

DRAFT

ANNUAL REPORT

2019-2020



PAKISTAN SCIENCE FOUNDATION

1 - Constitution Avenue

Islamabad

PAKISTAN SCIENCE FOUNDATION

ISLAMABAD

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(Interim)

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ACRONYMS

AGR	Agricultural Sciences
AJK	Azad Jammu and Kashmir
AKU	Agha Khan University
B	Baluchistan
BIO	Biological Sciences
BIOTECH	Biotechnology & Genetic Engineering
C	Capital
CDWP	Central Development Working Party
CEMB	Center of Excellence in Molecular Biology
CEME	College of Electrical and Mechanical Engineering
CEWRE	Center of Excellence in Water Resources Engineering
CIIT	COMSATS Institute of Information Technology
COMSATS	Commission on Science and Technology for Sustainable Development in the South
COMSTECH	OIC Standing Committee on Scientific and Technological Cooperation
DDWP	Departmental Development Working Party
EARTH	Earth Sciences
ENG	Engineering Sciences
ENVR	Environmental Sciences
ILG	Industrial Linkages Group
KPK	Khyber Pakhtunkhwa
PU	Peshawar University
FJWU	Fatima Jinnah Women University
GCU	Government College University
GU	Gomal University
KU	Karachi University
MED	Medical Sciences
NARC	National Agricultural Research Center
NIBGE	National Institute for Biotechnology and Genetic Engineering
NNSFC	National Natural Science Foundation of China
NSLP	Natural Sciences Linkage Programme
NSTC	National Science and Technology Commission
P	Punjab

P-AU	Agriculture University
P-PU	Punjab University
PHYS	Physics
PINSTECH	Pakistan Institute of Nuclear Science and Technology
PCCC	Pakistan Central Cotton Committee
PSDP	Public Sector Development Programme
S	Sindh
SALU	Shah Abdul Latif University
SUIT	Sindh Institute of Urology & Transplantation
SU	Sindh University

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

Research Support is the principal programme of the Foundation, which provides funding for research projects in natural and physical sciences. Project proposals submitted to the Foundation are evaluated initially by subject experts in relevant fields and then by Technical Committees on the basis of technical merit and relevance to the socio-economic needs of the country. The progress of research is monitored through evaluation of semi-annual and annual progress reports. Multi-disciplinary research projects in areas of economic significance to Pakistan are accorded special priority for award of financial support.

During 2019-2020, a total of **205** research proposals/concept papers in 10 scientific field namely Agricultural Sciences, Biological Sciences, Biotechnology & Genetic Engineering, Chemistry, Computer Sciences/Maths, Earth Sciences, Engineering Sciences, Health sciences, Environmental Sciences and Physics remained under active consideration. Among these, 60 projects were under-process, of which, 03 projects were recommended by Technical Committee for the approval of Foundation at a total cost of **Rs. 7,934 million**. Total 56 research projects were remained on-going and an amount of **Rs. 8,739 million** was released on account of due installments and evaluation fee of these projects. 31 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. One of the main achievements and usefulness of any research is the publication of its results in scientific journals. Based upon the results of 02 completed projects, 02 research papers were published in national/international journals. In addition, 01 Ph.D. and 06 M.Phil./M.Sc. (Hons) students

secured their respective degrees while working as Research Associates in these completed projects.

SCIENCE PROMOTION ACTIVITIES

During the report period, an amount of **Rs. 7,350 million** was released to various institutions for organizing 43 conferences, seminars, and workshops on important scientific topics and **Rs. 0.2 million** was released to scientific survey. However, Institutional Support and PSF Fellowships programmes were not entertained due to paucity of funds.

SCIENCE POPULARIZATION

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 central role in the socioeconomic, cultural, and environmental development of any country. It is usually understood as the system of measures aimed at the dissemination, appropriation, and valuing of science and technology goods, which include critical thought, ideas and values, the history and sociology of scientific knowledge, how science is practiced, and the results of scientific research and technological development. Popularization of science makes it possible to spark vocations and encourage talent for scientific research, technological development, and intellectual endeavors in general. It fosters creativity and innovation, further contributes to producing better trained human resources, expands social opportunities, and strengthens the educational system. It also helps to enhance the critical sense of the population, by increasing its involvement in decision-making and contributing to sustainable development.

INTERNATIONAL LIASION

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 year 2019-20, third call of proposals with National Natural Science Foundation of China, NSFC was launched. The calls were highly appreciated by the scientific community. International Linkages activities of Pakistan Science Foundation were expanded to the greater extent. More effective linkages were developed with international counter-parts to benefit the scientific community of Pakistan. During the report period, 56 projects remained ongoing under different calls with NSFC, TUBITAK, NSF Sri Lanka and MSRT. While 06 projects were selected for funding received under PSF-NSF, Sri Lanka first call. A total of 20 technical reports (semi-annual and annual) were received of ongoing projects and an amount of **Rs. 38.2 million** was released on account of due installments and first installment of newly initiated projects. Chairman, PSF had various meetings with international counter-parts to further expand the PSF activities at international scale. Delegates of TUBITAK and NSF-Sri Lanka visited PSF to chalk out the areas of joint collaboration.

PLANNING AND DEVELOPMENT SECTION:

P&D Section intensifies the mandate of the PSF and its subsidiary organizations through getting funds from PSDP of the Ministry of Science & Technology. After the formulation of P&D Directorate in Year 2000, it is coordinating with different Sections of PSF, PASTIC, PMNH and MoST for preparation / finalization / processing of new PC-Is, submission of PC-IVs / PC-Vs to MoST and various non-development activities like compilation & submission of Reports, Briefs, Presentations, Comments, Replies to National Assembly/Senate Questions and travel grant activity.

PAKISTAN SCIENTIFIC AND TECHNOLOGICAL INFORMATION CENTER (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. All have access to global information resources for dissemination of information to their users. 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. 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. The total sanctioned strength of PASTIC and its 6 sub-centers, among Scientific, Technical and Administrative Staff is 164.

PAKISTAN MUSEUM OF NATURAL HISTORY (PMNH)

Pakistan Museum of Natural History, the only natural history museum of Pakistan was established in 1976 under patronage of Pakistan Science Foundation, Ministry of Science & Technology, (Government of Pakistan). Pakistan Museum of Natural History (PMNH) has four principal divisions namely Earth Sciences Division, Botanical Sciences Division, Zoological Sciences Division and Public Services Division. First three scientific divisions are engaged in the collection, identification and research activities pertaining to plants, animals, fossils, and mineral resources of Pakistan, while the fourth one is responsible for mass education and popularization of natural history through various displays, exhibits and dioramas. Researchers of PMNH carried out extensive field works from the Coast of Arabian Sea to the Alpine regions, roamed through barren areas for the collection of flora & fauna, rocks, fossils and minerals not only for research work but also for the purpose of education because education is also one of the main objectives of PMNH. For this purpose, PMNH

regularly organized trainings, workshops, seminars, symposia, and other educational interactive activities related to natural history, environment, and biodiversity of Pakistan. International days are also observed by PMNH. The PMNH has developed 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 relations with other research institutions, PMNH has around 1.5million natural history specimens in its repositories. Research outcome of these field works and with 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-dimentional dioramas and exhibits. Students of schools, colleges and universities from all over the Pakistan visit PMNH as a part of their educational tours. Scientific and Technical staff of PMNH also facilitate the students and researchers from the other universities and institutes by providing help in the research in the form of information, technical assistance, specimens as a loan and guidance in their research work.

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:

Research Support is performing the following activities:

1. Research Support
 - a) Grants for Research Projects
 - b) Grants for Institutional Support
2. Research Evaluation
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. Survey and Statistics
9. Scientists Pool
10. Innovations & Inventions
11. Planning and Development Programme

Science Popularization carries out science popularization activities including Science Caravans, Science Clubs, Science Fairs and holding of Popular Science Lectures, Workshops, Conferences and Symposia.

Pakistan Scientific and Technological Information Centre (PASTIC) is another 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 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

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1.0 RESEARCH SUPPORT:

1.1 Research Funding

1.1.1 Research Projects Funded

Research support is the principal programme of the Foundation, which provides funding for research projects in natural and physical sciences. Project proposals submitted to the Foundation are evaluated initially by subject experts in relevant fields and then by Technical Committees on the basis of technical merit and relevance to the socio-economic needs of the country. The progress of research is monitored through evaluation of semi-annual and annual progress reports. Multi-disciplinary research projects in areas of economic significance to Pakistan are accorded special priority for award of financial support.

a) Under Process Project

During 2019-2020, a total of **205** research proposals/concept papers in 10 scientific field namely Agricultural Sciences, Biological Sciences, Biotechnology & Genetic Engineering, Chemistry, Computer Sciences/Maths, Earth Sciences, Engineering Sciences, Health sciences, Environmental Sciences and Physics remained under active consideration. Among these, 60 projects were under-process, of which, 03 projects were recommended by Technical Committee for the approval of Foundation at a total cost of **Rs.7.934 million**. Detail list is placed at *Annexure-II*.

b) On-going Projects

Total 56 research projects were remained on-going and an amount of **Rs. 8.739 million** was released on due installments and evaluation fee of these projects. **31** progress reports (semi annual, 1st, 2nd annual & final) of these projects were received. The detail list is placed at *Annexure-III*. 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.

c) Completed Projects

Total 06 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 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.	S-KU/Bio (454)	Study of Cysts of Dinoflagellates, Causing Harmful Algal Bloom (Red Tide) in Sediments of Coastal Areas of Pakistan, North Arabian Sea
2.	P-UVAS/Bio (416)	Estimation of Aflatoxins in Milk and its Control Measures
3.	P-FCC/Bio (434)	Influence of Family History of Type 2 Diabetes Mellitus (T2DM) on Pituitary Gonadal Axis in Adolescent and Young Males
4.	PSF/Res/S-ICCBS/Chem (516)	Identification of Small Molecular Agonists against G-Protein Coupled Receptors (GPCRs): Opportunities for Cancer Prevention and Treatment
5.	PSF/ Res/Biotech/S-KU/Med (80)	Production of Monoclonal Antibodies for Rapid Diagnosis of Hepatitis-C
6.	PSF/Res/KPK-KUST/Med (283)	Identification of Risk Factors for Hepatitis C Virus Infection and HCV Genotyping in Hemophiliac Patients of KPK

Biological Sciences:

Project No: PSF/Res/ S-KU/Bio (454)
Project Title: Study of Cysts of Dinoflagellates, Causing Harmful Algal Bloom (Red Tide) in Sediments of Coastal Areas of Pakistan, North Arabian Sea
Duration: 01-Year
Date of Initiation: 01.12.2011
Date of Completion: 31.05.2013 Extended
Total Cost Rs.938,209/-
Total Expenditure: Rs.807,672/-

Principal Investigator: Mrs. Furqana Chaghtai
Name of Institution: Centre of Excellence in Marine Biology
University of Karachi, Karachi

SUMMARY:

Harmful Algal Bloom forming Dinoflagellates cysts species were studied in sediments of coastal waters of Pakistan, from the two different coasts from two different provinces, i.e. two sites selected from Sindh Province (Korangi and Sandspit), and two selected from Baluchistan (Sonmiani and Sonari). This is the first complete survey of recent dinoflagellate cysts from Pakistani Marine Sediments. The report reveals the occurrence of thirteen different Dinoflagellates cyst types in the recent sediment samples collected between January 2012 – December 2012, i.e., from 12 stations along the Northern Arabian Sea, Pakistan. Station numbers 1-3 are the sites of Sand spit, 4-6 belongs to Korangi creek Sindh Coast. While the stations 7-9 are the sites of Sonmiani, and 10-12 are the sites of Sonari Baluchistan coast.

