
36	PSF/Res/P-IUB/Med(481)	Development of Optimized Dry Injectable Product of Docetaxel via Freeze Drying Method to Enhance the Solubility and Stability	Final Technical Report
37	PSF/Res/C-PIMS/Med(450)	Identification of Molecular Determinants of Hereditary Deafness	Final Technical Report
38	PSF/Res/P-NUST/Med(453)	EMG Powered Active Ankle Lower Limb Prosthetic Foot	Final Technical Report
39	PSF/Res/KPK-AWKU/Med (459)	Development of Coumarin Based Compounds for U2OS Bone Cancerous Cell Treatment	Final Technical Report
40	PSF/Res/P-UHS/Med(478)	Comparison of Salivary and Lacrimal Aquaporin-5 Levels in Patients with Type-I and Type-II Diabetes mellitus and Healthy Individuals	Final Technical Report
41	PSF/Res/C-QU/Med (516)	Identification of Molecular Determinants of Breast Cancer in Pakistan	First Annual Technical Report

**SCIENTIFIC PULICATIONS PRODUCED THROUGH PSF SUPPORTED
COMPLETED PROJECTS DURING 2022-23**

S.No.	Project No.	Publications
1.	PSF/Res/B-ARI/Agr(492)	<ul style="list-style-type: none"> • Mr. Malik Bakht Ali, Mr. Sher Mohammad Lehri, Mr. Bashri Ahmed Bangulzai and Mr Dawood Khan, (2020) • Evaluating the Various Indeterminate germplasm of tomato hybrids for yield components under High Tunnel at Climatic condition of Balochistan, International Journal of Agriculture and Biological Sciences- ISSN (2522-6584) July & Aug 2020
2.	PSF/Res/KPK-PU/Bio(661)	<ul style="list-style-type: none"> • Sidra Shehzadi, Sher Bahadar Khan, Umar Sadique and Saqib Nawaz, (2021), Isolation and Molecular Identification of Clostridium perfringens Type D in Goats in District Peshawar. DOI: 10.17582/journal.sja/2021/37.1.110.114 • Mumtaz Ali Khan, Sher Bahadar Khan, Shakoor Ahmad, Irshad Ahmad, Kashif Prince, Ghazunfar Rashid, MahboobAli, Imdad Ullah Khan, Asad Ullah, Naimat Ullah, Muhammad Shoab and Said Sajjad Ali Shah (2020), Variation in Physiological Biomarkers with Different Clostridium perfringens Isolate Infections in Balkhi Sheep, Pakistan J. Zool., pp 1-7
3.	PSF/Res/S-MUET/Engg (155)	<ul style="list-style-type: none"> • Arian, R. S., Peerzada, M. H., Arbab, A. A., Arain, S. B. An efficient, (2019), Ultrasonic and Microwave assisted extraction of organic Henna dye for Dyeing of synthetic Polyester fabric for superior color strength properties, journal Industria Textila, issue no. 4 • Arain, R., Ahmad, F. Khatri, Z., Peerzada, M. H. (2021), Microwave assisted Henna organic dyeing of polyester fabric: A green, economical and 11 energy proficient, journal Natural Product Research, Jan; 35(2):327330, DOI: 10.1080/14786419.2019.1619721
4	PSF/Res/C-SEECs-NUST/Engg(164)	<p>173</p> <ul style="list-style-type: none"> • Prof. Dr. Faisal Shafait, Muhammad Abdullah Anjum, Sohaib Nasir and Abdul Rehman Bin Saad. Title of Patent Filed: TeleDoc: A New Approach to

		Diagnostic Screening Mahnoor Haneef , Imran Mahmood, Shahzad Younis and Faisal Shafait, (2020), Artificial Intelligence Based Diagnostic Screening For Dengue Fever. International Conference on Dengue Prevention & Control
5	PSF/Res/KPK-GIKI/Engg (170)	<ul style="list-style-type: none"> • Muhammad Ramzan Abdul Karim, Danish Tahir, Ehsan Ul Haq, Azhar Hussain and Muhammad Sohail Malik, (2021), Natural fibres as promising environmental-friendly reinforcements for polymer composites, <i>Polymers and Polymer Composites</i>, Volume 29, Issue 4, May 2021, Pages 277-300 • Muhammad Ramzan Abdul Karim, Danish Tahir, Azhar Hussain, Ehsan Ul Haq and Khurram Imran Khan, (2020), Sodium carbonate treatment of fibres to improve mechanical and water absorption characteristics of short bamboo natural fibres reinforced polyester composite, <i>Plastics, Rubber and Composites</i> Volume 49, 2020 - Issue 10 Pages 425-433 • Muhammad Ramzan Abdul Karim, Danish Tahir, Khurram Imran Khan, Azhar Hussain, Ehsan Ul Haq & Muhammad Sohail Malik, (2022), Improved mechanical and water absorption properties of epoxy-bamboo long natural fibres composites by eco-friendly Na₂CO₃ treatment, <i>Polymers and Polymer Composites</i>, https://doi.org/10.1080/14658011.2022.2030152
6	PSF/Res/P-CUI/Engg (124)	<ul style="list-style-type: none"> • Z. Shamair, N. Habib, M. A. Gilani, A. L. Khan, Theoretical and experimental investigation of CO₂ separation from CH₄ and N₂ through supported ionic liquid membranes, <i>Applied Energy</i>, 268 (2020) 115016 F. Sohail, M. Batool, A. Shah, S. Tabassum, A. L. Khan, M. Gillani, Highly CO₂ selective mixed matrix membranes of polysulfone based on hetaryl modified SBA-16 particles, <i>Separation and Purification Technology</i>, 258 (2021) 117999 U. Saeed, A. L. Khan, M. A. Gilani, R. Bilad, A. U. Khan, Supported liquid membranes comprising of choline chloride based

		<p>deep eutectic solvents for CO₂ capture: Influence of 12 organic acids as hydrogen bond donor, Journal of Molecular Liquids, 335 (2021) 116155</p> <p>U. Saeed, A. L. Khan*, M. A. Gilani, M. Aslam, A.</p> <ul style="list-style-type: none"> U. Khan, CO₂ separation by supported liquid membranes synthesized with natural deep eutectic solvents, Environmental Science and Pollution Research, (2020), https://doi.org/10.1007/s11356-020-10260-x M. Ishaq, M. A. Gilani, M. R. Bilad, M. Rehan, A. L. Khan*, Novel Poly Deep Eutectic Solvents Based Supported Liquid Membranes for CO₂ Capture, Frontiers in Energy Research, 8 (2020) 595041
7	PSF/Res/P-IUB/Phys (189)	<ul style="list-style-type: none"> Alina Manzoor, Muhammad Azhar Khan, Muhammad Yaqoob Khan, Majid Niaz Akhtar, Altaf Hussain, Tuning magnetic and high frequency dielectric behavior in Li-Zn ferrites by Ho doping, Ceramics International 44 (2018) 6321-6329. Mushtaq Ahmad, Muhammad Azhar Khan, Azhar Mahmood, Shu-Sen Liu, Adeel Hussain Chughtai, Weng-Chon Cheong, Bilal Akram, Gulfam Nasar, Role of ytterbium on structural and magnetic properties of NiCr_{0.1}Fe_{1.9}O₄ co-precipitated ferrites, Ceramics International 44 (2018) 5433-5439. Muhammad Azhar Khan, Mubashar Nadeem, Shakeel Abbas, Majid Niaz Akhtar, Maria Yousuf Lodhi, Effects of Dy on structural, dielectric and magnetic properties of Ni-Sr-Y coprecipitated hexaferrites, Ceramics International 44 (2018) 22255- 22261. Muhammad Kashif Sharif, Muhammad Azhar Khan, Muhammad Farooq Warsi, M. Ramzan, Altaf Hussain, Structural and ferroelectric properties of hafnium substituted BiFeO₃ multiferroics synthesized via auto combustion technique, Ceramics International 44 (2018) 20648-20655. <p>175</p>

		<ul style="list-style-type: none"> • Syeda Rabia Ejaz, Muhammad Azhar Khan, Muhammad Farooq Warsi, Majid Niaz Akhtar, Altaf Hussain, Study of structural transformation and hysteresis behavior of MgSr substituted X-type hexaferrites, <i>Ceramics International</i> 44 (2018) 18903-18912.
8	PSF/Res/P-LUMS/ Phys (159)	Nil
9	PSF/Res/P-FCC/Phys (202)	Nil
10	PSF/Res/P-GCUF/Phys (203)	<ul style="list-style-type: none"> • Nasir Amin, K. Mahmood*, A. Ali, Salma Ikram, A.Ashfaq, U.Rehman, Sajid Hussain Siyal, Temperature dependent current-voltage characteristics of Ag/Zn₂GeO₄/Si diode grown by thermal evaporation method, <i>Materials Today Proceedings</i>, in press • S. Hussain, Jolly Jacob, K. Mahmood * , A. Ali, N. Amin, M. Isa, G N Wattoo, Mian H R Mahmood, Effect of growth temperature on Catalyst free hydrothermal Synthesis of crystalline SnO₂ micro-sheets, <i>Ceramics International</i>, 45 (2019) 4053. • Salma Ikram, Jolly Jacob, M. Imran Arshad, K.Mahmood * , A. Ali, N. Amin, N. Sabir, S. Hussain, Tailoring the Structural, Magnetic and Dielectric properties of Ni-Zn-CdFe₂O₄ spinel ferrites by the substitution of Lanthanum ions, <i>Ceramics International</i>, 45 (2019) 3563. • Faraz, K. Mahmood * , A. Ali, M I Arshad, M. Ajaz un Nabi, M. Akbar, N. Amin, S. Hussain, Enhancement of Al-N codopant solubility in ZnO by high temperature thermal annealing, <i>Ceramics International</i>, 45 (2019) 2948. • K. Mahmood,*, Jolly Jacob, R. Zahra, A. Ail, U. Rehman, A. Ashfaq, W. Ahmed, N. Amin, M.I. Arshad, Kashif Javaid, S. Ikram, M. Ajaz un Nabi, S. Hussain, Yuyi Feng, Thermoelectric properties of Zn₂GeO₄ nano-crystals grown on ITO and Au coated Si substrates by thermal evaporation, <i>Ceramics International</i> 45 (2019) 18333–18337

		<ul style="list-style-type: none"> • Arslan Ashfaq, Jolly Jacob, N. Bano, M. Ajaz Un Nabi, A. Ali, W. Ahmad, K. Mahmood*, M.I. Arshad, Salma Ikram, U. Rehman, N. Amin, S. Hussain, A two step technique to remove the secondary phases in CZTS thin films grown by sol - gel method, <i>Ceramics International</i> 45 (2019) 10876–10881 • R. Zahra, Jolly Jacob, N. Bano, A. Ali, K. Mahmood*, S. Ikram, M.I. Arshad, A. Ashfaq, U. Rehman, Sajad Hussain, Effect of secondary phases on the thermoelectric properties of Zn₂GeO₄ nano-crystals grown by thermal evaporation on Au coated Si substrate, <i>Physica B: Condensed Matter</i> 564 (2019) 143–146 • Jolly Jacob, R. Wahid, A. Ali, R. Zahra, S. Ikram, N. Amin, A. Ashfa, U. Rehman, Sajad Hussain, Dheya Shjaa Al-Othmany, S. Zafar Ilyas, K. Mahmood, Growth of Cu₂InO₄ thin films on Si substrate by thermal evaporation technique and enhancement of thermoelectric properties by post-growth annealing, <i>Physica B: Condensed Matter</i> 562 (2019) 59–62 • Ali, Jolly Jacob, Arslan Ashfaq, M. Tamseel, K. Mahmood*, N. Amin, S. Hussain, W. Ahmad, U. Rehman, S. Ikram, Dheya Shjaa Al-Othmany, Modulation of structural, optical and thermoelectric properties of sol-gel grown CZTS thin films by controlling the concentration of zinc, <i>Ceramics International</i> 45 (2019) 12820–12824 • Rehman, Jolly Jacob, R. Zahra, K. Mahmood*, A. Ali, U. Rehaman, Yasir Ali, A. Ashfaq, W. Ahmed, S. Ikram, N. Amin, S. Hussain, Growth of Mg₂GeO₄ Nano-crystals on Si substrate and modulation of Seebeck coefficient by post growth annealing technique, <i>Ceramics International</i> 45 (2019) 16275–16278
11	PSF/Res/ KPK-IBMS/Med (493)	<ul style="list-style-type: none"> • Comparison of methods of isolation and quantification of cell free DNA from plasma of patients with breast cancer A Bukhari, Z Khan, A Ali, N Nawaz
12	PSF/Res/CP/S-AKU/Med (488)	<p>177</p> <ul style="list-style-type: none"> • Tariq U, et al. The emergence of an unassigned complex recombinant form in a Pakistani HIV-infected individual. <i>Archives of virology</i>. 2020 Feb 14:1-6.

		<ul style="list-style-type: none"> • Abidi et al. Phylogenetic and drug-resistance analysis of HIV-1 sequences from an extensive pediatric HIV-1 outbreak in Larkana, Pakistan. <i>Frontiers in Microbiology</i> Nasim, et al. Viral infections in Pakistan: prevalence, factors affecting spread, and recommendations for control. JIDC • Siddiqui, et al. Identification and genetic analysis of two novel HIV-1 unique recombination forms in HIV-infected Pakistani individuals
13	PSF/Res/P-UHS/Med(492)	<ul style="list-style-type: none"> • Serum melanin and alpha –melanocyte stimulating hormone (α-MSH) levels in Pakistan individuals affected with oculocutaneous albinism (OCA). Muhammad Shakil, Kaukab Sultana, Rana Naveed Iqbal, Muhammad Ikram Ullah Shabbir Hussain, Haiba Kaul, and Saqib Mahmood. • Identification of novel and known mutations in TYR, OCA2 and HPS1 genes causative of oculocutaneous albinism in Pakistani population. Muhammad shakil ,Abida Akbar,Nazish Mahmood Aisha Muhammad Ikram Ullah, Haiba Kaul, Ali Amar ,Andrew crosby ,Saqib Mahmood.
14	PSF/Res/C-PIMS/Med(450)	<ul style="list-style-type: none"> • Zafar S, Shahzad M, Razaqat I, Yousaf A, Shaikh RS, Akram J, Ahmed ZM and Riazuddin S (2020). Novel mutations in CLPP, LARS2, CDH23, and COL4A5 identified in familial cases of prelingual hearing loss. <i>Genes (Basel)</i> 2020 Aug 22; 11(9):E978. doi: 10.3390/genes11090978. (Impact Factor: 3.759). • Richard EM, Santos-Cortez RL, Faridi R, Rehman AU, Lee K, Shahzad M, Acharya A, Khan AA, Imtiaz A, Chakchouk I, Takla C, Abbe I, Rafeeq M, Liaqat K, Chaudhry T, Bamshad MJ, Nickerson DA; University of Washington Center for Mendelian Genomics, Schrauwen I, Khan SN, Morell RJ, Zafar S, Ansar M, Ahmed ZM, Ahmad W, Riazuddin S, Friedman TB, Leal SM, Riazuddin S (2019). Global genetic insight contributed by consanguineous Pakistani families segregating hearing loss. <i>Hum Mutat.</i> 40:53–72 PMID: 30303587 (Impact factor:4.124)

15	PSF/Res//P-GCU/Med(485)	<ul style="list-style-type: none"> Nosheen Aslam, Sumreen Hayat, Tayyab Ali, Muhammad Waseem, Muhammad Hussnain Siddique, Muhammad Afzal, Aqsa Muzammil, Gullnaz, Ayesha Sarwar, Saima Muzammil . 2022. Antiadhesion and antibiofilm potential of Fagonia indica from Cholistan desert against clinical multidrug resistant bacteria. Brazilian Journal of Biology. 82: (1-8).
16	PSF/Res/KPK-AWKU/Med (459)	<ul style="list-style-type: none"> Theoretical and structural studies of a stable dinuclear sodium complex of dicoumarol - 3,3'-(pyridin-3-ylmethanediyl)bis(4hydroxy-2H-chromen-2-one) Author links open overlaid panel Muhammad Ikram ^a , Sadia Rehman ^a , Afzal Khan ^b , Ayub Jadoon ^b , Mutasem Omar Sinnokrot ^c Journal of Molecular Structure 1222 (2020) 128956 with 2.5 Impact Factor.

ANNEXURE V

	Project Title and No.	Name and Designation of P.I	Total Cost in Rs.
1	<p>PSF/ILP/P-PCSIR/ Chem (053)</p> <p>Development of Technology for the Synthesis of Pharmaceutical Raw Materials</p>	<p>Dr. Muhammad Naeem Senior Scientific Officer Applied Chemistry Research Centre Pakistan Council of Scientific & Industrial Research (PCSIR) Laboratory Complex Lahore chmnaem08@gmail.com 0333-4315583</p>	Rs. 1,949,016/-
2	<p>PSF/ILP/S-PCSIR/ Chem (065)</p> <p>Easy Maintainable Leather with Upgraded Properties through Advanced Nanomaterials</p>	<p>Dr. Hafiz Rub Nawaz Director Leather Research Center.PCSIR, D- 102, SITE, Karachi nawazhr@yahoo.com 03008996080 barkatso@hotmail.com 03343262901, 03002143146</p>	Rs.382,500/-
3	<p>PSF/ILP/KPK-GIKI / Engg (073)</p> <p>Design, Manufacturing and Installation of Gravitational Water Vortex Turbine at Mardan, KPK</p>	<p>Dr. Taqi Ahmad Cheema Associate Professor Faculty of Mechanical Engineering Ghulam Ishaq Khan Institute of Engineering Sciences & Technology, Topi, District Swabi tacheema@giki.edu.pk taqi_cheema39@hotmail.com 03405666990, 03405666989 0938281000 0938271858¹⁸⁰-2268 (ext.)</p>	Rs. 3,554,780/-

4	<p>PSF/ILP/C-KRL/ Engg (075)</p> <p>Indigenous Development of Alumina Ceramic Faucets</p>	<p>Dr. Muhammad Shuaib Incharge</p> <p>Ceramic Center</p> <p>Metallurgy Division</p> <p>Dr. A. Q. Khan Research Laboratory, Kahutal, Rawalpindi</p> <p>03342220435</p> <p>rayyans@hotmail.com</p>	<p>Rs. 1,927,800/-</p>
5	<p>PSF/ILP/C-QU/ Biotech (078)</p> <p>Development of Microbial based Feed Supplement and Evaluation of its Efficiency on Growth, Production and Health of Dairy Cattle</p>	<p>Dr. Muhammad Imran</p> <p>Assistant Professor</p> <p>Quaid-i-Azam University, Islamabad</p> <p>051-90643183</p> <p>0346-5459904</p> <p>m_imran766@hotmail.com</p> <p>mmimran@qau.edu.pk</p>	<p>Rs. 4,019,820/-</p>
6	<p>PSF/ILP/S-MUET/ Engg (081)</p> <p>Development of Water- Proof Breathable Nanofibers Membranes for Raincoat Application</p>	<p>Dr. Zeeshan Khatri</p> <p>Associate Professor</p> <p>Mehran University of Engineering & Technology</p> <p>Jamshoro</p> <p>khatri.zeeshan@gmail.com, zeeshan.khatri@faculty.mueta.edu.pk</p>	<p>Rs. 4,059,600/-</p>
7	<p>PSF/ILP/P-HIT/ Engg (085)</p> <p>Design Improvement of High Torque Low- Speed Diesel Engine: Phase-I</p>	<p>Brig. Dr. Syed Waheed Ul Haq</p> <p>Managing Director (Advance Research) Development & Information Centre (ARDIC), HIT, Taxila</p> <p>mdar@hit.gov.pk, wuhsyed@gmail.com</p> <p>0302-5967154</p>	<p>Rs.15,016,440/-</p>

		<p>(Hassan javed)</p> <p>03422177966, 03340299666</p> <p>hassanjavedsh@gmail.com</p> <p>Col. Dr. Syed Adnan Qasim</p> <p>General Manager</p> <p>DESCOM Factory</p> <p>Heavy Industries Taxila</p>	
8	<p>PSF/ILP/C-NUST/SCME/Engg (089)</p> <p>“Development and Commercialization of High Bond Strength, Synthetic Rubber Adhesive for High-Tech Applications in Local Industry”</p>	<p>Prof. Dr. Muhammad Shahid</p> <p>School of Chemical & Materials Engineering (SCME), National University of Sciences & Technology (NUST), Islamabad</p> <p>mshahid@scme.nust.edu.pk,</p> <p>03004193453</p> <p>051-90855212</p>	Rs. 3,346,273/-
9	<p>Project No. PSF/ILP/C-CUI/Biotech (090)</p> <p>Entitled Commercialization of PCR Diagnostic Kits for diagnosis of Banana Pathogens</p>	<p>Dr. Muhammad Zeeshan Hayder,</p> <p>Associate Professor, Department of Biosciences, COMSATS University, Islamabad,</p>	Rs. 2,993,250/-

Sr. No.	Project No./Title	Name & Address of Pakistani P.I.	Name & Address of Chinese P.I. side	Duration	Cost (Rs.)
1.	PSF-NSFC/JSEP/ENG/AJK/UKAJ K/01 Multi-criteria Decision-making of Collision Detection based on Aggregation Models of Group Generalized Intuitionistic Fuzzy Soft Sets	Dr. Khizar Hayat, Assistant Professor, University of Kotli, AJ&K, Pakistan	Prof. Jigen Peng, Guangzhou University, China.	02-Years	3,500,000/-
2.	PSF-NSFC/JSEP/ENG/P-IUB/02 MOF-MXene Hybrid Nanomaterials for Zn-ion Battery and Electrocatalysis: A Self-Powered Water Purification System	Prof. Dr. Aziz ur Rehman Institute of Chemistry, The Islamia University Bahawalpur, Bahawalpur, Pakistan.	Prof. Shu-Juan Bao School of Materials and Energy, Southwest University, Chongqing, China	02-Years	3,500,000/-
3.	PSF-NSFC/JSEP/ENG/NV/KPK-COMSATS/03 Spatio-temporal glacier variation and its influence on the water availability in Hunza Basin along the CPEC route	Dr. Adnan Ahmad Tahir, Associate Professor (Tenured), Department of Environmental Sciences, COMSATS University Islamabad, Abbottabad Campus	Kunpeng Wu, Associate Professor, Institute of International Rivers and Eco-security, Yunnan University	02-Years	3,450,000/-

4.	PSF-NSFC/JSEP/BI O/C-QAU/04 Ecological and molecular assessments of the prioritized endemic plants in the Himalaya	Dr. Shujaul Mulk Khan Department of Plant Sciences Quaid-i-Azam University, Islamabad	Dr. Jie Liu Kunming Institute of Botany; 132# Lanhei Road, Heilongtan, Kunming, Yunnan	02-Years	3,500,000/-
5.	PSF-NSFC/JSEP/ENG/S-IBA/05 Research on High Speed machine for Air Compressor Drive System	Qasim Ali, Assistant Professor, Department of Electrical Engineering, Sukkur IBA University	Fei Zhao, Assistant Professor. Shenzhen University Town, Nanshan District, Shenzhen, China	02-Years	3,500,000/-
6.	PSF-NSFC/JSEP/ENG/C-NUST/06 Research on semi-autonomous intelligent control of intrarenal interventional robot through the natural orifice	Professor Yasar Ayaz, National University of Sciences & Technology, Pakistan	Professor Le Xie, Shanghai Jiao Tong University, China.	02-Years	3,498,000/-
7.	PSF-NSFC/JSEP/ENV/P-UAF/07 Adaptation mechanism of Water, Food and Ecosystem synergistic Security in CPEC under climate change	Muhammad Khalid Bashir Associate Professor (Tenured), Institute of Agricultural and Resource Economics, University of Agriculture, Faisalabad	Hongyun Han Agricultural Economics, The College of Public Affairs, Zhejiang University China	02-Years	3,425,000/-
8.	PSF-NSFC/JSEP/ENG/P-UOW/08	Dr. Asma Arif 184	Li Huajiao Professor, China University of	02-Years	3,500,000/-

	China-Pakistan" nexus of the electronic vehicle industry chain and coordinated development policy	Assistant Professor, University of Wah, Wah, Pakistan	Geosciences (Beijing), School of Economics and Management, China		
9.	PSF-NSFC/JSEP/BI O/KPK-BKU/09 Identification and safety of plant origin and host plants of Cistanches Herbal, a traditional food herbal medicine in China and Pakistan	Bashir Ahmad, Professor, Bacha Khan University Charsadda.	Linfang Huang, Professor, Institute of Medicinal Plant Development, Chinese Academy of Medical Sciences, Peking Union Medical College	02-Years	3,350,000/-
10.	PSF-NSFC/JSEP/ENG/C-NUST/10 Stability Characteristics Prediction, Dynamics, and Control of Atmospheric Entry Vehicles	Adnan Maqsood, Tenured Associate Professor, School of Interdisciplinary Engineering and Sciences, National University of Sciences & Technology, Islamabad	XIE Dan, Associate Professor, School of Astronautics, Northwestern Polytechnical University	02-Years	3,470,000/-
11.	PSF-NSFC/JSEP/ENV/C-PCRWR/11 Exploring the supply mechanism of small-scale irrigation facilities in rural areas of China and Pakistan under climate change scenario.	Engr. Faakhar Raza, Regional Director, Pakistan Council of Research in Water Resources (PCRWR), Lahore.	Zhai Shiyan, Director, Center for Computational Geography, College of Geography and Environmental Science, Henan University	02-Years	3,500,000/-