All thirteen cysts were identified to the species levels representing eleven genera. A total of 13 cysts forming Dinoflagellates species were identified during the study, most of the cyst forming species (6 cysts) belong to the order Gonyaulacales, which was found very variable order, the most dominant species among them are *Alexandrium tamarense*, *Lingulodinium polyedrum*, *Phaeopolykrikos hartmannii*, *Protoceratium conicum*, *Protoceratium reticulatum* and *Pyrodinium bahamense*. *Pyrodinium bahamense* is the only one which has been reported previously in upper 2 cm layers of the sediments from Gawader, Baluchistan coast Chaghtai et al 2002.

Species variability was also recorded was also in the second group belongs to the order Peridinales, this have four (4) species *Diplosalis lenticulata*, *Protoperidinium leones*, *Protoperidinium Sp.*, and *Scripsiella trichoidea*.

The third type was found belongs to the order Gymnodiniales, which has three (3) different types of cyst forming species *Chochlodinium polykrikoides*, *Gymnodinium catenatum*, and *Gyrodinium instriatum*.

As for as the, stratification is concerned, it was noticed that some species observed from surface to bottom, whereas some found restricted to the depths. A variety of cyst profile types have been observed in natural sediments, some show their abundance in subsurface

layers, while other species show their abundance in surface and relatively few cysts are found in depths.

Cysts constitute seed bank for the region where they are present and supply the initial to form phytoplankton blooms whenever environmental conditions become favorable (mainly salinity, temperature, water currents, and p. H) are re-established. In addition, cysts of most toxic species such as Alexandrium tamarense, Lingulodinium polyedrum, and Gymnodinium catenatum more toxic than their motile vegetative cells and may therefore represent a source of paralytic shellfish poisoning (PSP) toxins in the sites of Korangi creeks, Sandspit coastal waters (Sindh coast), Sonari and Sonmiani (Baluchistan coast). As for as the toxicity is concerned, the bloom of most toxic species of Gymnodinium catenatum recorded from Korangi creek area, and the bloom of Lingulodinium polyedrum was also recorded from Sandspit coastal area is very alarming.

It is suggested from the data that, additional cyst surveys should be conducted in sediments from other coastal waters of Pakistan, like Jiwani, Ormara and Gawadar (Baluchistan) which was not yet investigated, and that are the potential places for paralytic shellfish poisoning toxicity as a result of blooms of toxic species may be more wide spread than previously documented.

Project No:	PSF/Res/ P-UVAS/Bio (416)
Project Title:	Estimation of Aflatoxins in Milk and its Control Measures
Duration:	02-years
Date of Initiation:	01.11.2010
Date of Completion:	31.10.2012
Total Cost	Rs.1,999,200/-
Total Expenditure:	Rs.1,702,233/-
Principal Investigator:	Prof. Dr. Makhdoom Abdul Jabbar (R)
Name of Institution:	University of Veterinary and Animal Sciences Lahore

SUMMARY:

Aflatoxins are the toxins, which are present in the feed and are produced during storage. These toxins are termed as B1, B2, G1 and G2. Aflatoxin M1 is present in milk which is hydroxylated metabolite of Aflatoxins B1. Aflatoxin M1 occur in milk and dairy products, resulting from the ingestion of aflatoxin B1 contaminated feedstuffs. Their toxic effects include carcinogenesis, reduced protein synthesis, and immunosuppressant effects. The aim of this study was to determinethe levels of aflatoxin M1 in milk and milk products. Pakistan Science Foundation sponsored thestudy. For estimation of aflatoxin, samples of milk and

sweets were collected from 36 districts of Punjab, in the first year of trial. Milk samples from 8 different Government Livestock Farms were also collected. These samples were analysed for aflatoxin M1 through ELISA technique. According to European Standards, the permissible level of aflatoxin M1 in milk is 0.05 µg/L while such safe level in dry milk powder is 0.50 µg/L. Results indicated that 72 out of 231 milk samples had aflatoxin higher than this level. The average level of toxins was 0.167 µg/litre and the range was 0.000 to 1.9 µg/Liter. Percentage of samples above the European standard was 31.16 percent.

Similarly, 60 out of 130 sweet samples had higher levels of aflatoxin than the reference level with an average value of 0.467 µg /litre with a range of 0.003-1.5 µg/litre. When compared with the permissible value of dried milk powder as per European standard about 46.15 percent sweets samples exceeded this value. Incidence of aflatoxin in milk samples collected from Public Livestock Farms was also high, but the severity was relatively less than the samples collected from field..

In the second-year trial, the aim of study was to determine the transfer efficiency of buffalo in converting aflatoxin B1 into Aflatoxin M1 and its detoxification by using three different toxin binders. For estimation of aflatoxin conversion, efficiency 16 lactating buffaloes were selected in four groups and were fed with 0ppb, 100ppb, 500ppb and 1000ppb level of aflatoxin B1 in experiment 1. For studying effect of toxin binder on aflatoxin M1 excretion again 16 lactating buffaloes were selected and were fed with 500ppb aflatoxin B1 and three toxin binders. These experiments were conducted at Livestock Experiment Station, Haroonabad, Punjab. These samples were analysed for aflatoxin M1 through ELISA technique using kits supplied by Helica Biosystem Inc. USA. In experiment 2, 16 lactating buffaloes were selected and were divided in four groups.

Each group was fed with different type of toxin binders. Daily feed intake and Milk yield was monitored on the farm and milk samples were collected after each 5 days and were analysed for AFM1 in milk.

The results indicate that the community is constantly exposed to these toxins and there should be some regulatory mechanism to control the toxins in milk and milk products. As feed is the main source of M1 in milk the level of aflatoxins should also be kept to the minimum in livestock feeds.

Moreover, efficacy of different toxin binders has also been determined

Project No:	PSF/Res/P-FCC/Bio (434)
Project Title:	Influence of Family History of Type 2 Diabetes Mellitus (T2DM) on Pituitary Gonadal Axis in Adolescent and Young

	Males
Duration:	01-Year
Date of Initiation:	01.03.2012
Date of Completion:	28.02.2013
Total Cost	Rs.1,263,349/-
Total Expenditure:	Rs.961,498/-
Principal Investigator:	Prof. Dr. M. Arslan
Name of Institution:	The Forman Christian College (A Chartered University) Lahore.

SUMMARY:

Type 2 diabetes mellitus (T2DM), has in the last two decades, increased alarmingly among children and adolescents, around the world. This emerging epidemic parallels an increase in incidence of obesity in younger age. due to sedentary lifestyle, cultural changes and rapid increase in urbanization. In spite of the unequivocal influence of environmental factors, T2DM is strongly related to a genetic predisposition and there is a robust correlation between first Degree relatives and type 2 diabetic patients regarding incidence of the disease. Previous Investigations provide evidence of an association of hypogonadism with T2DM in adult males.

This study is designed to explore the possibility of a predisposition to hypogonadism in male Offspring (9-18 years of age) of type 2 diabetic parents compared to control age matched subjects. Study design and Methods: The study is based on 40 male offspring of diabetic parents and 36 sex and age matched offspring of non-diabetic parents. The subjects were further divided into two age groups comprising peripubertal children or adolescents (9-17 yr of age), and young adults (19-25 yr of age). The parents were assessed for the presence and progression of diabetic condition. All subjects underwent a detailed family history and medical examination. Height, body BMI and blood pressure were determined in all subjects. Fasting blood samples were Analyzed for glucose and serum concentration of testosterone, sex hormone binding globulin (SHBG), insulin, and leptin were measured by ELISA. Insulin resistance was assessed by HOMA IR. *Results:* In the younger group, no statistically significant differences were found in the BMI of children of diabetic and non-diabetic parents. However, in the older group mean BMI of offspring of diabetic parents was significantly higher than those of healthy parents. Mean fasting blood glucose levels in all subjects were within the normal range. Serum testosterone levels in offspring of diabetic parents were significantly lower than those of offspring of non-diabetic parents, in both the age groups. Also, serum LH levels were markedly lower in children of diabetic parents compared to the controls, but no significant difference in levels of this hormone were

observed between offspring of diabetic and non-diabetic parents in the older group. Metabolic markers, serum insulin and leptin, insulin resistance as evidenced by HOMA-IR, were significantly raised above the control values in older offspring of diabetic parents but were within the normal range in young children of diabetic parents. Among parents, mean fasting PSF Technical Report P-FCC/Bio (434) Page 3 of 26 values of glucose, insulin and HOMA-IR, were significantly higher in diabetic subjects compared to non-diabetic subjects. *Conclusion:* Hypogonadism was the only indicator of a possible predisposition to metabolic dysfunction in lean male offspring of diabetic parents. However, a significant change in other metabolic markers such as insulin and leptin levels and insulin resistance, becomes evident with advancing age in normoglycemic offspring of diabetic parents, thus predisposing these subjects to diabetes. This study also indirectly suggests that control of body weight in children from diabetic families at an early age, could delay, blunt or altogether prevent onset of T2DM in later life.

Chemical Sciences

Project No:	PSF/Res/S-ICCBS/Chem (516)
Project Title:	Identification of Small Molecular Agonists against G-Protein Coupled Receptors (GPCRs): Opportunities for Cancer Prevention and Treatment
Duration:	02-Years
Date of Initiation:	20.09.2016
Date of Completion:	19.09.2018
Total Cost	1,894,956/-
Total Expenditure:	1,622,495/-
Principal Investigator:	Prof. Dr. Iqbal Choudhary
Name of Institution:	International Centre for Chemical & Biological Sciences University of Karachi, Karachi

SUMMARY

GPCRs are ubiquitous and versatile signalling cell surface proteins that transduce signals through heterotrimeric G-proteins. These receptors bind to a wide array of extracellular ligands and relay chemical signals inside the cell and thus control many physiological processes, such as inflammation, cell proliferation, immune responses, neurotransmission, etc. The current project is focused on the identification of new molecular entities, both natural and synthetic, which can interact specifically with G-protein coupled receptors (GPCRs), and halt cancer cell proliferation and metastasis. The work resulted in the identification of four classes of chemical compounds with potent GPCR antagonist and cytotoxic activities. The newly identified lead molecules can serve as templates for designing new therapeutic agents for the effective treatment, and management of various cancers.