12.	PSF-NSFC/JSEP/ENG/C-AU/12 Study on the characteristic of the liquid milk-bacteria particles liquid-solid two-phase flow in microchannel of MEMS sensor and the real-time detection method of particles	Dr. Sohail Iqbal Assistant Professor, DMAE, IAA, Air University, Sector E-9, Islamabad, Pakistan.	Dr. Liangliang Fan Associate Professor, Institute of Precision Engineering, School of Mechanical Engineering, Xi'an Jiaotong University, Xianning	02-Years	3,400,000/-
13.	PSF-NSFC/JSEP/ENV/B-LUAWMS/13 Assessment and regulation Mechanism for Mitigation of Climate Change Impact on Water-Energy-Food Nexus in typical areas of China and Pakistan	Dr. Kamal Ahmed Faculty of Engineering Science and Technology, Lasbela University of Agriculture, Water and Marine Sciences, Uthal, Balochistan.	Li Yalong Changjiang Professor-level senior engineer River Scientific Research Institute, Changjiang Water Resources Commission, Agricultural Water Resources Institute,Hubei,Ch ina.	02-Years	3,500,000/-
14.	PSF-NSFC/JSEP/ENV/C-CEWRI/14 The Impact of Climate Change on Water Resources in the Indus River Basin and Adaption Strategy to cope with	Dr. Bashir Ahmad Principal Scientific Officer NARC, Islamabad	Dr. Wenbin Zhu Vice Director, Water Resources Research Institute of Geographic Science and Natural Resources Research Chinese Academy of Sciences Beijing	02-Years	3,300,000/-
15.	PSF-NSFC/JSEP/BO/P-LCWU/15	Dr. Khajista Jabeen Associate Professor Department of Botany	Dr. Yanjun Kou Professor	02-Years	3,350,000/-

	Management of bacterial leaf blight by biological agents	Lahore College for Women University, Lahore, Pakistan.	State Key Laboratory of Rice Biology China National Rice Research Institute, Hangzhou, China.		
16.	PSF-NSFC/JSEP/Bio-Tech/P-NIBGE/16 Application of genomic assays for the development of improved wheat genotypes—varieties with improved amylose content	Dr Mehboob-ur-Rahman, Deputy Chief Scientist & Professor of Agricultural Biotechnology National Institute for Biotechnology & Genetic Engineering (NIBGE), Faisalabad.	Dr Liu Dongcheng Professor/Vice Dean State Key Laboratory of North China Crop Improvement and Regulation, College of Agronomy, Hebei Agricultural University (HBAU)	02-Years	3,499,000/-
17.	PSF-NSFC/JSEP/ENGINEERING/C-PIEAS/17 Fe-Encapsulated hollow zeolites used as oxygen carrier for chemical looping combustion: An experimental and computational study	Dr. Muhammad Zaman Department of Chemical Engineering (DChE), Pakistan Institute of Engineering & Applied Sciences (PIEAS), Islamabad	Dr. Xubin Zhang Yaguan Road, Haihe Education Park Jinnan District, Tianjin 300350, China	02-Years	3,400,000/-
18.	PSF-NSFC/JSEP/ENGINEERING/P-FCC/18 Application of spectral process manufacturing analysis technology in intelligent manufacturing	Dr. Muhammad Akhyar Farrukh Professor of Chemistry Director Post Graduate Programs Faculty of Science & Technology University of Central Punjab Lahore.	Dr. Ying Tian, Professor, College of Mechanical and Electronic Engineering, Shandong University of Science and Technology, China	02-Years	3,234,000/-

Federal Unit

LIST OF EXHIBITIONS OF SCIENCE CARAVAN, FEDERAL UNIT 2022-23					
Sr. #	Exhibition /Place	Date	No. of Days	No. of Schools	No. of Students
1.	Govt. Graduate College for Women, Zafar Ul Haq Road Rawalpindi	11.08.2022 to 12.08.2022	2	1	500
2.	The Spirit School Soan Garden Campus, Islamabad	05.09.2022 to 09.09.2022	5	5	1100
3.	Science Caravan Exhibition in KSS Science mela at DPS, Model Town Lahore	28.10.2022 to 31.10.2022	4	20	5000
4.	Allied School Ayan Campus, Islamabad	21-26 November . 2022	6	4	1683
5.	Mashal Degree College, Wah Cantt. Islamabad	12-16 Dec. 2022	5	6	1195
6.	Pakistan National Council of Arts, Islamabad	18-19 Feb. 2023	2	2	1683

Total	24	38	11161
--------------	-----------	-----------	--------------

Peshawar Unit

LIST OF EXHIBITIONS OF SCIENCE CARAVAN, PESHAWAR UNIT 2022-23					
Sr. #	Exhibition Place	Date	No. of Day s	No. of Schoo ls	No. of Studen ts
1.	GHS-Adam Dheri Dir (Lower)	15.08.202 2 to 20.08.202 2	6	9	1496
2.	GGHSS-University Town Peshawar	26.09.202 2 to 28.09.202 2	03	2	1378
3.	GHS-Forest College Peshawar	03.10.202 2 to 04.10.202 2	02	4	755
4.	GGHSS-Hayatabad Ph # 1 Peshawar	05.10.202 2 to 07.10.202 2	03	3	1638
5.	GGMHS-Dabgari Garden Peshawar	17.10.202 2 to 19.10.202 2	03	5	1144
6.	GHSS-4 City Peshawar	20.10.202 2 to 22.10.202 2	03	4	1114
7.	Govt. Girls Higher Secondary School	08-11 Nov. 2022	4	5	937
8.	Academy of Modern Studies (Boys& Girls) 190	21-23 Nov. 2022	3	3	986

9.	GHS- Sarai Gadai Haripur	09-13 January 2023	5	6	1480
10.	GCMHS-1 Hangu	13-17 Feb. 2023	5	5	2081
11.	GHSS- Kunda Swabi	27 Feb to 03March, 2023	5	7	1202
12.	GHSS Kunda Swabi	01.03.202 3to 03.03.202 3	3	5	1202
13.	GGHS-Civil Quarter Peshawar	15.05.202 3 to 17.05.202 3	3	2	972
14.	GHS/G.Shaheed Ishaq Amin H.S. Civil Quarter Peshawar	18.05.202 3 to 19.05.202 3	2	1	715
Total			50	61	17100

Multan Unit

LIST OF EXHIBITIONS OF SCIENCE CARAVAN, UNIT MULTAN 2022-23					
Sr. #	Exhibition /Place	Date	No. of Days	No. of Schools	No. of Students
1.	Science Exhibition at Tehsil Multan	25-27 Oct 2022	3	2	840
	191				

2.	Govt. APS Memorial Boys High School, Sahiwal	09-13 January 2023	5	4	1545
3.	Govt. Girls Comprehensive Higher Secondary School, Multan	17-19 January 2023	3	2	865
4.	Written Exams of PSDP projects (STEM, STFS, and CRP)	05 March 2023	1	00	681
5.	STFS 6 th Batch, Interviews	06-08 March 2023	3	00	270
6.	Science Exhibition Tehsil Multan	09-11 May 2023	3	2	583
Total			18	10	4784

Faisalabad Unit

LIST OF EXHIBITIONS OF SCIENCE CARAVAN, UNIT FAISALABAD 2022-23					
Sr. #	Exhibition /Place	Date	No. of Days	No. of Schools	No. of Students
1.	Govt. High School, Lagar District Sheikhupura	12-16 Dec, 2022	5	6	1345
2.	Govt. High School 203/RB District Faisalabad	07-11 Nov. 2022	5	6	1535
3.	Govt. MC HSS District Faisalabad	21-25 Nov 2022	5	5	1493
4.	Govt. Lobatory HSS Kamalia, District Toba Tek Singh	20-24 Feb, 2023	5	5	1120

5.	Govt. HSS Pir Mahil District Toba Tek Singh	06-10 Feb, 2023	5	6	1320
6.	STFS 6 th Batch, Interviews	28 Feb. to 1 st March 2023	2	00	146
7.	Govt. High School, District Chiniot	13.05.2023to 17.05.2023	5	5	1130
8.	G.H.S.S Nankana Sahib	08.05.2023to 12.05.2023	5	4	1125
9.	G.H.S District Jhang	22.05.2023to 26.05.2023	5	3	1215
Total			42	40	10429

Tandojam Unit

LIST OF EXHIBITIONS OF SCIENCE CARAVAN, UNIT TANDOJAM 2022-23					
Sr. #	Exhibition /Place	Date	No. of Days	No. of Schools	No. of Students
1.	Science Caravan Sindh Unit-II, TandoJam Participated STEM Science Exhibition at Public School, Hyderabad	28-01-2023	1	5	1125
2.	Science Caravan Exhibition at Government (Boys and Girls) Higher Secondary School, Mirpur Sakro District Thatta	23-28 Jan, 2023	6	4	1489
3.	Science Caravan Exhibition at Shah Abdul Latif Bhittai Government Higher Secondary School,(Boys and Girls) of Taluka Islamkot District Tharparkar	06-11 Feb, 2023	6	11	1899
Total			13	20	4513

Sukkur Unit

LIST OF EXHIBITIONS OF SCIENCE CARAVAN, UNIT SUKKUR 2022-23					
Sr. #	Exhibition /Place	Date	No. of Days	No. of Schools	No. of Students
1.	Govt. Boys Higher Secondary School Badah District Larkana	31 st Oct. To 4 Nov. 2022	5	4	1415
2.	Govt. Boys & Girls Higher Secondary School, Tehsil Theri District Khairpur	09-18, January 2023,	8	11	2650
3.	GBHS School Nau-Dero District Larkana	6-10 Feb 2023	4	5	1645
4.	STFS 6 th Batch, Interviews	06 March 2023	1	00	68
5.	Science exhibition at Roshan Tara Model High School, Ghotki	16-18 March, 2023	3	4	1090
Total			21	24	6868

Quetta Unit

LIST OF EXHIBITIONS OF SCIENCE CARAVAN, UNIT QUETTA 2022-23					
Sr. #	Exhibition /Place	Date	No. of Days	No. of Schools	No. of Students
1.	Science Exhibition at Govt. Boys High School, District Ziarat	17-22 July, 2023	6	10	2350
2.	Science Exhibition at Grammar School Quetta	28-09-2022	01	01	250
3.	Geological Survey of Pakistan BRS College Quetta	08 th Nov. 2022	01	01	335
4.	Science Exhibition at Educator School System Quetta	18 May,2023	01	01	370
5.	Science Exhibition at Govt. Girls High School, Postal Colony Quetta	24 May, 2023	01	01	390
6.	Science Exhibition at Helper Public Girls High School, Quetta	31 st May, 2023	01	01	350
7.	Popular Science Lecture on Scope and Importance of Biotechnology	23 rd June,2023	01	05	585
Total			12	20	4630

Scientific Conferences/ Seminars/ Symposia/ Workshops Funded

Financial Support to Scientific Societies in Pakistan (Phase-II)

Sr. No	Topic	Nature of the Event
1.	Importance of Healthy Diet and Lifestyle to Prevent Cardiovascular Diseases	Conference
2.	8 th International & 17 th National conference on “Advances in Plant Science in the Era of Climate Change”	Conference
3.	Three Days International Conference on the Applications of Nuclear Techniques for Sustainable Socio- Economic Development	Conference
4.	20 th International Conference on Statistical Sciences	Conference
5.	Devastating Floods in Pakistan and the Way Forward	Conference
6.	Disaster Risk Management in Pakistan	Conference
7.	International Conference on Minerals and Metals Processing in Pakistan	Conference
8.	World Water Day on Protection of Groundwater Resources	Conference
9.	Sensitization on Media and Civil Societies on Heart and many other Fatal Diseases in Pakistan	Workshop
10.	Workshop with the Alliance of Academia, Researchers, Health Professionals, Civil Societies and Media to promote evidence based health policies for NCDs Prevention	Workshop
11.	25 th Symposium on Chips & Science	Symposium
12.	26 th Symposium on Sustainable Development Goals for Pakistan	Symposium
13.	27 th Symposium on Energy Crises in Pakistan	Symposium
14.	28 th Symposium New Technologies for Hydrogen Storage	Symposium
15.	Membrane Based Reactors for Waste Water Treatment	Lecture
16.	How to Manage Sustainable Development Goals	Lecture
17.	Hydrogen Storage New Technologies	Lecture
18.	Leadership in Engineering Organizations	Workshop
19.	Entrepreneurship	Workshop
20.	Capital Budgeting Methods for Engineers	Workshop
21.	Cyber Security	Workshop
22.	5th IEEE International Conference on Robotics and Automation in Industry (ICRAI 2023)	Conference