Biotechnology and Genetic Engineering

Project No:	PSF/ Res/Biotech/S-KU/Med (80)
Project Title:	Production of Monoclonal Antibodies for Rapid Diagnosis of Hepatitis-C
Duration	02-years
Date of Initiation:	10.12.2007
Date of Completion:	10.12.2009
Total Cost	1,152,600/-
Total Expenditure:	Rs.364,057
Principal Investigator	Prof. Dr. Mustafa Kamal Chairman Department of Biotechnology University of Karachi, Karachi
Name of Institution	University of Karachi, Karachi

SUMMARY:

The present research project describes the “Production of Monoclonal Antibodies for Rapid Diagnosis of Indigenous Strain of Hepatitis Virus”. The selection of immunogen and appropriate cell line play a vital role in the production of monoclonal antibodies, thus we selected the HCV-RNA positive serum and HCV recombinant antigen for the immunization of mice. BALB/c mice were purchased from PCSIR, Karachi and Aga Khan University Hospital, Karachi, HCV-RNA positive samples were obtained from Rahia Research & Reference Laboratory (Pvt), Ltd. Karachi. A series of structural recombinant antigens of HCV derived from the core region (core 2-119aa) and three nonstructural recombinant antigens e.g., NS3 region (1359-1456aa), NS4 region (1916-1947aa) and NSS region (2212-231aa) were purchased from Yorkshine Bioscience Ltd, Heslington, United Kingdom, Sp2/0Ag-14 myeloma cell line was obtained from American Type Culture Collection (ATCC), Manassas, VA 20108 USA.

The stability of Immunogen was checked with phosphate buffered saline, Freund’s complete adjuvant and Freund’s incomplete adjuvant (FIA). However, stable immunogens were prepared from the HCV-RNA positive serum and HCV recombinant antigen at ratio 1:1 with FCA for the first immunization and FIA for subsequent immunization.

Ten mice were selected and divided into three groups. These groups were designated as group-I (4 males) group-II (4 females) and group-III (1 male and 1 female). The group-I and group-II were the test groups, while group-III was treated as control.

Mice of group-I and group-II were intra-peritoneally injected with 200µl of above immunogen at 0 week as first immunization. Group-III was injected with Freund's complete adjuvant only. Re-immunization was done at 4th week, with same protocol. Blood samples were collected at 0-, 3- and 6-weeks interval. The blood samples were centrifuged at 1000rpm for 3 minutes and then serum antibody titer was determined by ELISA.

The mice were anaesthetized with diethyl ether and were scarified by cervical dislocation and spleens were removed aseptically. Spleens were disaggregated with sterile stainless steel sieve mesh no 60 and homogenate masses were obtained. Sp2/0Ag-14 myeloma cell lines were grown in Dulbecco's Modified Eagle's Medium (DMEM), 10% FETAL CALF SERUM (fcs) AND 3.7 MGS OF SODIUM BICARBONATE. AMPICILLIN 50 µG/ML AND Streptomycin 300 µg/ml was also added. 10 ml medium was dispensed into 75 cm² tissue culture flask.

Health Sciences:

Project No:	PSF/Res/KPK-KUST/Med (283)
Project Title:	Identification of Risk Factors for Hepatitis C Virus Infection and HCV Genotyping in Hemophiliac Patients of KPK
Duration	02-Year
Date of Initiation:	01.10.2016
Date of Completion:	30.09.2018
Total Cost	1,049,070/-
Total Expenditure:	1,041,930
Principal Investigator	Dr. Shahid Niaz Khan, Chairman, Department of Zoology, Kohat University of Science & Technology, Kohat
Name of Institution	Kohat University of Science & Technology, Kohat

SUMMARY:

HepatitisC virus (HCV) is a common cause of chronic liver hepatitis and has emerged as a leading cause of end stage liver complications causing high morbidity and mortality across the globe. The virus exhibits high genetic diversity which leads to varying genotypes and subtypes distributed worldwide. Hepatitis C transmits mainly through blood and blood products and the patients that require frequent blood and blood products transfusion like hemophiliacs are more subjected to acquire the infection.

This study was conducted in hemophilia patients of Khyber Pakhtunkhwa to assess the prevalence and their risk factors of HCV genotypes. 672 patients were enrolled in the study of which 664 (98.81%) were male and 8 (1.19%) were female and overall, 572 (85.12%) were with hemophilia A and 100 (14.88%) with hemophilia B. of the total 68 (10.12%) were with severe hemophilia, 540 (80.36%) with moderate and 64 (9.52%) with mild hemophilia. The age ranged from 3-57 years. Serum samples taken from the patients were tested for anti-HCV using ICT (Immunochromatographic test). Anti-HCV positive samples were analyzed for HCV RNA detection by PCR. PCR positive samples were subjected to genotypes discrimination using the method described by Ohno et al. 1997.

Overall prevalence rate of anti-HCV was 150 (22.32%) of which 124 (18.54%) were HCV RNA positive. The prevalence of anti-HCV and HCV RNA was higher in patients with age <10 years 38 (28.78%) and 32 (24.25%) respectively and >30 years 27 (27%) and 24 (24%) respectively and in patients with hemophilia A 134 (23.43%) and 109 (19.06%) respectively. On analyzing the clotting factor level-based positivity of HCV significantly ($p<0.05$) high prevalence of anti-HCV and HCV RNA was detected in severe hemophiliacs. Significant prevalence ($p<0.05$) of HCV antibodies and HCV RNA was detected in patients transfused with plasma and factor concentrate. The most dominant HCV genotype among hemophilia patients in KP was 3a (19.35%) followed by 2a (16.13%) and 1a (12.9%). 22.58% samples were not typed while mixed genotypes were found in 22.58% individuals.

1.1.2 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 02 completed projects, 02 research papers were published in national/international journals placed at *Annexure-IV*.

1.1.3 Higher Degrees Earned through PSF Supported Projects

One of the major goals of the Foundation is the development of scientific human resource in the country. This results in strengthening of R&D infrastructure of various scientific organizations. The Foundation has been developing scientific manpower through its research projects and the Research Associates employed in the PSF supported research projects to register for higher degrees. During the year 01 Ph.D and 06 M.Phil/M.Sc (Hons) students secured their respective degrees while working as Research Associates in these completed projects. Detail list is placed at *Annexure-V*.

1.1.4 SciencePromotion Activities

During the report period, an amount of Rs. 7.35 million was released to various institutions for organizing 43 conferences, seminars and workshops on important scientific topics and Rs.0.2 million was released to scientific survey. However, Institutional Support and PSF Fellowships programmes were not entertained due to paucity of funds. The detail list is placed at *Annexure-VI*.

1.1.5 R&D-Industry Programme

Focusing on collaborative 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.

2.0 SCIENCE POPULARIZATION

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.

2.1 Objectives and Functions

Popularization of science plays a central role in the socioeconomic, cultural, and environmental development of any country. It is usually understood as the system of measures aimed at the dissemination, appropriation, and valuing of science and technology goods, which include critical thought, ideas and values, the history and sociology of scientific knowledge, how science is practiced, and the results of scientific research and technological development. Popularization of science makes it possible to spark vocations and encourage talent for scientific research, technological development, and intellectual endeavors in general. It fosters creativity and innovation, further contributes to producing better trained human resources, expands social opportunities, and strengthens the educational system. It also helps to enhance the critical sense of the population, by increasing its involvement in decision-making and contributing to sustainable development.

To achieve the objective of increased science awareness, PSF is undertaking a number of programs including:

- Science Caravan (Mobile Science exhibition)
- Establishment of Science Centre, Museums, Herbaria & Planetaria
- Strengthening of the Laboratories of the Govt. High School of rural areas
- Organizing of S&T Fairs and Travelling Expos.
- Organizing Science Poster, Essay and Quiz Competitions
- Holding Popular Science Lectures
- Donation of Popular Science Magazines and Scientific Books to Schools Universities and S&T Organizations

- Preparation and dissemination of Scientific Literature in the form of leaflets, posters, Booklets and Brochures
- Financial assistance for publication of Scientific Books
- Financial Assistance for Science Popularization activities of the other organizations
- Establishment of Science Clubs in High Schools
- Inquiry Based Science Education Programme in Pakistan

2.1.1 Science Popularization Activities

2.1.2 Science Caravan (Mobile Science Lab) is a Mobile Science Exhibition that has been designed to increase public awareness about science and to motivate the younger generation of the country towards study of science. Science Caravan consists of three major components, firstly demonstrate the exhibits & display items, secondly film for 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, nine Science Caravan units are in operation, two for each of the four provinces and one for federal and adjoining areas. During the year 2019-20, 49,566 students from 234 schools visited Science Caravan Exhibitions as detailed below.

- Federal unit: 9,234 students from 49 schools visited the exhibition.
- Sindh units: 12,456 students from 60 schools visited the exhibition.
- Punjab units: 7,334 students from 17 schools visited the exhibition.
- Khyber Pakhtunkhwa units: 12,891 students from 65 schools visited the exhibition.
- Baluchistan units: 7,651 students from 43 schools visited the exhibition.

2.1.3 29th Annual Intra and Inter Board Science Essay and Poster Competitions was canceled due the spike op the Covid-19 Pandemic.

2.1.4 Donation of Popular Science Magazines and Scientific Books is one of the regular and important activities for science popularization. 8000 copies of Quarterly “Urdu Science Magazine” were distributed to 2000 schools during the report period.

2.1.5 World Science Day for Peace and Development (WSDPD): PSF in collaboration with other organizations like UNESCO, Intel, and Federal Directorate of Education organized various activities for students and scientists to commemorate the world science day like Convention of Scientists, Science Caravan Exhibitions, Panel Discussions on TV and Prize Distribution to the winners of PSF Annual Inter Board Science Essay and Poster Competitions etc. This year, the theme selected by UNESCO was “Open Science, Leaving No One Behind” and the Foundation celebrated WSDPD on November 11, 2019. Chairman PSF Major (Retd) Qaiser Majeed Malik, Prof. Dr. Hamid Saleem, Ex-Director General, National Centre for Physics (NCP), Islamabad shared their views. Dignitaries from COMSTECH, PCRET and other scientific organizations, students from different universities, colleges and schools of Islamabad also participated. Medals, cash prizes and certificates were also distributed among the winners of PSF’s 28th Science Essay & Poster Competitions and ASC-19. Science Caravan Units also celebrated the day.