23.	41st Congress of Zoology (International)	Congress
24.	Climate, Biodiversity, Non-timer Forest Products and Weed	Workshop
25.	9 th International and 18 th National Conference on Biodiversity and Medicinal Plants	Conference
26.	Transplant the only cure for B-Thalassaemia Major”	Seminar
27.	Nuclear Medicine in Thyroid Cancer Management”	Seminar
28.	Nuclear Science & Technology”	Seminar
29.	Long term safety of Nuclear Power Plants	Seminar
30.	Bone Marrow Transplant the only cure for B-Thalassaemia Major	Symposium
31.	Medical Physics	Seminar
32.	Nuclear Techniques in Agriculture	Seminar
33.	Cancer Management	Symposium
34.	Advance in Cancer Diagnostic and Therapy	Seminar
35.	Nuclear Medicine and Radiotherapy	Seminar
36.	6 th International Conference on Biosciences	Conference
37.	Land Degradation: Threats and Potential Remedies	Seminar
38.	Applied Surface Science	Workshop
39.	Prostate Cancer Management-An Evolving Paradigm	Seminar
40.	Radionuclide therapies	Seminar
41.	Cutting Edge Manufacturing Techniques and Operations for Robots	Workshop

List of Journal Funded**Financial Support to Scientific Societies in Pakistan (Phase-II)**

Sr. No	Name of the Journal	Name of the Society
1.	Soil & Environment	Soil Science Society of Pakistan
2.	Pakistan Journal of Zoology	The Zoological Society of Pakistan
3.	Pakistan Journal of Weed Science	Weed Science Society of Pakistan
4.	Pakistan Journal of Science	Pakistan Association for the Advancement of Science
5.	Pakistan Journal of Nematology	Pakistan Society of Nematologists
6.	Pakistan Journal of Botany	Pakistan Botanical Society
7.	Pakistan Journal of Statistics	Islamic Society of Statistical Sciences
8.	Journal of Applied Probability and Statistics	Islamic Society of Statistical Sciences
9.	Journal of Islamic Countries Society of Statistical Sciences	Islamic Society of Statistical Sciences
10.	International Journal of Economic and Environmental Geology	Society of Economic Geologists & Mineral Technologists (SEGMITE)
11.	Biologia	The Biological Society of Pakistan

Linkage fee to International Federation

Sr. No.	Name of the Society	International Federation	Amount
1.	Soil Science Society of Pakistan	International Union of Soil Sciences	215,400
2.	Pakistan Academy of Engineering	International Council of Academies of Engineering & Technological Sciences	229,188
3.	Pakistan Society for Biochemistry and Molecular Biology	International Union for Biochemistry and Molecular Biology	555,000
		Federation of Asian and Oceanian Biochemists and Molecular Biologists	
4.	Pakistan Vacuum Society	International Union for Vacuum Science Technique and Application (IUVSTA)	92,100
Total			1,091,688

Website Maintenance

Sr.No	Name of the Society	Amount
1.	Soil Science Society of Pakistan	100,000
2.	Pakistan Academy of Engineering	60,000
3.	Pakistan Society for Biochemistry and Molecular Biology	45,000
4.	Pakistan Botanical Society	150,000
5.	Biological Society of Pakistan	100,000
6.	Society of Economic Geologists & Mineral Technologists (SEGMITE)	60,000
Total		515,000

Travel Grant under Non-Development Budget

S. No.	Name	Amount
1.	Dr. Mazhar Rafique The University of Haripur	278,586
2.	Dr. Fazal Said Abdul Wali Khan University Mardan	300,000
3.	Dr. Gul Nabi Khan Islamia College University, Peshawar	225,000
4.	Dr. Najeeb Ullah Khan The University of Agriculture, Peshawar	130,289
5.	Dr. Rozina Khattak Shaheed Banazir Bhutto Women University, Peshawar	341,000
6.	Dr. Muhammad Ali University of Peshawar, Peshawar	238,462
7.	Dr. Imtaiz Khan Agriculture University, Peshawar	179,000
8.	Dr. Bushra Naeem BUIITEMS, Quetta	300,000
9.	Prof. Dr. Anis-ur-Rehman COMSAT University, Islamabad	300,000
10.	Dr. Tahir Waseem PMNH, Islamabad	150,000
11.	Dr. Ahmer Mehmood Islamic University, Islamabad	380,000
12.	Dr. Summaya Sohail Chaudry PIMS Hospital, Islamabad	159,437
13.	Dr. Ayesha Atta GC University, Lahore	178,195
14.	Dr. Noshin Ilyas PMAS Arid Agriculture University, Rawalpindi	212,000
15.	Dr. Isma Hamid National Textile University, Faisalabad	98,312
16.	Dr. Mudassar Faiz Rawalpindi Medical University, Rawalpindi	300,000
17.	Muhammad Farhan Khan University of Health Sciences Lahore	193,192
18.	Dr. Asim Faraz BZU Multan	200,000
19.	Dr. Adnan Ahmed University of Engineering Science & Technology, Nawabshah	250,000
20.	Dr. Urooj Haroon Federal Urdu University, Karachi	68,000
	Total	4,481,473

Travel Grant Availed from Natural Sciences Linkage Program (NSLP) Funds

S. No.	Name	Amount
1.	Dr. Muhammad Ali Afzal National Textile University, Lahore	500,000
2.	Dr. Asif Javed Hazara University Mansehra	174,960
3.	Dr. Abdul Qayyum The University of Haripur	220,000
4.	Ms. Qurati-ul-Ain Ahmed Ministry of Climate Change, Islamabad	490,000
5.	Ms. Elia Nouroz Ali NUST, Islamabad	546,000
Total		1,930,960

Details of Newly Initiated Projects during 2022-23

Sr. No	Project No. & Title	Total Cost	Duration	PI Name/Organization
1	PSF/CRP/Consrn-58 CRISPRi mediated tissue specific reduction of Gossypol content in Cotton Seed	6,255,000	2 year	Dr. Aftab Ahmad Assistant Professor Biochemistry/Center of Advanced Studies in Agriculture and Food Security (CAS-AFS), University of Agriculture, Faisalabad (UAF), Agriculture University Road, Faisalabad.
2	PSF/CRP/TH/4/CFP/430 Essential oil nano emulsion dip coatings of fruits (Kinnow) to increase their market availability (selflife) for economic boost	4,745,000	2 year	Dr. Muhammad Amjad Assistant Professor, Department of Mechanical Mechatronics and Manufacturing Engineering University of Engineering and Technology Lahore
3	PSF/CRP/TH/4/CFP/597 Development and commercialization of semen technology for rapid ge0-economic gains in indigenous dairy breeds of Pakistan	5,961,500	2 year	Dr. Aftab Ahmad Assistant Professor Department of Biochemistry Cotton Biotechnology Lab.CAS-AFS, University of Agriculture Faisalabad
4	PSF/CRP/TH/4/CFP/156 Development of nano bio-fertilizer (nano-encapsulated PGPR) with Silicon Dioxide nano-particles for	4,724,650 202	2 year	Dr. Noshen Ilyas, Assistant Professor, Department of Plant Microbiology

	improvement in Wheat Growth and its commercialization			PMAS Arid Agriculture University Rawalpindi
5	PSF/CRP/TH/4/CFP/121 Design and development of 2D Styrofoam cutting machine	1,040,000	2 year	Dr. Imran Zaka, Deputy Chief Engineer, Department of Electronics Division/PINSTECH, PAEC Islamabad
6	PSF/TUBITAKIII/ENG/C-NCP (17) An Investigation of Environmentally Friendly Na-Ion Electrode Materials and Their Battery Performance	12,320,000	3 years	Dr. Muhammad Arshad SSO Nan science & Technology Department Pakistan National Centre for Physics, Quaid-i-Azam University Campus Islamabad.
7	PSF/TUBITAKIII/BIOMED /P-COMSATS (21) Better Bones Regeneration - Development of Osteogenic Bioceramics Reinforced Tri-layer Electrosoun Fibers	11,197,122	2 years 5 months	Dr. Hamad Khalid COMSATS University Lahore Campus
8	PSF/TUBITAKIII/ENG/P-UOP (22) Energy Storage Through Carbon Dioxide Conversion to Methanol	11,125,000	2 year	Prof. Dr. Muhammad Rashid Usman Professor Institute of Chemical Engineering & Technology University of the Punjab,

				Lahore.
9	PSF/TUBITAKIII/ENG/KP-GIKI(24) AI based Portable Microscopic Urine Sediment Analysis System	8,428,000	2 year	Dr. Muhammad Hanif Associate Professor Ghulam Ishaq Khan Institute of Engineering Sciences and Technology Topi, Swabi
10	PSF/TUBITAK III/Biomed/P/ Comsats(19) Translating Smart Design V-Patch for Vesicovaginal Fistula Repair: Bench-top to Clinical Application	12,500,000	3 years	Dr. Muhammed Yar Pakistan Interdisciplinary Research Center in Biomedical Materials, COMSATS University Islamabad Lahore Campus
11	PSF/TUBITAK III/ Engineering/C/ Comsats(20) 2D Material Based Flexible Li-Ion Batteries for Robust and Wearable Electronics	9,965,000	3 years	Dr. Shumaila Karamat COMSATS University Islamabad
12	PSF/CRP/P-UET/Constrm-(53) Leachate treatment and Energy recovery by synergic Biological & Catalytic Ozonation processes	3,180,000	2 Years	Dr. Amir Ikhtlaq Associate Professor Institute of Environmental Engineering & Research University of Engineering & Technology Lahore 03209446452
13	PSF/CRP/C-NUST/SP-(11) Development of MOF Electrochemical Sensor for	3,998,800 204	2 years	Dr. Usman Liaqat Assistant Professor, School of Chemical and Material Engineering (SCME) NUST, Islamabad

	the Detection of Pre-Diabetes Biomarker			
14	PSF/CRP/TH/4/CFP/431 Natural essential oil loaded nanoparticles (nanoemulsion) incorporated in poultry feed as alternative to antibiotics	6,639,300	2 years	Prof. Dr. Ikram ul haq Institute of Industrial Biotechnology, GC university Lahore
15	PSF/CRP/P-UET/Constrm-(06) Innovative Solar Water Desalination System Based on Novel Nanomaterials for Renewable Energy Exploitation	6,125,000	2 years	Dr. Muhammad Amjad Assistant Professor Department of Mechanical Mechatronics and Manufacturing Engineering University of Engineering and Technology Lahore 0331-6669905
16	PSF/CRP/TH/4/S-NEDUET/523 Development of Reactive Inks for Digital Printing	5,331,880	2 years	Dr. Saira Faisal Associate Professor, Department Textile Engineering, NED University of Engineering & Technology, Karachi.
17	PSF/CRP/P-PMAS/Constrm-260 Identification and development of functional molecular markers related to resistance against viral diseases in chili	4,625,000	02 years	Dr. Rashid Mehmood Rana Assistant Professor, Department of Plant Breeding & Genetics, PMAS- Arid Agriculture University, Rawalpindi. 03335567455
18	PSF/CRP/PUVAS/Constrm(377) Development of Recombinant Vaccine Based on	6,990,000 205	2 years	Dr. Haroon Akbar, Associate Professor, Department of Parasitology, University

	Gametocyte Antigens of <i>Eimeria</i> , its subsequent trails and marketing			of Veterinary and Animal Science, Lahore.
19	PSF/CRP/TH/4/P-UET/618 Development of styrenics blend with elastomers and thermoplastics for commercial applications	12,059,000	02 years	Prof. Dr. Asif Ali Qaiser Chairman, Department of Polymer and Process Engineering, University of Engineering and Technology, Lahore.
20	PSF/CRP/TH/4/P-PU/564 Evaluation of Lithium mineral deposits in the sedimentary succession of Permian age, Salt Range, Pakistan: An economic implication for renewable and sustainable energy development	988,784	1.5 years	Dr. Muhammad Jawad Munawar , Assistant Professor, Institute of Geology, University of Punjab, Lahore.
21	PSF/CRP/T-Helx-141 Development and commercialization of indigenous technology for production of moringa seed oil as food ingredient	5,010,000	02 years	DR. Muhammad Shahbaz , Assistant Professor, Food Science and Technology, MNS-University of Agriculture Multan.
22	PSF/CRP/Consrm-610 Indigenous development of characterization equipment for a multitude of electronic and electrochemical devices	1,915,000	2 years	Dr. Mamoon Sajid , Assistant Professor, Faculty of Electrical Engineering, GIK Institute of Engineering Sciences and Technology, Topi, Swabi.
23	PSF/CRP/SP/P-UVAS/SP-(11-B)	10,830,000 206	2 years	Prof. Dr. Tahir Yaqub , Institute of Microbiology, University of Veterinary

	Development of Inactivated Lumpy Skin Disease Virus (LSDV): An Interdisciplinary Approach Towards Control of LSDV in Pakistan			and Animal Sciences (UVAS), Lahore
24	PSF/TUBITAK-III/Engineering/P/COMSATS (18) Innovative Bio Degradable Zinc Materials and Implants for Pediatric Orthopedic Application	12,919,990	3 years	Dr. Farasat Iqbal Pakistan Interdisciplinary Research Center in Biomedical Materials, COMSATS University Islamabad Lahore Campus
25	PSF/CRP/Constrm-376 Economic Utilization of Salt Affected Soil with the Integration of Chemical and Biological Approaches to Live within Salinity for sustainable Agroecosystems	3,326,600	2 years	Dr. Muhammad Anwar ul Haq Associate Professor, Saline agriculture Research Center, Institute of Soil and Environmental Sciences, University of Agriculture, Faisalabad
26	PSF/CRP/T-Helix-42 Development of Pak Army CCD and Khaki Uniform Fabric with Improved Properties	11,170,935	2 years	Dr. Ahsan Nazir Assistant Professor Department of Textile Processing National Textile University, Faisalabad
27	PSF/CRP/3/P-NIBGE/PPE/47 Conversion of PPE Waste into Multipurpose Beneficial Materials Using Self Designed Pyrolysis Technique: A Safe Disposal with Trash-to-Treasure Approach	4,175,000	2 years	Dr. Asma Rehman, Principal Scientist Nano-biotechnology Group, Industrial Biotechnology Division, NIBGE, Faisalabad.

28	PSF/CRP/C-NUST/Constrm-600 Pilot Scale study of Biogas upgrading process using hybrid system based on water scrubbing and Membrane Technology.	5,012,600	2 years	Dr. Zaib Jahan Assistant Professor School of Chemical and Materials Engineering (SCME) NUST, Islamabad
29	PSF/CRP/C-NUST/Constrm-438 Technology Development for Next Generation Fighter Aircraft (NGFA): Store separation from cavities.	886,176	2 years	Dr. Adnan Maqsood Associate Professor Research Centre for Modeling and Simulation NUST, Islamabad.
30	PSF/CRP/Constrm-398 Novel Therapeutic approach of capped Magnetic Nanoparticles for Cancer treatment Via Hyperthermia Therapy.	4,493,000	2 years	Dr. Tahir Munir , Assistant Professor, Physics Department, GC University, Faisalabad.
31	PSF/CRP/TH/4/KPK-PAF-IAST/453 AI based Skilled people market place for finding experts and tasks to facilitate citizens	1,101,000	2 years	Dr. Maqbool Khan Assistant Professor, Department of IT&CS, PAF-IAST, Haripur.

RESEARCH PROJECTS RECOMMENDED BY THE PSF-NSLP TECHNICAL COMMITTEE

Sr. #.	Project No. and Title	Name, Designation & Address of PI
1.	Evaluation and utilization of forage grasses produced in salt-affected areas for feeding and fattening of small ruminants PSF/NSLP/P-NIAB(922)	Dr. Muhammad Rizwan Principal Scientist Soil and Environmental Sciences Division, NIAB, Faisalabad.
2.	Development of rapid authentication technologies using specific DNA for meat/animal/plant species identification to verify the labeling/mislabeling/adulteration of commercial products in Pakistan PSF/NSLP/P-CUVAS(933)	Dr. Muhammad Safdar, Chairman, Department of Breeding and Genetics, Cholistan University of Veterinary & Animal Sciences, Bahawalpur Near DHA Bahawalpur.
3.	Development of naturally colored cotton and creation of environment friendly denim fabrics using routine weaving setup PSF/NSLP/P-NIAB(934)	Dr. Manzoor Hussain (T.I) Deputy Chief Scientist Cotton Group/PBGD, NIAB, Faisalabad.
4.	Proteomic Analysis of Fish Mucus and Their Therapeutic Use against Drug Resistant Bacteria PSF/NSLP/KP-KUST(941)	Dr. Waheed Ullah Assistant Professor Department of Microbiology, Kohat University of Science and Technology, Kohat.
5.	Development of a bacteriophage biobank against major pathogenic bacteria of poultry, and poultry borne human pathogenic bacteria. PSF/NSLP/C-NUMS(946)	Dr. Raees Khan, Assistant Professor Department of Biological Sciences, National University of medical sciences, The Mall, Rawalpindi.
6.	Enhancement of leaf rust disease resistance in wheat using Agrobacterium-mediated protein translocation (a non GMO approach) PSF/NSLP/KP-UAP(950)	Dr. Majid Khan Assistant Professor Institute of Biotechnology and Genetic Engineering, the University of Agriculture Peshawar.
7.	Improving wheat grain yield at reduced N fertilizer supply by knocking out TaGASR7 gene through CRISPR-Cas9 genome editing approach	Dr. Ch. M. Moddassir Ahmed Principal Scientist, National Institute for Biotechnology and Genetic Engineering, Faisalabad.

	PSF/NSLP/P-NIBGE (959)	
8.	Design and development of integrated partial automatic potato digger PSF/NSLP/P-MNSUAM (961)	Engr. Dr. Umair Sultan Assistant Professor, Department of Agricultural Engineering, MNS University of Agriculture, Multan.
9.	Production of Black Soldier Fly larvae as sustainable proteinaceous food for Poultry industry. PSF/NSLP/KP-NIFA(937)	Miss. Noor Fatima Jr. Scientist, Nuclear Institute for Food and Agriculture (NIFA), Tarnab, Peshawar
10.	Optimization of Quick and Efficient methods for Animal Species Identification through Meat and Meat Products PSF/NSLP/KP-UAP (954)	Dr. Rajwali Khan Assistant Professor, Department of Livestock Management, Breeding and Genetics, The University of Agriculture, Peshawar
11.	Development of Climate Resilient cotton resistant to drought and heat through editing of negative regulators by using Cpf1 multiplex system PSF/NSLP/P-UoP (955)	Dr. Abdul Qayyum Rao Professor, CEMB, University of Punjab Lahore
12.	Development of Indigenous Low Distribution Manure Injection Machine for the enrichment of Soil Nutrients. PSF/NSLP/P-MNSUAM (971)	Dr. Sarfraz Hashim Department of Agricultural Engineering, Muhammad Nawaz Shareef University of Agriculture, Multan.
13.	Industrial-Scale Production of Bio-Fertilizers from Waste Biomass for Agriculture Applications (Bio-Agro-Fertilizer) PSF/NSLP/S-MUET (973)	Dr. Tanveer Ahmed Gadhi Assistant Professor US Pakistan Center for Advanced Studies in Water, Mehran University of Engineering & Technology, Jamshoro
14.	Formulation of Eco-friendly Trichoderma based Indigenous Bio-fertilizer for Management of Plant Diseases PSF/NSLP/C-PMNH (990)	Dr. Muhammad Ismail Associate curator Botanical Sciences Division Pakistan Museum of Natural History, Islamabad
15.	Biofortification of Bread Wheat for iron (Fe) and Zinc (Zn) by CRISPR/Cas9 Genome Editing PSF/NSLP/C-QAU (1019)	Prof. Dr. Tariq Mahmood, Department of Plant Sciences, Quaid-i-Azam University, Islamabad

16.	Quality enhancement of indigenous shrimps: Pathogenic bacterial isolation-characterization and therapeutic intervention by GRAS bioactive metabolites (Bacteriocins) NSLP/CP/S-FUUAST(808) PSF/NSLP/S-FUUAST(841)	Dr. Munazza Danish Associate Professor, Department of Microbiology, Federal Urdu University of Arts, Science and Technology, Karachi
17.	Fabrication and characterization of Silver Sulphadiazine loaded Bio-Polymeric cellulose scaffold for wound dressing application PSF/NSLP/CP/ P-NUMS (1143) PSF/NSLP/P-NUMS (953)	Dr. Adnan Haider Assistant Professor Department of Biological Sciences National University of Medical Sciences, Rawalpindi, Pakistan
18.	Development of antibacterial socks using banana fibers extracted from fruit stick and other cellulosic fibers PSF/NSLP/CP/P-NTU (1076) PSF/NSLP/P-NTU(917)	Dr. Zulfiqar Ali Associate Professor Department of Textile Engineering, National Textile University Faisalabad
19.	Deployment of genomic assays upon the selected heat tolerant elite cotton lines for future breeding work PSF/NSLP/CP/P-NIBGE (1173) PSF/NSLP/P-NIBGE (970)	Dr. Mehboob-ur- Rahman Deputy Chief Scientist, National Institute for Biotechnology & Genetic Engineering Faisalabad
20.	Improving Reproductive Potential Of Gulabi Goat Breed Through Estrus Synchronization And Artificial Insemination PSF/NSLP/CP/S-SBBUVAS (1183) PSF/NSLP/S-SBBUVAS (976)	Dr. Qudratullah Kalwar Assistant Professor, Department of Animal Reproduction, Shaheed Benazir Bhutto University of Veterinary and Animal Science Sakrand
21.	Development of sperm cryopreservation protocols for <i>Cirrhinus mrigala</i> and <i>Labeo rohita</i> PSF/NSLP/P-AAUR (985)	Prof. Dr. Shamim Akhter Department of Zoology, Wildlife & Fisheries, PMAS Arid Agriculture University, Rawalpindi
22.	Synthesis of 1,3-Disubstituted Thioureas as Potential Pesticides to Deal with the	Dr. Amara Mumtaz

	Hurdles in Sustainable Wheat Growth in Pakistan PSF/NSLP/KP-CU (989)	Associate Professor, Department of Chemistry, COMSATS University Islamabad, Abbottabad Campus
23.	Investigate the protective efficacy and nutraceutical role of selenium nanoparticles in broiler chicken: Effect on immune response, antioxidant defense and production performance PSF/NSLP/CP/B-LUAWMS (1230) PSF/NSLP/B-LUAWMS (1007)	Dr. Nisar Ahmed Ujjan Assistant Professor, Lasbela University of Agriculture, Water and Marine Sciences, Uthal
24.	Development of cotton genotypes having higher lint yield, superior seed nutritive quality and germination by using induced mutations and physio-biochemical approaches PSF/NSLP/P- NIAB (1027)	Dr. Sajjad Haider Principal Scientist, Plant Breeding and Genetics Division, Nuclear Institute for Agriculture and Biology, Faisalabad
25.	Development of Nanotherapeutics based on Phyto Fabrication of Metal Oxide Nano Particles PSF/NSLP/C-AIOU (1032)	Dr. Sobia Kanwal Assistant Professor, Department of Biology, Faculty of Science, Allama Iqbal Open University, Islamabad
26.	Exploring the signaling role of rice mutant (astol1) in drought tolerance and its future perspective related to develop drought resistance genotypes PSF/NSLP/KP-HU (1051)	Dr. Nisar Ahmad Associate Professor, Hazara University, Department of Biotechnology and Genetic Engineering, Mansehra
27.	Development of local attractive bait matrix and toxin delivery foraging stations for control of Pakistani subterranean termites species PSF/NSLP/KP-NIFA(939)	Mr. Muhammad Irfan Senior Scientist, Nuclear Institute for Food and Agriculture, Peshawar
28.	Development and Introduction of Production Technology of Morels (Guchhi mushroom) in Mountain Region Gilgit-Baltistan Pakistan PSF/NSLP/GB-KIU (981)	Dr. Azhar Hussain Assistant Professor, Department of Agriculture and Food Technology, Karakorum International University, Gilgit.
29.	Evaluation of responsive Drip Irrigation System for Upscaling of food Security in Balochistan PSF/NSLP/B-LUAWMS (1008)	Engr. Muhammad Irfan Malik, Assistant Professor, Lasbela University of Agriculture, Water and Marine Sciences, Uthal
30.	Development of green and innovative Micro-extraction techniques for the	Dr. Shaukat Ali

	determination of emerging toxic trace species in drinking water and human food stuffs in Gilgit-Baltistan PSF/NSLP/GB-KIU (1017)	Associate Professor, Environmental Sciences, Karakoram International University, Gilgit.
31.	Development of tobacco varieties with improved sugar content and leaf area for enhanced productivity. PSF/NSLP/KP-UoH (1033)	Dr. Khurram Shahzad Assistant Professor, Department of Plant Breeding and Genetics, Haripur, The University of Haripur
32.	Bio-augmentation of soils contaminated with excessive pesticide application on peach plantation in the valley of Swat PSF/NSLP/KP-UAP(1020)	Dr. Mohammad Sayyar Khan, Associate Professor , Institute of Biotechnology and Genetic Engineering (IBGE), The University of Agriculture, Peshawar