2.1.6 Popular Science Lectures:

Pakistan Science Foundation arranges series of lectures where eminent Scientists and educationists express themselves for the benefit of the audience Comprising scientists, scholars, students, and the general public as one of its mandatory functions. During the current year. 05 Popular Science Lectures were organized on different scientific themes.

DEVELOPMENT ACTIVITIES

2.1.7 PARTICIPATION OF PAKISTANI STUDENTS IN INTERNATIONAL FORUM ASIAN SCIENCE CAMP (ASC)

PSF, being a focal organization for ASC, coordinated with the organizers for participation of Pakistani students in ASC-19. This year Asian Science Camp was organized on 28th July-03rd August 2019 in Shantou, Guangdong Province, China. The Pakistani delegation comprising five students along with the Team Leader from PSF participated in the event and also won Bronze and Silver Medal.

The following five students participated in the event,

1. Mehboob ur Rehman S/o Mujeeb Ur Rehman
2. Hafiz Abdul Saboor S/o Abdul Salam
3. Yasin Ismail S/o Ismail
4. Zahekat ul Jannat D/o Muhammad Ijaz

5. Maria D/o Muhammad Aslam

Ms. Syeda Rehana Batool, Pricipal Scientific Officer, Science Popularization also participated in this event as group leader to guide and assist students in preparation for camp activities.

2.1.8 PARTICIPATION OF PAKISTANI STUDENTS IN INTERNATIONAL FORUM INTERNATIONAL JUNIOR SCIENCE OLYMPIAD (IJSO-2019)

PSF, also being a focal organization for IJSO, coordinated with the organizers for participation of Pakistani students in IJSO-19. This year International Science Olympiad was organized on 03-12 December 2019 at Doha, Qatar. The Pakistani delegation comprising four students along with the Team Leader from PSF participated in the event.

3. PAK-US NATURAL SCIENCES 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 farmer's 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 177 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

1. 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, 203 concept papers remained under consideration of the NSLP. Out of these concept papers, 30 projects were presented in three Technical Committee meeting held during the report period. Technical Committee recommended 15 new projects for funding at total cost of Rs.70 million. List of projects recommended for funding during the report period is given in *Annexure VII*.

b) On-going Projects

During the year, there were seventy (70) ongoing research projects and (62) 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.50.417 million was released on account of due installments of on-going projects. A list of semiannual, annual and final reports is given in *Annexure VIII*.

c) Completed Projects

During the year eleven (12) 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/KP-AU(270)
Project Title	Genetic Transformation of <i>Brassica Carinata</i> for Low Viscosity Biodiesel Production
Duration	3-years
Date of initiation	15-01-2015
Date of completion	14-07-2018

Final report received	07.01.2019
Final technical report was adopted in the Technical Committee meeting held on	28.11.2019
Location of project	IBGE, The University of Agriculture, Peshawar
Principal Investigator	Dr. Iqbal Munir Associate Professor
Total Expenditure	Rs.3,272,100/-
Main objectives	<ul style="list-style-type: none"> • To standardize protocol for <i>Agrobacterium</i> mediated stable integration of T-DNA in <i>Brassica carinata</i> under local conditions • To develop transgenic <i>Brassica carinata</i> genotype having low viscosity seed oil by stably integrating <i>EacDAcT</i> gene from <i>Euonymus alatus</i> (Burning bush) • To build knowledge capacity regarding genetic transformation of crop plants for biodiesel production.

Project No	PSF/NSLP/P-AU (489)
Project Title	Development of Technology Rich Seeds for Improving the Performance of Crops
Duration	3-years
Date of initiation	20.01.2016
Date of completion	19-01-2019
Final report received	26-06-2019
Final technical report adopted in the Technical Committee meeting was held on	28.11.2019
Location of project	Department of Agronomy, University of Agriculture, Faisalabad
Principal Investigator	Dr. Irfan Afzal Associate Professor

Total Expenditure	Rs.2,742,800/-
Main objectives	<ul style="list-style-type: none"> • Optimizing seed pelleting and coating technologies to make planting easier and spacing more precise for small seeded crops by utilizing indigenous material • Evaluating the efficiency of coated and pelleted seeds in green houses and field conditions • Investigating shelf life of treated seeds under optimum storage conditions

Project No	PSF/NSLP/S-PARC (603)
Project Title	Evaluation Of Chili Varieties For Qualities Production, High Yield And Disease Resistance In Lower Sindh
Duration	3-Years
Date of initiation	01.01.2016
Date of completion	30-06-2019
Final report received	11-09-2019
Final technical report was adopted in the Technical Committee meeting held on	28.11.2019
Location of project	Arid Zone Research Institute Umerkot, Sindh, Pakistan Agricultural Research Center, Islamabad
Principal Investigator	Dr. Attaullah Khan Director
Total Expenditure	Rs.1,438,850/-
Main objectives	<ul style="list-style-type: none"> • To identify elite genotypes of chilies • To select/develop chili varieties from evaluated material • To improve post-harvest methods for exportable chilies

Project No	PSF/NSLP/KP-UAP (691)
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Project Title	Physico-chemical and Hormonal Effects of Acupuncture Combined with Clonidine and Morphine Drug to Provide Analgesia in Goats
Duration	1.5-Years
Date of initiation	10-07-2017
Date of completion	09-01-2019
Final report received	24-06-2019
Final technical report was adopted in the Technical Committee meeting held on	28.11.2019
Location of project	Department of Animal Health, The University of Agriculture, Peshawar
Principal Investigator	Dr. Zahir Shah Lecturer
Total Expenditure	Rs. 1,687,650/-
Main objectives	<ul style="list-style-type: none"> • To investigate the analgesic effect of clonidine and morphine in goats. • To investigate the possible synergism between the test drugs (clonidine and morphine) and acupuncture in goats. • To investigate the combination effects (i.e., drugs with acupuncture) on the regulation of multiple important organs function (physiological, biochemical and hormonal effects) in goats.

Project No	PSF/NSLP/P-AU (531)
Project Title	Delivery of Protein and Micronutrients to School going Children through Shelf Stable Ready to Eat Crispy Nutribars
Duration	2-Years
Date of initiation	01.05.2016
Date of completion	30-04-2018 (10 months no cost extension)
Final report received	16-09-2019
Final technical report was adopted in the Technical Committee meeting held on	20.01.2020

Location of project	National Institute of Food Science & Technology, University of Agriculture Faisalabad
Principal Investigator	Dr. Mian Kamran Sharif Assistant Professor
Total Expenditure	Rs.1,928,753/-
Main objectives	<ul style="list-style-type: none"> • Develop process based nutrient fortification technology for the delivery of protein and micro-nutrients using agricultural co-products. • Optimize and manufacture prototypes of nutrient dense, ready-to-eat, cereal grain-based, low moisture products for school going children (6-12 years). • Determine the product quality, shelf stability, nutritional quality and consumer acceptability. • Conduct efficacy trials in school going children to assess the potential nutritional benefits of fortification on health develop and implement a strategy for transferring the technology to manufacture nutribars for use in school nutrition programs and emergencies.

Project No	PSF/NSLP/C-NARC (595)
Project Title	DNA Based Identification of Adulteration in Meat and its Products
Duration	2-Years
Date of initiation	17-07-2017
Date of completion	16-07-2019
Final report received	30-09-2019
Final technical report was adopted in the Technical Committee meeting held on	20.01.2020
Location of project	Animal Biotechnology, NIGAB, NARC,

	Islamabad
Principal Investigator	Dr. Muhammad Naeem Riaz Senior Scientific Officer,
Total Expenditure	Rs.1,895,005/-
Main objectives	<ul style="list-style-type: none"> • Development of an efficient technology to test and authenticate meat and meat-based products for origin of meat species. • Identification of adulteration incidence in local market meat and meat products.

Project No	PSF/NSLP/AJK-MUST (620)
Project Title	Effect of Non-Catalytic Domain on Characteristics of Endoglucanase (Ce19A) from Locally Isolated <i>Bacillus licheniformis</i>
Duration	2-Years
Date of initiation	11-11-2016
Date of completion	09-05-2019 (7 months no cost extension)
Final report received	23-08-2019
Final technical report was adopted in the Technical Committee meeting held on	20.01.2020
Location of project	Department of Biotechnology, Mirpur University of Science and Technology (MUST), Mirpur, AJK
Principal Investigator	Dr. Rehana Asghar Chairperson
Total Expenditure	Rs.1,219,178/-
Main objectives	<ul style="list-style-type: none"> • Heterologous expression of endoglucanase constructs in <i>E. coli</i>. • Determination of effect of non-catalytic domain on enzyme's catalysis. • Construction of endoglucanase chimera for

	improved characteristics
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Project No	PSF/NSLP/P-FCCU (655)
Project Title	Insect Resistance Management by Vegetative Insecticidal Protein (VIP) Based Biopesticide
Duration	2-Years
Date of initiation	01.02.2017
Date of completion	30.01.2019
Final report received	30-09-2019
Final technical report was adopted in the Technical Committee meeting held on	20.01.2020
Location of project	Biological Science Department
Principal Investigator	Dr. Deeba Noreen Baig Assistant Professor, Forman Christian College University, Lahore
Total Expenditure	Rs.4,097,800 /-
Main objectives	<ul style="list-style-type: none"> • In silico selection of potential vegetative insecticidal protein (<i>vip</i>) encoding genes and primer designing for PCR amplification from available <i>Bt</i> strains. • Synthesis of <i>vip</i> construct in cloning vector to preserve specific gene as well as to enhance copy number of gene incorporated plasmid. • Incorporation of <i>vip</i> gene in expression vector under suitable promoter in <i>E. coli</i> expression system. • Production, purification and efficacy evaluation of Vip toxin under optimized conditions. • Expressed <i>vip</i> gene will be used for the development of <i>vip</i> transgenic plant in the second phase of project.