LIST OF PROGRESS REPORTS RECEIVED FROM DURING 2017-2018

A. Semi annual reports

Sr. No.	Project No.	Project Title	Reports
1.	NSLP/P-NIAB(853)	Breeding high yielding tomato hybrids resilient to diseases and drought	1 st
2.	NSLP/P-UVAS (833)	Surveillance and pathobiological investigations against Contagious Ecthyma Virus	1 st
3.	NSLP/P-UAF(873)	Determination of Weed crop competition time and economic threshold of weeds in major crops	1 st
4.	NSLP/P-UAF(877)	Development of low phytate maize through CRISPR/Cas genome editing	
5.	NSLP/S-KU (902)	Isolation, preparation, formulation and application of novel nematicidal compound Chloro - Trifluoromethyle Phenyl for the control of plant parasitic nematodes	1 st
6.	NSLP/KP-NIFA(904)	Sustainable Approach for Effective Control of Peach Stone Replant Disorders	1 st
7.	NSLP/KP-UAP(912)	Development of local toxin binder for the prevention and control of mycotoxicosis in poultry	
8.	PSF/NSLP/KP-UAP(918)	Exploring the In-vitro and In-vivo antibacterial role of Herbal Medicine (6-Gingerol) to Treat Mastitis in small ruminants	1 st
9.	PSF/NSLP/P-NIAB(925)	Development of forecasting model for early warning system of leaf and yellow rust diseases in wheat	1 st
10	PSF/NSLP/P-IUB(931)	Devising and Validating Pen-side Hematological Tests as an Enhanced Approach to the Diagnosis of Anemia in Cholistani Livestock (Camels and Cattle)	1 st
11	NSLP/P-UAF(783)	Development, evaluation and commercialization of potato culls and processing wastes as concentrate source	2 nd

		in animal feed for cost effective feed formulation	
12	PSF/NSLP/KP-VRI(759)	Development of Loop Mediated Isothermal Amplification (LAMP) for detection of important tick-borne hemoparasitic diseases of bovines	2 nd
13	PSF/NSLP/KP-NIFA (724)	Breeding Heat Tolerant and High Yielding Chickpea (<i>Cicer arienum</i>) Genotypes	2 nd
14	PSF/NSLP/KP-UAP(768)	Development of a phyto-protease and its comparative assessment with different commercial proteases used in poultry feed production	2 nd
15	NSLP/C-CIIT(820)	Development of probiotic formulation to mitigate mycotoxicity and fortify the growth potential of livestock feed	2 nd
16	NSLP/KP-AWKUM(827)	Large Scale Reclamation of Farm Land Using Innovative Bio-solid Fertilizer from Different Agro-waste, Sewage Slurry and Microbes	2 nd
17	PSF/NSLP/P-UoL(757)	Diversity of Rhizobacteria Associated with Chickpea and Cluster Bean Growing in Marginal Land	2 nd
18	PSF/NSLP/P-AAU(790)	Preparation and Evaluation of bovine serum and chicken egg derived immunoglobulins for the treatment of <i>staphylococcus aureus</i> mastitis in cattle and buffaloes	2 nd
19	PSF/NSLP/P-UVAS(840)	Assessment of water conservation strategies for cooling dairy animals during summer	2 nd
20	NSLP/P-BARI(843)	Establishment of Vermiculture and Vermi-Composting Production Units and Technology Transfer to the Farmers	2 nd
		215	
21	NSLP/P-UAF(857)	Treatment of Acute Mycotoxicosis in Poultry and Animals Through	2 nd

		Development of Indigenous Mycotoxins Inactivating Liquid Product	
22	NSLP/P-CUVAS(861)	Traceable beef production: An innovative production system to develop consumer trust on food safety through traceability	2 nd
23	NSLP/S-SIBA(862)	Weed Control in vegetable farms via Microwave Irradiation	2 nd
24	NSLP/C-CUI(880)	Feed-grade Nano-additives to Control the Salmonellosis and Campylobacteriosis	2 nd
25	NSLP/KP-UAP(887)	Development of effective diagnostics and vaccine for the control of <i>Mycoplasma bovis</i> (local strain) infections in cattle and buffaloes	
26	NSLP/CP/KP-UOH(1051) PSF/NSLP/KP-UoH (907)	Development, Formulation and Patenting of Mycorrhizal Fungi Based Biofertilizer	2 nd
27	NSLP/P-UAF(845)	Development and Characterization of Biodegradable Food Packaging Films from Indigenous Agricultural Residues	3 rd
28	PSF/NSLP/S-KU(692)	Preparation of Industrially Important Instant Starches (Cold Water Swell-able) and its Application in Food Products	3 rd
29	PSF/NSLP/C-QU (706)	Functional Analysis of Rice NAC Transcriptional Factor in Transgenic Wheat against Various Stresses	3 rd
30	PSF/NSLP/KP-UAP (709)	Optimization of Environmental and Nutritional Standards for Mass Production of Mealworm Meal Under Tropical Environment of Pakistan	3 rd
31	PSF/NSLP/C-CIIT (743)	Phage Based Biocontrol of Bacterial Wilt Disease in Tomato and Chillies for Sustainable Production	3 rd
32			

B: First Annual Reports

Sr. No.	Project No.	Project Title
1.	PSF/NSLP/KP-NIFA (724)	Breeding Heat Tolerant and High Yielding Chickpea (<i>Cicer arietinum</i>) Genotypes
2.	PSF/NSLP/ GB-PARC (727)	Promotion of Improved Varieties of Buckwheat through Seed Production Villages Temperate Area of Gilgit-Baltistan

3.	NSLP/GB-KIU(756)	Phytochemical Investigation of Seabuckthorn (<i>Hyphophea rhmodies L.</i>) and Development of value added products
4.	NSLP/C-CIIT(820)	Development of probiotic formulation to mitigate mycotoxicity and fortify the growth potential of livestock feed
5.	NSLP/KP-AWKUM(827)	Large Scale Reclamation of Farm Land Using Innovative Bio-solid Fertilizer from Different Agro-waste, Sewage Slurry and Microbes
6.	PSF/NSLP/P-UoL(757)	Diversity of Rhizobacteria Associated with Chickpea and Cluster Bean Growing in Marginal Land
7.	PSF/NSLP/P-AAU(790)	Preparation and Evaluation of bovine serum and chicken egg derived immunoglobulins for the treatment of <i>staphylococcus aureus</i> mastitis in cattle and buffaloes
8.	PSF/NSLP/P-UVAS(840)	Assessment of water conservation strategies for cooling dairy animals during summer
9.	NSLP/P-BARI(843)	Establishment of Vermiculture and Vermi-Composting Production Units and Technology Transfer to the Farmers
10.	NSLP/CP/KP-UOH(1051) PSF/NSLP/KP-UoH(907)	Development, Formulation and Patenting of Mycorrhizal Fungi Based Biofertilizer
11.	NSLP/P-UAF(845)	Development and Characterization of Biodegradable Food Packaging Films from Indigenous Agricultural Residues
12.	NSLP/P-GCUF(769)	Development of Bacteriophage Therapy against Multi Drug Resistant Avian Pathogenic <i>E coli</i> causing Colibacillosis in Poultry
13.	NSLP/P-UVAS(780)	Facile synthesis of Iron oxide nanoparticles as nutraceuticals for application in Livestock and Poultry Industry
14.	NSLP/P-NIAB(785)	Effect of antioxidant resveratrol supplementation to semen extender on post-thawed sperm quality and fertility in mixed beetal goats
15.	NSLP/P-UVAS(798)	Development and production of bio pesticides for the control of tick infestation in cattle in Pakistan

16.	NSLP/P-GCUL(804)	Green active packaging of poultry, livestock meat, fruits and shrimps having nanoencapsulated natural preservatives to boost national economy
17.	PSF/NSLP/P-UVAS(813)	Treatment of Abattoir Sludge for the Control of Parasitic Infection and Efficient Usage as Organic Fertilizer
18.	NSLP/P-UAM(838)	Biofortification of Fodders with Selenium to Improve Milk Yield and Quality in Dairy Cattle
19.	NSLP/P-UVAS(840)	Assessment of water conservation strategies for cooling dairy animals during summer
20.	NSLP/P-UAF(845)	Development and Characterization of Biodegradable Food Packaging Films from Indigenous Agricultural Residues
21.	NSLP/P-UAF(857)	Treatment of Acute Mycotoxicosis in Poultry and Animals Through Development of Indigenous Mycotoxins Inactivating Liquid Product
22.	NSLP/P-CUVAS(861)	Traceable beef production: An innovative production system to develop consumer trust on food safety through traceability
23.	NSLP/KP-UAP(865)	Development of multi strains Probiotic for the production of safe, antibiotic free and high quality Poultry meat
24.	NSLP/KP-UAP(887)	Development of effective diagnostics and vaccine for the control of <i>Mycoplasma bovis</i> (local strain) infections in cattle and buffaloes
25.	NSLP/P-UAF(908)	Treatment of Mastitis by nanoparticles and egg yolk antibodies

C: Second Annual Progress Reports

Sr. No.	Project No.	Project Title
1.	NSLP/P-UAF(783)	Development, evaluation and commercialization of potato culls and processing wastes as concentrate source in animal feed for cost effective feed formulation
2.	PSF/NSLP/KP-NIFA (724)	Breeding Heat Tolerant and High Yielding Chickpea (<i>Cicer arietinum</i>) Genotypes
3.	PSF/NSLP/KP-UAP(768)	Development of a phyto-protease and its comparative assessment with different commercial proteases used in poultry feed production
4.	NSLP/C-CIIT(820)	Development of probiotic formulation to mitigate mycotoxicity and fortify the growth potential of livestock feed

5.	NSLP/KP-AWKUM(827)	Large Scale Reclamation of Farm Land Using Innovative Bio-solid Fertilizer from Different Agro-waste, Sewage Slurry and Microbes
6.	PSF/NSLP/P-UoL(757)	Diversity of Rhizobacteria Associated with Chickpea and Cluster Bean Growing in Marginal Land
7.	PSF/NSLP/P-AAU(790)	Preparation and Evaluation of bovine serum and chicken egg derived immunoglobulins for the treatment of <i>staphylococcus aureus</i> mastitis in cattle and buffaloes
8.	NSLP/B-LUAWMS(763)	Investigate the effect of <i>in ovo</i> feeding of amino acids and trace elements on immunity and production performance of post-hatch broiler chicken
9.	PSF/NSLP/S-KU (735)	Production and characterization of modified starches from mango processing waste.
10.	NSLP/P-GCUF (750)	Enrichment of <i>Omega</i> (Ω) Fatty Acids in Edible Oils using Ultrasound Technology
11.	NSLP/GB-KIU(756)	Phytochemical Investigation of Seabuckthorn (<i>Hyphophea rhmodies L.</i>) and Development of value added products
12.	NSLP/C-CUVAS(825)	Way forward to the commercial farming of grey francolin (<i>Francolinus pondicerianus</i>) at CUVAS, Bahawalpur
13.	NSLP/KP/AWKUM (827)	Large Scale Reclamation of Farm Land Using Innovative Bio-solid Fertilizer from Different Agro-waste, Sewage Slurry and Microbes

D: Final Reports

Sr. No.	Project No.	Project Title
1.	PSF/NSLP/P-CIIT (664)	Evaluating the Potential of Zero Energy Cool Chambers (ZEEC) for Horticultural Crops
2.	PSF/NSLP/P-UAF (670)	Spectrochemical Studies of Pollutants in Soil, Water and Vegetation Using Laser Induced Breakdown Spectroscopy
3.	PSF/NSLP/KP-UoS (737)	A Rapid Method for the Isolation of Bioactive Phytochemicals from <i>Parthenium Hysterophorus</i> for New Pharmaceutical Products Development
4.	PSF/NSLP/P-UAAR (695)	Molecular Cloning and Heterologous Expression of Endopolygalacturonas gene in <i>E. coli</i> as a Promising Application for Food Industry
5.	PSF/NSLP/P-UVAS (697)	Evaluation of Biological and Trans-Placental Potentials of Tick-Borne Diseases in Cattle
6.	PSF/NSLP/KP-AWKUM (646)	Improvement in anti-tick vaccine efficacy against Pakistani strain <i>Rhipicephalus (Boophilus) microplus</i>
7.	PSF/NSLP/P-UCP(712)	Optimization, Validation and Multiplexing of 11 ChrX MiniSTRs in Pakistani Population
8.	PSF/NSLP/P-UVAS (689)	Use of Indigenous Fruit Extracts as Nutraceuticals and Their Therapeutic Efficacy Against <i>Clostridium perfringens</i> in Broiler Chicken
9.	PSF/NSLP/KP-NIFA (705)	Pilot scale production and popularization of compost tea as organic fertilizer nutrient source
10.	PSF/NSLP/KP-NIFA (656)	Commercialization of Existing Technology of Mushroom and Popularization of Oyster and Milky Mushrooms as Cottage Industry for Economic Uplift of Landless Communities of KPK, Balochistan & Upper Punjab
11.	PSF/NSLP/B-BU(714)	Develop Web-accessible Documented and Illustrated Information on Plants of Balochistan

List of Research Publications Produced from NSLP Funded projects

Sr. No.	Project No	Publications
1.	PSF/NSLP/P-CIIT (664)	Khalid, S., Majeed, M., Ullah, M. I., Shahid, M., Riasat, A. R., Abbas, T., ... & Farooq, A. Effect of storage conditions and packaging material on postharvest quality attributes of strawberry. <i>Journal of Horticulture and Postharvest Research</i> , 3(2), 195-208.
2.	PSF/NSLP/S-KU(692)	The research paper " <u>Comparative study on citric acid modified instant starches (alcoholic alkaline treated) isolated from white sorghum and corn grains</u> " has been published in International Journal of Biological Macromolecules (Impact factor 5.16).
3.	PSF/NSLP/S-KU(692)	The research paper " <u>Combined effects of hydroxypropylation and alcoholic alkaline treatment on structural, functional and rheological characteristics of sorghum and corn starches</u> " pasted in Annexure I has been published in International Journal of Biological Macromolecules (Impact factor 5.16)
4.	PSF/NSLP/P-UVAS (697)	Atif et al. "Strategies for prevention and control of anaplasmosis: at human-animal interface" submitted in Pakistan Journal of Agricultural Sciences No. 9849. Impact factor (0.748)
5.	PSF/NSLP/P-UVAS (697)	Atif et al. review paper manuscript ID: vetsci-1357362 , submitted in " Veterinary Sciences " submitted on August 11, 2021, entitled "Epidemiology, diagnosis and control of canine cyclic thrombocytopenia and granulocytic anaplasmosis: emerging diseases of veterinary and public health significance". Impact factor (2.304)
6.	PSF/NSLP/KP-AWKUM(827)	Nawab, J., Din, Z.U., Ahmad, R. et al. Occurrence, distribution, and pollution indices of potentially toxic elements within the bed sediments of the riverine system in Pakistan. <i>Environ Sci Pollut Res</i> 28, 54986– 221

		55002 (2021). https://doi.org/10.1007/s11356-021-14783-9
7.	PSF/NSLP/KP-AWKUM(827)	Sardar, S.W., Rehman, S.A.U., Nawab, J. et al. Quantification of potentially toxic elements in degraded mining soils and medicinal plants: a case study of Indus Kohistan region Northern Pakistan. Environ Earth Sci 80, 641 (2021). https://doi.org/10.1007/s12665-021-09927-6
8.	PSF/NSLP/KP-AWKUM(827)	Nawab, J., Din, Z.U., Faisal, S., Khan, S., Ali, A., Rahman, Z., Alam, M., Khan, A.Z., Khan, M.A., Khan, K. and Khan, A., 2021. Farmlands degradation with conventional agricultural practices and human health risk assessment: A case-study of Punjab Province, Pakistan. Land Degradation & Development, 32(16), pp.4546-4561.
9.	PSF/NSLP/P-UVAS (747)	Influence of hen egg white lysozyme N-acetylmuramide glycan hydrolase on the antimicrobial activity and textural characteristics of high-moisture Mozzarella cheese. Iqra Muqadas Saleem, Nabila Gulzar, Muhammad Nadeem, Aysha Sameen, Saima Rafiq, Sadia Rehman. J Food Process Preserv. 2021;45:e1557, DOI: 10.1111/jfpp.15573.
10.	PSF/NSLP/P-UVAS (747)	Iqra Muqadas Saleem ¹ , Nabila Gulzar ^{1*} , Saima Rafiq ² , Ayesha Sameen ³ , Ishtiaque Ahmad ¹ , Mubashrah Munir ⁴ , Hafiz Adeel Nazish: Exploring the Antioxidant Potential of Hen Egg White Lysozyme N-acetylmuramide Glycan Hydrolase in Full Fat Mozzarella Cheese. Emirates journal of Food and Agriculture

Details of Newly Initiated Projects in FY 2023-24

Sr. No.	Project Number	P.I Address	1st Installment	Quarter
	PSF/CRP/S-MUET/Constrm-172 Design of a Vascular Analysis Framework for Automated Quantification of Non-Calcified Coronary Plaques	Dr. Moazzam Jawaid Associate Professor Department of Computer Systems Engineering Mehran University of Engineering and Technology, Jamshoro	1,111,946	1 st
	PSF/CRP/Constrm-114 Integrative Omics Studies of Environmentally and Medically Important Lichens of Pakistan	Dr. Arslan Ali Assistant Professor Dr. Panjwani Center for Molecular and Drug Research University of Karachi, Karachi	1,295,000	1 st
	PSF/CRP/3/P-UET/PPE/50 Development of Economical Nanocomposites through Upcycling of Personal Protective Equipment (PPE) Waste for Automotive and Electronics Applications	Dr. Yasir Qayyum Gill Assistant Professor Department of Polymer & Process Engineering University of Engineering & Technology, Lahore	4,219,900	2 nd
	PSF/CRP/P-UAF/Constrm-(313) Developing Innovative and Low-Cost Biochar-Based Materials for Filtration of Arsenic from Drinking Water	Dr. Nabeel Khan Niazi Assistant Professor Institute of Soil and Environmental Sciences University of Agriculture Faisalabad	5,602,200	2 nd
	PSF/CRP/TH/4/P-UET/717	Dr. Muhammad Irfan-ul-Hassan ²²³	2,129,200	2 nd

	Development of Bricks and Wall-Panels using Sustainable Construction Materials for Low-Cost Housing Sector of Pakistan	Associate Professor Department of Civil Engineering University of Engineering & Technology, Lahore		
	PSF/CRP/P-GCU/Constrm-579 Development and Lead Optimization of Novel Me2 and 6PGD Inhibitors that Halts Fibroblast Accelerated Migration of Cancer Cells	Dr. Azhar Rasul, Assistant Professor Department of Zoology Government College University, Faisalabad	6,935,000	2 nd
	PSF/CRP/P-GCU/Constrm-92 Multifunctional Scaffold Materials for Highly Efficient Hybrid Halide Perovskite Solar Cells	Dr. Muhammad Ikram Assistant Professor Department of Physics Government College University Lahore	7,032,500	2 nd
	PSF/CRP/S-AKU/Constrm-220 Early Detection of Oral Pre-Cancerous Lesions among Smokeless Tobacco Users, Adolescents by Analyzing Salivary Metabolites and Cytokines	Dr. Shafquat Rozi Assistant Professor Department of Community Health Sciences The Agha khan University Karachi	2,592,000	2 nd
	PSF/CRP/SP/C-PMNH/03 Establishment of a DNA Barcode Reference Bank for the Marine and Freshwater Fishes in Pakistan	Dr. Shabir Ali Amir Associate Curator Zoological Sciences Division Pakistan Museum of Natural History Islamabad	5,910,000	2 nd

<p>PSF/CRP/KPK-GU/Consrn-46</p> <p>Identification of Genetic factors responsible for variable Phenotypes of Thalassemia Patients in KP, Pakistan</p>	<p>Dr. Jabbar Khan</p> <p>Assistant Professor</p> <p>Department of Biological Sciences</p> <p>Gomal University, D. I. Khan</p>	<p>2,100,000</p>	<p>2nd</p>
<p>PSF/CRP/C-QAU/TH-70</p> <p>Piloting and Commercialization of the Indigenous Probiotic for Food and Feed Application</p>	<p>Dr. Muhammad Imran</p> <p>Associate Professor</p> <p>Department of Microbiology</p> <p>Quaid-i-Azam University</p> <p>Islamabad</p>	<p>13,484,000</p>	<p>2nd</p>
<p>PSF/CRP/P-NIBGE/Consrn-431</p> <p>Diagnosis and Newborn Screening of Treatable Aminoacidopathies in Pakistani Patients</p>	<p>Dr. Fazli Rabbi Awan</p> <p>Principal Scientist</p> <p>Health Biotechnology Division National Institute for Biotechnology and Genetic Engineering (NIBGE)</p> <p>Faisalabad</p>	<p>3,715,000</p>	<p>3rd</p>
<p>PSF/CRP/P-CU/Consrn-(365)</p> <p>Cohort: A 32-bit Configurable Digital Signal Processor for Industrial Control Applications</p>	<p>Prof. Dr. Nadia Nawaz Qadri</p> <p>Department of Electrical and Computer Engineering</p> <p>COMSATS University</p> <p>Islamabad, Wah Campus</p>	<p>965,000</p>	<p>3rd</p>
<p>PSF/CRP/Consrn-(142)</p> <p>Development of Smartphone Based Point of Care Device for Rapid Infection Disease Detection</p>	<p>Dr. Jahan Zeb Gul</p> <p>Assistant Professor</p> <p>Department of Mechatronics and Biomedical Engineering</p> <p>Air University, Islamabad</p>	<p>3,305,000</p>	<p>3rd</p>
<p>PSF/CRP/C-QU/T-helix-08</p> <p>Development, validation and commercialization of a viral nucleic-acid</p>	<p>Dr. Muhammad Rizwan Alam Assistant Professor</p> <p>Department of Biochemistry</p>	<p>2,115,078</p>	<p>3rd</p>

isolation assay: A product with enormous potential in the clinical diagnostic sector of Pakistan	Quaid-i-Azam University, Islamabad		
PSF/CRP/TH/4/CFP/708 Development of a gel-based topical nano-laced patch for quick relief of pain	Dr. Adeel Masood Butt Assistant Professor Institute of Pharmaceutical Sciences University of Veterinary and Animal Sciences, Lahore	3,697,200	3 rd
PSF/CRP/S-UOK/Constrm-636 Exploration of Coastal Areas of Baluchistan for Faunistic Diversity, Inventorying and Monitoring	Dr. Qadeer Muhammad Ali Incharge, Marine Reference Collection and Resources Centre University of Karachi, Karachi	2,420,000	3 rd
PSF/CRP/Constrm-(676) Development of Silver (I)-N-Heterocyclic Carbene based Cubosome Hydrogels for Topical Treatment of Burns	Dr. Muhammad Adnan Iqbal Assistant Professor Department of Chemistry University of Agriculture, Faisalabad	1,420,000	3 rd
PSF/CRP/Constrm-(754) Establishment of Certified Huanglongbing (HLB) free citrus nurseries through advance metabolomics technologies	Dr. Fozia Saleem Assistant Professor Center for Agriculture Biotechnology and Biochemistry (CABB) University of Agriculture, Faisalabad	1,497,500	3 rd
PSF/CRP/SP/B-UoB/07 Commercialization of Eye Smart Helmet for Coal Miner's Safety	Dr. Waheed Noor Assistant Professor Computer Science and IT University of Balochistan, Quetta	7,645,000	3 rd

	<p>PSF/CRP/TH/4/KP-PAF-IASST/465</p> <p>Development of Fully Mechanized Shearer/Coal Cutter Prototype to Mine the Thin Coal Seams of <u>Pakistan</u></p>	<p>Dr. Rana Muhammad Asad Khan</p> <p>Assistant Professor</p> <p>Department of Mining Engineering Pak-Austria Fachhochschule Institute of Applied Sciences and Technology, Mang, Haripur</p>	2,144,000	3 rd
	<p>PSF/CRP/6/E/Indv-277</p> <p>Fabrication of Highly Stable Perovskite and All Oxide Solar Cells for Their Application as Solar Windows for Renewable Electricity Generation</p>	<p>Dr. Muhammad Talha Masood</p> <p>Assistant Professor</p> <p>Department of Materials Engineering</p> <p>National University of Sciences and Technology</p> <p>Islamabad</p>	1,546,860	3 rd
	<p>PSF/CRP/6/E/Constrm-76</p> <p>Low Cost Durable Electric Bicycle and Bike</p>	<p>Dr. Muhammad Rauf</p> <p>Assistant Professor</p> <p>Department of Electronic Engineering</p> <p>Dawood University of Engineering and Technology, Karachi</p>	640,000	3 rd
	<p>PSF/CRP/6/E/Indv-405</p> <p>Portable Hybrid Electric Power Generator for low power applications</p>	<p>Mr. Syed Qaisar Abbas Rizvi</p> <p>Principal Engineer, PINSTECH, Pakistan Atomic Energy Commission, Islamabad</p>	890,000	3 rd
	<p>PSF/CRP/C-QU/Cons-308</p> <p>An Integrated Approach Towards Wastewater Bio-Sensing, Bio-Decontamination And Energy (Electrical) Harvesting In Self-</p>	<p>Dr. Naeem Ali</p> <p>Associate Professor</p> <p>Department of Microbiology</p> <p>Quaid-i-Azam University</p> <p>Islamabad 227</p>	3,915,000	3 rd