Project No	PSF/NSLP/P-FJWU (711)
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Project Title	Design and Application of Photocatalytic Nanocoatings for Treatment of Polluted Water
Duration	1-Years
Date of initiation	10-05-2018
Date of completion	09-05-2019
Final report received	23-07-2019
Final technical report was adopted in the Technical Committee meeting held on	20.01.2020
Location of project	Department of Environmental Sciences, Fatima Jinnah Women University, Rawalpindi
Principal Investigator	Dr. Rohama Gill Assistant Professor
Total Expenditure	Rs.639,783/-
Main objectives	<ul style="list-style-type: none"> • To synthesize metaloxides (ZnO, SnO₂, etc.) and mixed metaloxides (ZnO-MgO, TiO₂-SnO₂, etc.) as photocatalysts for polymer nanocoatings. • To fabricate photocatalytic nanocoatings for photodegradation of pollutants such as dyes, pesticides, etc. from wastewater by embedding synthesized photocatalytic metal and mixed metaloxide in polyelectrolyte multilayers. • To analyze the efficiency of prepared nanocoatings for several cycles against a variety of pollutants as a function of pH, contact time, type and concentration of photocatalyst, number of layer pairs, concentration of pollutant, etc

Project No	PSF/NSLP/P-AU(167)
Project Title	Development of Information Management System for Commercial Broiler and Layer Farm Data
Duration	3-Years

Date of initiation	01-01-2013
Date of completion	31-12-2015 (Extended till 30.06.2016)
Final report received	06-02-2017
Final technical report was adopted in the Technical Committee meeting held on	20.01.2020
Location of project	Department of Poultry Science, University of Agriculture, Faisalabad
Principal Investigator	Dr. Shahid-ur-Rehman Lecturer
Total Expenditure	Rs.1,102,759/-
Main objectives	<ul style="list-style-type: none"> • Development of information management systems for broiler and layer farming operation. • To provide decision making tool to the local broiler and layer farmers which can also record the financial as well as performance records.

Project No	PSF/NSLP/P-BZU (394)
Project Title	Nutritional Profiling and Antioxidant Potential of Selected Vegetables Waste and its Utilization for the Production of Value Added Foods
Duration	2-Years
Date of initiation	01.08.2016
Date of completion	31-07-2018
Final report received	25-09-2019
Final technical report was adopted in the Technical Committee meeting held on	07.05.2020
Location of project	Department of Food Sciences, Bahauddin Zakariya University, Multan
Principal Investigator	Dr. Saeed Akhtar Associate Professor

Total Expenditure	Rs.1,302,964/-
Main objectives	<ul style="list-style-type: none"> • To explore vegetables waste for their nutritive value and antioxidant potential • To ascertain vegetables waste as a potential source of dietary fiber. • Optimization of technique to exploit vegetables waste at industrial scale for the production of value added food products • To help food and pharmaceutical industry promote reliance on natural antioxidants in several food and pharmaceutical preparations • To utilize vegetables waste to uphold environmental protection, hygiene and sanitation

Project No	PSF/NSLP/KP-NIFA(492)
Project Title	Breeding high Yielding Mungbean (<i>Vigna Radiata</i>) <i>L. Wilczek</i>) genotypes for the agroclimatic conditions of Kuram Agency
Duration	3-Years
Date of initiation	01-05-2016
Date of completion	30-04-2019
Final report received	04-06-2019
Final technical report was adopted in the Technical Committee meeting held on	07.05.2020
Location of project	Nuclear Institute for Food & Agriculture, Peshawar
Principal Investigator	Dr. GulSanat Shah Deputy Chief Scientist
Total Expenditure	Rs.1,345,480/-
Main objectives	<ul style="list-style-type: none"> • Development of black seeded mungbean mutants with erect and semi erect plant type and seed yield potential of (1.5-2.0 tones ha⁻¹) through induced mutations using gamma rays

d) 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 four (04) research papers were published in peer review journals the details of which are given at *Annexure IX*.

e) Project Formulation Workshops

A total of two (02) Project Formulation Workshops were organized to enhance the capacity of the researchers for writing project proposals. The workshops were organized at Virtual University of Pakistan, Lahore. The workshop enabled and trained 110 researchers and Scientists in preparing fund winning project proposals.

f) Meetings of Fund Management Committee of NSLP

During the year two (02) meeting of the Fund Management Committee (FMC) were held on 11.03.2021 and 11.06.2021, 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 sixteen new projects of worth Rs.76.251 million, recommended by the NSLP Technical Committee.

g) Meetings of Technical Committee of NSLP

During the year 2019-20 three (03) meeting of the Technical Committee (TC) were held on 28.11.2019, 20.01.2020 and 07.05.2020, respectively to technically evaluate the projects to be funded. The meeting was chaired by the Chairman, PSF/Chief Executive, NSLP and attended by the renowned scientists related to agriculture and natural sciences. A total of 30 new projects were presented to the Technical Committees out of which 15 projects were recommended for funding.

4.0 Science Talent Farming Scheme (STFS) for Young Students Phase-I, Component- (Revised)

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).

4.1 Objectives

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

Each year 300 students, passed their SSC/matriculation from pure Government schools are selected to groom them to achieve the highest degrees (up to PhD level) in various scientific disciplines. PSF is undertaking STFS for F.Sc. studies, whereas Higher Education Commission (HEC) is responsible for university level/higher education under STFS, Phase-II.

4.1.1 Implementation Strategy

The project objectives will be achieved through the following processes and activities:

- a) Selection of 300 students, each year, through evaluation by a specialized testing agency e.g. NTS etc. Scientific aptitude test to be conducted in three phases:
 1. Specialized written/screening test
 2. Paper Based IQ Test
 3. Presentation on innovative ideas/Interview
- b) Scholarships @Rs. 10,000/- per month, Tuition fee @Rs. 10,000/- per year and hostel fee (where applicable) @Rs. 10,000/- per year
- c) Research projects to be undertaken by each student under supervision of university teacher/researcher.
- d) Visits to universities and S&T organizations both at national and international levels

- e) Science lectures, Presentations, Film/ Planetarium Shows and Hands on activities through Mobile Science Labs
- f) Interaction with eminent scientists
- g) Participation in Summer Colleges and National Youth Science Forums
- h) Computer/android-based learning through laptops/tablets
- i) Online meetings and Interaction with eminent scientists through Mobile Science Labs

4.1.2 Allocation for the Year 2019-20

- Fund allocation for Year 2019-20: 150.00 million

Sr. No	Item Description / PC-I Head	Expenditure in 2019-20
1	Establishment of National Science School	0
2	Advertisements about STFS and selection of students	0.188
3	Selection / Monetary Benefits for the students	39.00
4	Additional Interventions	4.00
5	Special Activities of the project	5.53
6	Salaries / Allowances / Honorarium	5.48
7	Strengthening of Mobile Labs, Addition of Working Models	0
8	Transport	0
9	Office Furniture/Equipment and other facilities for the Project Management Unit	0.562
10	Contingencies including POL and other Misc expenses	0.471
	Total	55.231

1. Selection of STFS 5th batch

Selection process of STFS 4 batches (1200 total) has been completed. For selection of 300 students for STFS 5th batch, as per directives of Ministry of Science and Technology, the services of Candidates Testing Service (CTS) were hired through open bidding process. Application process for STFS 5th batch has been completed. The formula approved by MoST for final selection is described below.

Matric (9 th & 10 th combined)	Scientific Aptitude Test	IQ Test	Interview/Presentation on Scientific Ideas	Total
30%	40%	20%	10%	100%

Details regarding distribution of students are given below.

Total seats: 300

- BISE position holders (10%) seats = 30
- Quota wise distribution of remaining seats (300-30 = 270)

Details of quota wise distribution of seats (270)

No. of students	Merit	Punjab/Islamabad	Sindh	KPK	Balochistan	GB/FAT A	AJK	Total
Percentage	7.5%	50%	19%	11.5%	6%	4%	2%	100%
270	20.25 (21)	135	*51.3 (51) 31(R) 20(U)	31.05 (31)	16.2 (16)	10.8 (11)	5.4 (5)	270

4.1.3 Monetary Benefits for the students

Selection of 4 batches of STFS (1200 total) has been completed. Monetary benefits i.e. scholarships and tuition fee for 2 years to 1st and 2nd and 3rd batch already completed. Monetary benefits @ Rs. 130,000 for one year to 276 students of STFS 4th batch has been made.

4.1.4 Summer Camps for STFS students

As per approved PC-I, arrangement of summer camp is an important additional intervention in which visits are arranged to S&T organizations along with interaction with eminent scientists, presentations and Inquiry Based Science Education (IBSE) sessions for STFS students each year.

Travel Agency was hired through tender process for making all necessary arrangements for the first two batches. For the 1st batch of 300 students, these activities were organized in July, 2016. For the 2nd batch, summer camp and other related activities were organized in July, 2017.

For arranging 3rd summer camp and international study visit, tendering process was initiated many times for hiring of travel agency but each time it was cancelled due to some technical reasons.

Advertisement floated again in local Newspapers on 20.11.19 for pre-qualification of tour operators/firms. Out of 4 firms, three companies pre-qualified and informed through letters. Askari travel and tours were awarded work order for arrangement of local study visit. Local study visit was held from 02-07 March 2020 in Pearl Continental Hotel, Rawalpindi by the tour operators. Students visited NCP, NUST,

PIEAS and PMNH. Inquiry based learning sessions by SKOOL21 and Engineering for Kids were held. Motivational lectures by eminent Scientist were also arranged.

4.1.5 Selection of Universities and Research Supervisors/mentors for undertaking research projects of STFS students

As per approved PC-I, the STFS students have to undertake research project under the mentorship of universities teachers/professors. The STFS students will use the labs and other facilities of selected universities and S&T/academic institutions nearby their areas. In this regard 36 mentors have to be selected for mentorship of students.

Payment @Rs. 1.0 million to newly selected university (PMAS Arid Agriculture University, Rawalpindi) on account of financial assistance for undertaking research projects of STFS students has been made. In addition, honorarium @Rs. 100,000 on account of mentorship of STFS students to 16 newly selected/replaced mentors has been released.

4.1.6 Research Projects of STFS Students

Undertaking research projects by STFS students, under university teachers is an important activity of the project. In this regard, 36 university teachers were approved as mentors from nine universities from all over Pakistan. Subsequently, students of 1st and 2nd batches have completed their research projects and have submitted their reports in form posters. More than 80 new research projects of 2nd and 3rd batch students have been received in Poster/report form. Posters have been printed for STFS-PMU record.

Allocation process of 300 students of STFS 4th batch to university mentors for undertaking research projects has been completed. However, due to Covid-19 pandemic universities/educational institutes are closed and students are doing their theoretical work under guidance of their mentors.

4.1.7 Payment to Advertisement Agencies

In connection with selection of STFS students, tenders for procurement of different items, hiring of travel agencies, and Request for Proposals (RFPs), a number of advertisements/tenders were floated in the national press through PSF designated

advertising agencies. In this regard, the agencies submitted their bills, duly verified from the Press Information Department (PID) for payment.

Accordingly, as per PID quota policy, payments have been made to following three agencies; the Public Procurement Regulatory Authority, the Circle Agency (Pvt) Ltd, Islamabad and M/S Maxim Advertising Company (Pvt) Ltd, Islamabad.

4.1.8 Meetings held

6th meeting of STFS Executive Committee held on 14 Oct 2019. All agenda items were approved.

5.0 INTERNATIONAL LIAISON

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 year 2019-20, third call of proposals with National Natural Science Foundation of China, NSFC was launched. The calls were highly appreciated by the scientific community. International Linkages activities of Pakistan Science Foundation were expanded to the greater extent. More effective linkages were developed with international counter parts to benefit the scientific community of Pakistan. During the report period, 56 projects remained ongoing under different call with NSFC, TUBITAK, NSF Sri Lanka and MSRT. While 06 projects were selected for funding received under “PSF-NSF, Sri Lanka first call. A total of 20 technical reports (semi-annual and annual) were received of ongoing projects and an amount of Rs. 38.2 million was released on account of due installment and first installment of newly initiated projects.

Chairman, PSF had various meetings with international counter parts to further expand the PSF activities at international scale. Delegates of TUBITAK and NSF-Sri Lanka visited PSF to chalk out the areas of joint collaboration.

DETAILED REPORT (International Liaison Activities of PSF)

5.1 Joint R & Bilateral Projects and Calls

5.1.1 PSF-NSFC, China joint call for proposals

During the year 2019-20, third call of proposals with National Natural Science Foundation of China, NSFC was launched between 22.04.2020 and 03.06.2020 under disciplines of Fossil energy conversion and materials, Renewable energy, new energy and resource utilization and its scientific basis and Safety evaluation and adaptation mechanism of Water-Energy-Food Nexus in CPEC under climate change respectively. A total of 131 proposals were commonly received at PSF-NSFC. After three tier review process, 09 proposals have been selected for funding under “PSF-NSFC, China Third Call of Proposals”. The list of projects approved for funding under this call is given at *Annexure-X*. 26 projects awarded under first call are ongoing in different universities/S&T organizations across the country.

5.1.2 PSF-TUBITAK, joint call for proposals

15 projects awarded under first and second calls are ongoing in different universities/S&T organizations across the country.

5.1.3 PSF-MSRT joint call for proposals

18 projects awarded under first and second calls are ongoing in different universities/S&T organizations across the country.

5.1.4 Call for Joint Proposals with Sri Lanka

06 projects awarded under first are ongoing in different universities/S&T organizations across the country.

5.1.5 Visit of International Delegations to Pakistan Science Foundation

Foreign delegates from Beijing Association of Science and Technology (BAST), Beijing Academy of Science and Technology (BJAST) and Chinese Association of Science and Technology (CAST) visited PSF to initiate programed of mutual collaborations. Two officers from PSF and PMNH participated in “BJAST Science

Fair” held on October 14-20, in Beijing, China. Two officers from PSF and PMNH participated in “BJAST Science Fair” held on October 14-20, in Beijing, China

5.1.6 Seminars/Workshop

PSF in collaboration with EU delegation to Pakistan organized “Seminar on EU Horizon 2020 Programme Open Call for Proposals” March 02, 2020. The seminar was delivered by Anne Marchal, Deputy Head of Mission, and Delegation of the European Union to Pakistan.

6.0 PLANNING AND DEVELOPMENT SECTION

6.1 Activities under Development Budget:

i) On-going Development Projects:

6.1.1 Competitive Research Programme (CRP):

The Competitive Research Programme is the PSDP awarded to PSF 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 4th December 2017 and the authorization was issued by the Ministry of Planning, Development and Reforms dated 6th March, 2018. The administrative approval from Ministry of Science & Technology was received dated 20th June 2018 at a total cost of Rs. 1964.500 million. However, no allocation was made under the project in financial year 2018-19 and the project activities were started in 2019-20.

An amount of Rs. **109.543** million was utilized under the on-going development project titled “Competitive Research Programme”. This is an important umbrella project first of its kind in Pakistan to fund research projects of mega national issues through consortium of scientists from multiple professions and organizations with specific target of socio-economic gains. Another important objective is to resolve industrial issues to substitute imports and enhance exports through indigenous research and value addition. Moreover, bilateral research projects in collaboration with international research organizations to take benefit from the research of technically advanced countries are also the part of this programme. During the financial year, fourteen (14) research projects were funded under 1st Call, COVID-19 Call and PAK-China Joint Call.

a) 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.

6.1.2 Achievements:

1. 1st Call for Proposal

The call for proposals was launched in two funding streams viz., Consortium Research Grants and Triple Helix Model. All research fields under PC-I were included in this call viz., Agriculture and Food Security, Earth, Environment and Climate Change, Biotechnology, Biochemistry and Molecular Biology, Water & Soil, Energy, Engineering and Manufacturing, Health Sciences, Livestock, Chemistry and Physics, STEM Education, Space Sciences and Other Emerging Areas. A total of 1162 research proposals were received. After thorough scrutiny, almost 500 projects are yet under-process and more than 660 projects have been finalized. Due to COVID-19 scenario, this call was halted and thus only one project could be funded. This call will remain under-process during 2020-21.

Following is the summary of research projects and the list of funded projects:

Summary of Research Projects under 1st Call for Proposals

Sr. #	Detail	Project Proposals
1.	Total Number of Project Proposals Received	1162
2.	Total Number of Project Proposals Ineligible due to missing documents/duplication/Request of PIs to withdraw project/Wrong Categories of Funding	205
3.	Total Number of Project Proposals Dropped due to Non submission of revised versions/Wrong Categories of Funding	322
4.	Total Number of Eligible Project Proposals for Funding Consideration	957
5.	Projects recommended for funding by 1st Meeting of Technical Committee held on 18-DEC-2019 (out of 26)	4
6.	Projects recommended for funding by 2nd Meeting of Technical Committee held on 11-MAY-2020 (out of 41)	4
7.	Projects recommended for funding by 3rd Meeting of Technical Committee held on 18-MAY-2020 (out of 32)	2
8.	Projects recommended for funding by 4th Meeting of Technical Committee held on 19-MAY-2020 (out of 36)	6
9.	Number of Projects Not Recommended by Scrutiny Committee, Technical Committee, Project Award and Steering Committees	451
10.	Number of Projects approved by Project Award and Steering Committees (out of 16)	01
11.	Number of Projects Under Process	500

Projects Funded Under 1st Call for Proposal

Sr. No.	Project No. & Title	P.I. Name and Address	Duration & Total Cost (Rs.)	Page #
1.	PSF/CRP/P-NTU/T- Helix (194) Indigenous Development of Needle less Roll To Roll Pilot-Scale Electro spinning Machine	Dr. M. Bilal Qadeer Assistant Professor Department of Yarn Manufacturing National Textile University (NTU) Faisalabad.	03-Years 19,487,318	10

2. Call for Proposal on COVID-19:

Keeping in view the emergency situation in the country. A special call to address COVID-19 was launched. Total 446 research projects were received under this call. After thorough scrutiny, 06 research projects were funded. Two projects are exclusively for indigenous development of Ventilators. The trials of one ventilator have begun at NUST and the other ventilator is being developed by Riphah International University. Both of these ventilators are also approved by the committee of Pakistan Engineering Council. Two projects are on Artificial Intelligence. One on AI based rapid diagnosis of COVID-19 patients being executed by PIMS, Islamabad and second one is on data mining platform for informed decision making in COVID-19 scenario.

It is pertinent to mention that PSF was the first funding agency to approve and fund research projects on COVID-19. Total five different funding agencies launched their calls in Pakistan to address COVID-19 including HEC, DoST KPK, IGNITE and PSF.

Following is the summary of the Call for Proposals and the list of funded projects under COVID-19:

Summary of Research Projects under Special Call for Proposals to Address COVID-19

Sr. #	Detail	Project Proposals
1.	Total Number of Project Proposals Received	446
2.	Total Number of Project Proposals Ineligible due to missing documents/ duplication	70
3.	Total Number of Eligible Project Proposals for Funding Consideration	376
4.	Projects recommended for funding by 1st Meeting of Technical Committee held on 25-May-2020 (out of 109)	07
5.	Projects recommended for funding by 2nd Meeting of Technical Committee held on 25-Jun-2020 (out of 76)	03
6.	Number of Projects approved by Project Award/Steering Committee	04

3. Projects Funded Under Special Call for Proposals on COVID-19

Sr. No.	Project No. & Title	P.I. Name and Address	Duration & Total Cost (Rs.)	Page #
Projects Funded Under Special Call for COVID-19				
1.	PSF/CRP/Covid-19/Cons-09 Development of Artificial Intelligence based CADx system for rapid diagnosis of COVID-19 patients using Chest X-Ray (CXR) and Computed Tomography (CT) scans	Dr. Ayesha Isani Majeed Associate professor/ Head Department of Radiology, Pakistan Institute of Medical Sciences Hospital, Islamabad	12-Months 19,001,500	20
2.	PSF/CRP/Covid-19/TH-42 Development of Indigenous Ventilators	Engr. Dr. Muhammad Shafique Head of Department of Biomedical Engineering Faculty of Engineering and Applied Sciences Riphah International University, Islamabad	6-Months 12,008,400	21
3.	PSF/CRP/Covid-19/Cons-06 Up scaling and Pilot Production of Lifesaving Portable Ventilator Device	Murtaza Najabat Ali Associate Professor, School of Mechanical and Manufacturing Engineering, NUST, Islamabad.	6-Months 14,242,000	22
4.	PSF/CRP/Covid-19/TH-40 Upscaling of an AI enabled data mining platform for “Informed Decision Making (IDM)” in COVID-19 and future pandemic scenarios for Government of Pakistan	Dr. Erum Jamil Incharge/ Chairperson Department of Electrical Engineering International Islamic University, Islamabad.	12-Months 16,896,400	23

4. 3rd Joint Call with PSF-NSFC, China

PSF is actively engaged in S&T based collaboration with the National Science Foundation, China. Under the 3rd Call for Proposals between PSF and NSFC, 216 research projects

were submitted. 09 research projects have been funded under this call. Following is the summary of the research projects and the list of research projects funded.