	Automated Microbial Fuel Cell			
	PSF/CRP/6/E/Constrm-(305) Development of coatable super-hydrophobic, anti-dust as well as UV blocking solution for the enhancement of life, performance and stability of already installed solar panels	Dr.-Ing. Iftikhar Ahmed Channa Assistant Professor Department of Metallurgical Engineering NED University of Engineering and Technology, Karachi	2,210,000	3 rd
	PSF/CRP/6/E/Constrm-(289) Hybrid Concentrated Solar Power for Industrial and Domestic Applications	Prof. Dr. Adeel Waqas Principal U.S. Pakistan Center for Advanced Studies in Energy National University of Science & Technology, Islamabad	2,325,000	3 rd
	PSF/CRP/6/E/Indv-234 Design and Fabrication of Generator for Counter Rotating Wind Turbine Application	Dr. Faisal Khan Assistant Professor Electrical and Computer Engineering Department COMSATS University Islamabad, Abbottabad campus	2,168,000	3 rd
	PSF/CRP/6/E/Th-(357) Design, Development and Commercialization of Metal Organic Framework (MOF) based Efficient Perovskite Solar Cells	Dr. Hafiz Muhammad Asif Javed Assistant Professor Department of Physics University of Agriculture, Faisalabad	3,425,000	4 th
	PSF/CRP/6/E/Constrm-(177) Fresnel Lens Concentrating Solar PV Modules	Engr. Dr. Mumtaz A. Qaisrani, Assistant Professor Department of Mechanical engineering	3,515,000	4 th

		Khwaja Fareed University of Engineering and Information Technology, Rahim Yar Khan		
	PSF/CRP/P-NUMS/Consrn (48) Immune defence augmentation effect of fish collagen peptides on the human skin commensals microbiome against pathogenic bacteria	Dr. Fazli Subhan Assistant Professor Department of Biological Sciences National University of Medical Sciences (NUMS) Rawalpindi	5,290,000	4 th
	PSF/CRP/P-UoG/Cons-239 Development of proto type Platform for Production of Proteases Involved in Ecofriendly Leather Processing in Pakistan	Dr. Nadia Zeeshan Assistant Professor Department of Biochemistry and Biotechnology University of Gujrat, Gujrat	3,616,545	4 th
	PSF/CRP/7/AI/Indv-63 Innovative Robotic Rehabilitation System for Upper Limb Motor Impairments: Robo-Litiation	Prof. Dr. Arfan Jaffar Department of Computer Science Superior University Lahore	2,097,492	4 th
Total			Rs.112.974 Million	

Scientific Conferences/ Seminars/ Symposia/ Workshops Funded**Financial Support to Scientific Societies in Pakistan (Phase-II)**

Sr. No	Topic	Nature of the Event
1.	Advanced Robotics Manufacturing Workshop	Workshop 2
2.	8th Annual Conference of the Pakistan Society of Nuclear Medicine” Nuclear Medicine in Pakistan Generation Next	Conference
3.	“Emerging Trends in Nuclear Medicine-Molecular Imaging & Theranostics”	Symposium
4.	Radioiodine Therapy in Thyroid Diseases Current Trends and Future Directions	Symposium
5.	Soil Health: A Key to Food Security	Conference
6.	Vacuum Application in Applied Surface Sciences	Workshop
7.	Renewable Energy and Sustainability	Conference
8.	Advanced Field Training and Workshop in Salt Rang Area	Workshop
9.	Water Awareness Week	Conference
10.	Tropical Cyclone & Tsunami to Pakistan Coast and Our Preparation	Seminar
11.	Better Heart Health on International World Heart Day	Seminar
12.	Capacity Development of Provisional food Regulatory Authorities in Policy formulation for Health Diet	Conference 4
13.	Global Evidence and Policy Formulation for Health Diet	Symposium
14.	Tobacco Control Policy Analysis and Way Forward on International World No Tobacco Day	Symposium
15.	42 nd Pakistan Zoological Conference	Congress
16.	Quality of Engineering Education	Symposium
17.	Industrialization in Pakistan	Symposium
18.	Nuclear Hydrogen	Symposium
19.	Introduction of New Technology and Role of Consulting Engineers	Symposium
20.	Thar Coal for Energy	Lecture

21.	Geothermal Potential of Laki Shah Sadar, Sindh	Lecture
22.	Generative AI tools for Beginners	Workshop
23.	Web Security	Workshop
24.	Agile Project Management	Workshop
25.	Innovation Commercialization Cycle for Startups	Workshop
26.	Advances in Nematology and Emerging Threats”	Symp cum W.shop
27.	Thalassemia Day	Symposium
28.	4 th International Conference on Emerging Trends in Earth and Environmental Sciences	Conference
29.	Nuclear Technology in Pakistan	Symposium
30.	Improving in crops varieties by Nuclear Techniques	Symposium
31.	PNS Awareness session on Nuclear Technology	Symposium
32.	PNS College Conference	Conference
33.	S&T for Women in Nuclear and Allied Disciplines”	Conference
34.	Commercial Potential and Societal Impact of Nano Technology	Symposium
35.	Industrial Application of Nuclear Techniques	Symposium
36.	15 th Biennial Conference of the Society	Conference
37.	Role of Artificial Intelligence in Public Health and Medicine	Conference
38.	National Workshop on Plant Taxonomy and its Role in Plant Research	Workshop

International Linkage fee to International Federations

Sr. No	Society	International Federation
1.	Pakistan Society for Biochemistry and Molecular Biology 231	<ul style="list-style-type: none"> • The International Union of Biochemistry and Molecular Biology (IUBMB) • The Federation of Asian and Oceanian Biochemists and Molecular Biologists, (FAOBMB)

2.	Soil Society of Pakistan	International Union of Soil Sciences
3.	Pakistan Vacuum Society	International Union for Vacuum Sciences Techniques and Application
4.	Pakistan Academy of Engineering	International Council of Academies of Engineering and Technological Sciences, Inc

Expenditure for Travel Grant Activity 2023-24 under Development Budget

Sr. No	File No.	Name / Institute	Field/ Specialization	Amount
1.	PSF/P&D/TG-PSDP (23)/2023-24	Dr. Fazal Said Assistant Professor AWKU, Mardan	Entomology	375,000
2.	PSF/P&D/TG-PSDP (30)/2023-24	Dr. Shujaul Mulk Professor QAU, Islamabad	Plant Ecology and Conservation	350,000
3.	PSF/P&D/TG-PSDP (35)/2023-24	Prof. Dr. Tariq Mahmood Professor, QAU, Islamabad	Plant Sciences	450,000
4.	PSF/P&D/TG-PSDP (25)/2023-24	Ms. Hira Saleem PhD Scholar PMAS Arid Agriculture University, Rawalpindi	Environmental Sciences	387,000
5.	PSF/P&D/TG-PSDP (31)/2023-24	Dr. Abdul Qayyum Assistant Professor Haripur University, KP	Agronomy	260,000
6.	PSF/P&D/TG-PSDP (38)/2023-24	Dr. Shazia Fatima Director KIRAN Hospital, Islamabad	Nuclear Medicine	165,000
7.	PSF/P&D/TG-PSDP (40)/2023-24	Mr. Sohail Hassan PhD Scholar/Lecturer UVAS, Lahore	Microbiology	300,000
8.	PSF/P&D/TG-PSDP (42)/2023-24	Prof. Dr. Khan Bahadar Marwat 233	Weed Sciences	300,000

		Professor/President of Weed Science Society of Pakistan		
9.	PSF/P&D/TG-PSDP (61)/2023-24	Dr. Samiullah Associate Professor QAU, Islamabad	Microbiology	430,000
10.	PSF/P&D/TG-PSDP (58)/2023-24	Dr. Sobia Kanawal Assistant Professor AIOU, Islamabad	Biochemistry & Molecular Biology	500,000
11.	PSF/P&D/TG-PSDP (51)/2023-24	Dr. Shanawer Niaz Assistant Professor Thal University, Punjab	Physics	274,383
12.	PSF/P&D/TG-PSDP (49)/2023-24	Ms. Aamenah Siddiqui PhD Scholar, QAU, Islamabad	Electronics	329,981
13.	PSF/P&D/TG-PSDP (60)/2023-24	Dr. Fazal Said Assistant Professor AWKU, Mardan	Entomology	330,000
14.	PSF/P&D/TG-PSDP (53)/2023-24	Mr. Farooq Aslam PhD Scholar, IST, Islamabad	Aeronautics	260,000
15.	PSF/P&D/TG-PSDP (57)/2023-24	Ms. Sehrish Gul University of Agriculture, Faisalabad	Microbiology	270,000
	Total			4,981,364

VII. Financial Statements

1. PSF Financial Statement

PAKISTAN SCIENCE FOUNDATION ISLAMABAD

SUMMARY

SUMMARIZED BUDGET / REVISED ALLOCATION, ACTUAL EXPENDITURE OF 2022-23 & BUDGET ALLOCATION, ACTUAL EXPENDITURE 2023-24 UNDER BUDGET IB-3368 PAKISTAN SCIENCE FOUNDATION (PSF).

Object Code	Heads/ Classification	Budget Position & Actual Expenditure <u>2022-23</u>						Budget Position & Actual Expenditure 2023-24	
		Budget Allocation <u>2022-23</u>	Revised Budget Allocation After Re-appropriation <u>2022-23</u>	% age of Allocation	Actual Expenditure <u>2022-23</u>	% age of	Budget Allocation <u>2023-24</u>	Actual Expenditure <u>2023-24</u> (30.9.2023)	
1	2	3	4	5	6	7	8		
	TOTAL BUDGET ALLOCATION	280.288 (M)	443.969 (M)		443.968 (M)		299.402 (M)	70.346 (M)	
A01	EMPLOYEE RELATED EXPENSES (A + B)	190,000,000	190,574,796	42.9%	190,574,614	100.0%	246,762,000	61,711,692	
A01 1-1	A). Pay (a + b)	95,637,000	117,137,000	0.2635384	117,137,000	100.0%	179,000,000	28,843,395	

A01 101	a). Pay of Officer s	65,137, 000	79,737, 000	18.0 %	79,737, 000	100.0 %	90,000,000	19,649,835	
A01 151	b). Pay of other Staff	30,500, 000	37,400, 000	8.42 %	37,400, 000	100.0 %	89,000,000	9,193,560	
A01 2	B). Allow ances (c + d)	94,363, 000	73,437, 796	16.5 4%	73,437, 614	100.0 %	67,762,000	32,868,297	
A01 2-1	c). Regular Allow ances	78,363, 000	54,863, 000	#RE F!	54,863, 000	100.0 %	52,762,000	21,966,002	
A01 2-2	d). Other Allow ances	16,000, 000	18,574, 796	4.18 %	18,574, 614	100.0 %	15,000,000	10,902,295	
A02	PROJ ECT PRE- INVE STME NT ANAL YSIS (STAT UTOR Y FUNC TION S) (a + b)	-	150,00 0,000	33.7 9%	150,00 0,000	100.0 %	-	-	
A02 201	a). Grant for Resear ch & Instituti on Support	-	136,38 7,446	30.7 %	136,38 7,446	100.0 %	-	-	
A02 201	b). Science Promoti on Activiti es	-	9,131,0 81	2.06 % ²³⁵	9,131,0 81	100.0 %	-	-	

	c). Plannin g & Develo pment Section	-	4,481,4 73	1.01 %	4,481,4 73	10 0. 0 %	-	-
A03	OPER ATIN G EXPE NSES	56,937, 000	58,034, 734	13.1 %	58,034, 239	10 0. 0 %	52,640,000	8,633,844
A04	EMPL OYEE S RETI REM ENT BENE FITS	20,000, 000	21,000, 000	4.7 %	21,000, 000	10 0. 0 %	-	-
A05	GRAN TS SUBSI DIZE & LOAN ADVA NCES/ OTHE RS	600,00 0	18,095, 000	4.08 %	18,095, 000	10 0. 0 %	-	-
A06	TRAN SFER S	2,000,0 00	2,326,0 70	0.52 %	2,326,0 70	10 0. 0 %	-	-
A09	EXPE NDIT URE ON ACQU IRIN G OF PHYS ICAL ASSE TS	8,414,0 00	-	0.00 %	-	0. 0 %	-	-
A13	REPA IR & MAIN TEN ANCE	2,337,0 00	3,938,4 00	0.89 % 237	3,938,4 00	10 0. 0 %	-	-

-	-	Grand Total :-	280,288,000	443,969,000	443,968,323	100.00%	299,402,000	70,345,536
---	---	-----------------------	--------------------	--------------------	--------------------	----------------	--------------------	-------------------