Summary of Research Projects under PSF-NSFC Call Joint Call for Proposals

Sr. #	Detail	Project Proposals
1.	Number of Projects Received at PSF	216
2.	Number of Project Received at NSFC China	188
3.	Number of Common Eligible Projects at both sides	168
4.	Number of projects recommended for review after screening committee meeting	54
5.	Number of projects jointly recommended by PSF and NSFC for funding	09
6.	Number of projects approved by the Project Award/Steering Committee	09

Projects Funded in Collaboration with China

Sr.	Project No. & Title	Pakistani and Chinese PI	Duration & Cost
1.	PSF-NSFC-III/Bio/C-PMNH (13) Cooperative development of an innovative auto-ID platform for the beetles from China and Pakistan	Dr. Muhammad Abbas Pakistan Museum of Natural History (PMNH) Shakarparian, Islamabad. Ming BAI Institute of Zoology, Chinese Academy of Sciences Beijing, China	3-years 5,010,444/-
2.	PSF-NSFC-III/Med/P-NIBGE (14) Integration of ultrasound and nano technology based approaches for enhancing the therapeutic efficacy of prostate cancer	Dr. Waheed S. Khan Nano-Biotechnology Group, NIBGE Jhang road, Faisalabad Prof. Dr. Zhifeidai Peking University Beijing, China	3-years 10,378,704/-
3.	PSF-NSFC-III/Med/S-HEJ (15) Designing of super molecular nano carriers based chemotherapy to overcome side effects of anti-cancer drugs and improve their efficacy by co-drug delivery enhanced bioavailability	Prof. Dr. Muhammad Raza Shah International Center for Chemical and Biological Sciences H.E.J. Research institute of Chemistry, University of Karachi Karachi. Prof. Dr. Dong-Sheng Guo College of Chemistry, Nankai University, Tianjain China.	3-years 5,698,944/-
4.	PSF-NSFC-III/Agr/C-QAU (16) Molecular mapping and map based	Dr. Awais Rasheed Department of Plant Sciences Quaid-i-Azam University,	3-years 11,181,255/-

	cloning of disease resistance genes and developing new disease resistant wheat germ plasm	Islamabad Prof. Xian Chu Xia Institute of Crop Sciences, Chinese Academy of Agricultural Sciences Beijing, China.	
5.	PSF-NSFC-III/Med/P-IUB (17) Multi-Omics Analysis to investigate Chemotherapeutic Drug resistance associated Biomarkers & Molecular mechanism in Colorectal Cancer	Dr. Samina Ejaz Department of Biochemistry & Bio technology Bagdad Campus Faculty of Science the Islamia University of Bahawalpur Prof. Dr. Shufang Liang State key laboratory Biotherapy & Cancer Centre, West China Hospital, Sichuan University, China	3-years 8,947,822/-
6.	PSF-NSFC-III/Agr/P-UAAR (18) Mining for private/unique genes preserve in rare rapessed (brassica napus) germ plasm regulating drought and salinity tolerance and special seed nutrition quality based on genome structural variation analysis of a core collection	Prof. Ghulam Jilani Institute of Soil Science PMAS Arid Agricultural University, Rawalpindi Prof. Lixi Jiang Department of Agronomy College of Agriculture and Biotechnology, ZheJiang University, Hang Zhou, China	3-years 9,784,611/-
7.	PSF-NSFC-III/Agr/C-COMSATS- Isb (19) Sustainable bio energy development in emerging economies under global changes: current practice, prescription, response and management	Dr. Muhammad Abid Assistant Prof Centre for Climate Research and Development, COMSATS University, Islamabad. Prof. Dr. Shiwei Yu School of Economic and Management, China University of Geo Sciences Wuhan, China.	3-years 4,209,744/-
8.	PSF-NSFC-III/Agr/KP-AWKM (20) Inter-generational epigenetic transmission of <i>staphylococcus aureus</i> mastitis and functional validation of resistance genes in China & Pakistan dairy cattle	Dr. Tahir Usman College of Veterinary Sciences and Animal Husbandry, Garden Campus, Abdul Wali Khan University, Mardan. Prof. Yuying College of Animal Science & Technology, China Agricultural University, China.	3-years 7,606,344/-
9.	PSF-NSFC-III/Agr/S-UoK (21) Revealing mechanistic basis of salt secretion in halopythic grasses to improve salinity stress tolerance in	Prof. Bilquees Gul Institute of Sustainable Halophyte Utilization, University of Karachi Karachi	3-years 6,820,944/-

cereal crops	Prof. Sergey Shabala Foshan University, Foshan, China	
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5. PSF- TUBITAK Joint Funding Program:

PSF has the mandate to liaise with similar international bodies across the globe and is in active collaboration with many similar International bodies. PSF signed a MoU with the Scientific and Technological Research Council of Turkey on 17th September, 2013. To implement this MoU, PSF and TUBITAK have launched the two successive calls of joint research projects on various scientific disciplines such as Agriculture & Biotechnology, Engineering and Materials Sciences and Environmental Sciences. After the completion of review process 15 projects have been selected for funding in different universities and R & D establishments across Pakistan. The Steering Committee approved the launch of 3rd PSF-TUBITAK Joint Call under CRP.

6.1.3 Science Talent Farming Scheme (STFS) for Young Students Phase-I

(Component -I):

Development project “Science Talent Farming Scheme (STFS) for Young Students, Phase-I, Component-I (Revised)” was conceived by the 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 6th July, 2017 at a total cost of Rs.1285.361 million for a period of 5 years (December 2015 – December 2020). An amount of Rs. **55.231** million were utilized under the on-going development project titled “Science Talent Farming Scheme (STFS) for Young Students Phase-I (Component-I)” for the monetary benefits and the additional interventions designed for the students.

a) Objectives:

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

Each year 300 students, passed their SSC/matriculation from pure Government schools are selected to groom them to achieve the highest degrees (up to PhD level) in various scientific disciplines. PSF is undertaking STFS for F.Sc. studies, whereas

Higher Education Commission (HEC) is responsible for university level/higher education under STFS, Phase-II.

6.1.4 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 year 2019-20, an amount of Rs. **7.325** 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 Thirteen (13) registered Scientific Societies.

- i. Pakistan Society for Biochemistry and Molecular Biology
- ii. Islamic Society of Statistical Sciences
- iii. Soil Science Society of Pakistan
- iv. Pakistan Academy of Engineering
- v. Pakistan Society of Nematologists
- vi. Pakistan Nuclear Society
- vii. Society of Economic Geologists and Mineral Technologists (SEGMITE)
- viii. The Zoological Society of Pakistan
- ix. Pakistan Thalassaemia Welfare Society
- x. Weed Science Society of Pakistan

- xi. Chemical Society of Pakistan
- xii. Pakistan Botanical Society
- xiii. Pakistan Association for the Advancement of Science

The request received from the societies were considered in the four (04) meetings of the Committee constituted in the approved development project. The meetings were held on **15th October, 6th December 2019, 4th February and 6th May 2020**. Following activities were undertaken by the societies,

- ✓ Twenty-One (21) International / National Science Conferences / Workshops / Seminars organized (*Annex-XI*).
- ✓ Thirty-Eight (38) issues of ten (10) Scientific Journals were published (*Annex-XII*).
- ✓ Linkages Fee paid to three (03) International Federations.

Views/ Comments on the PC-Is received from MoST:

- **Views/ Comments on the PC-I titled “Science Diplomacy Initiative-SDI: Strengthening of International Collaboration of the Pakistan Academy of Sciences”** prepared and submitted to MoST.

6.1.5 Activities under Non-Development Budget

a) Provision of Travel Grants:

During the year 2019-20, an amount of Rs. **3.00** million were allocated and spent mainly for provision of travel grants to scientists/technologists/ other heads of the project. A total of **178** requests were received from scientists and technologists of the country. After comprehensive scrutiny as per eligibility criteria **130** requests were presented in **07** meetings of Travel Grant Award Committee (TGAC). A total of **48** requests were dropped due to non-confirmation to the eligibility criteria and non-provision of requisite documents by the scientists. Out of the **130** requests presented to the TGAC, **36** were recommended whereas **26** scientists/technologists availed the grant and **10** could not proceed abroad due to visa problems and other reasons. However, **94** requests were not recommended by the Committee.

b) Submission of important reports to MoST/ Planning Commission:

- ✓ Fixing of Targets and Submission of Regular Report on Achievements of the organizations

- ✓ Preparation and Circulation of Yearbook 2018-19 In Pursuance of Rule 25 of the Rules of Business 1973
- ✓ Monthly Progress Report on the prescribed proforma from organizations of MoST
- ✓ Full Year Review of PSDP 2018-19 (July 2018 – June 2019)
- ✓ Public Sector Development Programme- PSDP 2019-20
- ✓ First Quarter Review of PSDP 2019-20 (July-September 2019)
- ✓ Implementation and Quarterly Review of Annual Plan 2019-20
- ✓ Public Sector Development Programme (PSDP) 2020-21
- ✓ Mid-Year Review of PSDP 2019-20 (July-December 2019)
- ✓ Material for Pakistan Economic Survey 2019-2020
- ✓ Preparation of Performance Agreement for F.Y. 2020-21

c) Replies to the National Assembly/ Senate Questions/ Standing Committees:

- ✓ Starred National Assembly Question No. 199, 8th Group, 16th Session Moved by Mr. Sheikh Rohale Asghar, MNA
- ✓ Minutes of the Meeting of the Senate Standing Committee on Science & Technology Held on 5th September 2019 At 11:00 A.M in Old PIPS Hall (PRC-Hall), Parliament Lodges, Islamabad
- ✓ Directions / Recommendations of the National Assembly Standing Committee on Science & Technology made in its 5th Meeting Held on 16th October, 2019
- ✓ National Assembly Starred Question No. 101, Moved by Ms. Shunila Ruth, MNA
- ✓ Meeting of the National Assembly Standing Committee on Science & Technology will be held on 27th and 28th January 2020 at 02:00 P.M and 11:00 am respectively in Committee Rooms of PCST and PEC Islamabad
- ✓ Minutes of the Meeting of the Senate Standing Committee On Science & Technology to be held on 13th February 2020 at 11:00 A.M in Committee Room No.4 Parliament House, Islamabad
- ✓ Directions/ Recommendations of the National Assembly Standing Committee on Science & Technology made in its 8th Meeting held on 23rd December 2019
- ✓ Minutes of the meeting of the Senate Standing Committee on Science & Technology to be held on 19th February 2020 at 11:00 A.M in Committee Room No.4 Parliament House, Islamabad.

II. PAKISTAN SCIENTIFIC AND TECHNOLOGICAL INFORMATION CENTRE (PASTIC)

II. PAKISTAN SCIENTIFIC AND TECHNOLOGICAL INFORMATION CENTRE (PASTIC)

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 and its 6 sub-centers, among Scientific, Technical and Administrative Staff is 164.

1.0 PASTIC Objectives:

1. Development of a National S&T/R&D Information Repository of indigenous information resources (databases)
2. S&T/R&D information dissemination through contemporary reference information tools
3. Strengthen National Science Reference Library for resource sharing & Inter-library collaborations (consortium) and empowerment of information professionals.
4. Promotion of R&D based industrial development
5. Facilitate printing of S&T/R&D Publications
6. Capacity/skill development of researchers & entrepreneurs
7. Develop collaborations with national and international information networks

1.1 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 2019 to June 2020 are described below:

1.1.1 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)

1. Institute of Electrical and Electronics Engineers (IEEE)
2. American Chemical Society (ACS)
3. Nature Publishing
4. JSTOR
5. Springerlink

B. HEC licensed databases through VPN

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

1. All disciplines of Science Direct
2. IEEE

Under the Bibliographic Information & Document Supply Service, 35114 S&T documents and 2783 bibliographies in digital form were supplied to 2632 on users upon their request during the year 2019-20.

1.1.2 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. Earlier it was published in the form of a printed secondary journal with detailed author and keyword index. Since 2011, an online database application has been developed for its wider use.

During the period 2019-20, 10577 abstracts were processed for import into the database.

1.1.3 PUBLICATIONS

Pakistan Journal of Computer Sciences & Information System (PJCIS): PJCIS is a peer reviewed biannual journal of Computer Science and Engineering published by PASTIC. It is an open access online journal published twice a year. The mission of the journal is to provide a forum for researchers to debate and discuss interdisciplinary issues in Computer Science, Computer System Engineering and Information Systems. It invites and welcomes contributions in all areas of Computer Science, Computer System Engineering and Information Systems. During the period, PJCIS Vol.3, Issue 2 was published online.

Abstract book/Conference Proceeding: PASTIC collaborates with S & T /R & D institutions by publishing Abstract Book/Proceeding of Conferences organized. During current period, Abstract Book for International Conference on Chemistry organized by Islamia College Peshawar was published.

Technology Roundup: A bimonthly Trade and Technology news bulletin entitled “Technology Roundup” is regularly published and six issues of this news bulletin were made available online on PASTIC website.

1.1.4 TECHNOLOGY INFORMATION SERVICE

This service is meant for dissemination of Technological Information Services to R&D Workers, Engineers, Entrepreneurs, SMEs, and the Industrialists. The aim is to facilitate growth, potential and competitiveness among SMEs at national and international level, build effective coordination between R&D Sector and Industry for enhancing innovations, competitiveness, and development & promotion of indigenous technologies. During 2019-2020, 6 online issues of “Technology Roundup” and 02 UIP Seminars/workshops on IP/Patent have been arranged.

1.1.5 Reports

1. PASTIC TIS attended meetings during 2019 held at Pakistan Science Foundation as the member working group for discussion on draft prepared for formulating Independent ***Intercultural Property Rights Policy*** for organizations working under Ministry of Science & Technology (MoST).

2. PASTIC TIS worked on *Import Substitution Industrialization* Analysis and prepared report on January 2020, based on Triple Helix Model as member of the MoST Committee.
3. A report entitled “*COVID-19 (SARS-COV-2): Global and Pakistan Perspective*” compiled by PASTIC TIS and was submitted to Secretary MoST on 23-4-2020.

1.1.6 Patent data provision under PASTIC- TISC (Technology and Innovation Support Centre), PASTIC-TISC

1. Patent abstracts/other information provision to number of clients through Offline/Online Patent Query Form at PASTIC web = 30
2. Intellectual Property Rights / Patent seminars under TISC = 3

1.1.7 Expos/Workshops under UIP program:

Expos/Workshops under UIP program = 3

Duplication check prior to R&D projects evaluation by PSF

PASTIC TIS verified the PSF projects from the completed/ongoing database and gave feedback by email.

Trainings/Certificates:

1. TIS officer completed training workshop on “Patent Database Searches & Development of Technology & Innovation Support Centres (TISCs),” organized by IPO- Regional Office Lahore & HEC-WIPO at LUMS, Lahore from 20-21 February 2019.
2. TIS officer completed free distance learning general course on Intellectual Property from 22 February 2019 to 6th April 2019, organized by WIPO Academy.
3. TIS officer completed the free online session of IP Panorama including DL450 IP Management Course within the framework of Advance International Certificate Course (AICC) from April to May 2019, organized by KIPO (Korea), WIPO, KAIST (Korea) and KIPA (Korea).

Content/layout development

1. PASTIC TIS developed content for COVID 19 S&T Information Portal in Scientists, COVID fighting models, books and COVID Research articles and other news.
2. PASTIC TIS provided layout for application development by IT about Online Patent Query Form and Industry Databases.

1.1.8 PASTIC NATIONAL SCIENCE REFERENCE LIBRARY SERVICE

The National Science Reference Library 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 (300 journals regular among them) and approximately 5000 miscellaneous documents such as reference material/secondary sources, encyclopedias, government documents, conferences/seminars proceedings, etc. The HEC Digital library is also accessible at PASTIC. The library also organizes capacity building programmes in the area of Library & Information Management, Library Automation, Digital Library, Soft Skills for Librarians, and Information Literacy, etc.

Main services of library include:

- Reference & Referral Services
- Reader Service
- Journal Listings
- Photocopying & Scanning Services
- Free WIFI access

During 2019-20, 9523 users/researchers visited PASTIC library for reference purpose, reading, photocopying and internet browsing. Besides, the library received 107 issues of different national and international journals, 36 miscellaneous documents, reports, etc. All this library material was processed and shelved for use. 12 issues of the library bulletin “Fresh Arrivals” of PASTIC library were regularly published on monthly basis and distributed among relevant circles and uploaded on PASTIC website. 5235 Books were entered in KOHA. The library has also been renovated during the current financial year for providing a better environment to the library users for study, consultation, and internet facility.

1.1.9 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 year 2019-20, 68 printing jobs were carried out for 28 R&D organizations.

1.1.10 IT SUPPORT SERVICE

PASTIC has a well-equipped IT section with a dedicated team of IT professionals, working hard to enhance the IT infrastructure, for strengthening and effective delivery of its services. PASTIC IT section also provided their expertise to PSF and PMNH, for website updation.

During 2019-20, following activities were undertaken by the PASTIC IT:

1.1.11 Technical support in following PASTIC and PSF development projects:

- Networking and Capacity Building of Women Entrepreneurs (SMEs) from SAARC Countries (PASTIC Project).
- Modernization of PASTIC National Science Reference Library for effective resource sharing among S&T libraries in Pakistan (PASTIC Project).
- Science Talent Farming Scheme (STFS) for Young Students (PSF Project).
- Pakistan Science Abstract (PSA) application with efficient search features was successfully developed.
- PASTIC Journal Management System (OJS) was transformed on Cloud platform and PJCIS data shifting, and testing was completed in live mode.
- PSDP project proposal (PC-1) entitled “Development of National Digital Archives of Research Published in Pakistani Journals” was submitted to MoST.
- PSF sub-domain (URL: www.stfs.psf.gov.pk) was launched with PSF website and activated STFS web contents.
- Online application of “Pakistan and International Industrial Linkages database” was launched.
- SAARC Women Entrepreneurs (SMEs) web portal and android application (saarcweportal.com) was technically supervised and launched.
- Online application was developed and data of "Scientific Societies/Associations of Pakistan” was uploaded on PASTIC website.
- CSTRDLP web portal (Consortium of Science & Technology and Research & Development Libraries of Pakistan) (<http://consortium.pastic.gov.pk/>) development and updation activity for promotion of resource sharing among libraries was supervised.

- Training workshop on “Writing a Quality Research Paper” was organized at PASTIC National Centre, Islamabad on November 29, 2019.
- Extended PASTIC Publicity support to Institute of Research Promotion (IRP), Lahore for launching of “Innovation Summit Baluchistan 24-15, September 2019” through PASTIC website and bulk email service.
- Launched survey activity at PASTIC National Centre and sub-Centers to review status electronic mail usage (email) and finally incorporated unified email policy as per government directives.
- Principal System Analyst, PASTIC delivered talk on UNESCO- Information for all Programme (IFAP) jointly organized Workshop entitled “Tools for Media Information Literacy (MIL)” on 22nd-23rd October, 2019 at PASTIC National Center, Islamabad.
- Principal System Analyst, PASTIC and Web Manger PASTIC delivered talk in “3-days SAARC Women SMES Portal Awareness & ICT Workshops” on December 11-13, 2019, Lahore.
- Principal System Analyst, PASTIC and Web Manger PASTIC deliver talk in 3-days “Portal Awareness & ICT Capacity Building Workshop “at Dhaka Bangladesh from 29-31 December, 2019.
- Principal System Analyst, PASTIC and Web Manger PASTIC delivered talk in 3-days “Networking and Capacity Building of Women Entrepreneurs (SMEs) from SAARC Countries” on December 22-24, 2019 at, Karachi.
- PASTIC IT section designed and uploaded Covid-19 S&T Information Resource Portal with PASTIC sub domain URL: <http://covid.pastic.gov.pk/>
- Compiled and deployed online database of Pharmaceuticals Manufacturers in Pakistan on PASTICwebsite.
- Launched PASTIC library automation (Koha) and Union Catalogue (PakCat) domains with PASTIC domain to activate development project applications on web (www.koha.pastic.gov.pk; www.pakcat.pastic.gov.pk).
- Launched online application for mapping of major R&D Equipment/ devices/machines /analytical facilities of the organization/Universities with PASTIC and MoST websites.
- Organized PASTIC-UAF one-day Stem & IT Innovations EXPO at University of Agriculture Faisalabad 29th January 2020.

1.1.12 Databases Developed/Updated on PASTIC website:

- Offices of Research, Innovation and Commercialization (ORIC) of Pakistani Universities
- Conferences / Workshops / Seminars / Proceedings of Pakistan
- Overseas Investors of Industry and Commerce in 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)
- Commercializable Pakistani Products (Indigenous)
- 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
- Chambers of Commerce of Pakistan
- Industrial Associations of Pakistan
- Universities/Institutes of Pakistan
- Foreign Industries in Pakistan
- University-Industry Linkages
- S&T libraries of Pakistan
- Pakistani Scientists
- Industries of Pakistan
- Industrial issues

1.1.13 Consortium of Science & Technology and Research & Development Libraries of Pakistan (CSTRDLP) webpage was updated on PASTIC wesbite.

“SAARC WE Portal” developed under PASTIC International Project “Networking and Capacity Building of Women Entrepreneurs (SMEs) from SAARC Countries” (NCBWESC) displayed in the International “Training Programme on Entrepreneurship skills for Innovators from Developing countries and 6th International Exhibition of Innovators” on 23-25 October, 2019 organized by Non Alignment Movement (NAM) Head Quarters, India in collaboration with Academy of Scientific Research & Technology (ASRT) at Cairo, Egypt.

1.1.14 INTERNATIONAL LIAISON

PASTIC has been designated as National Focal Point of UNESCO IFAP National Committee (UNESCO Information for All Programme IFAP), PASTIC is executing SAARC Development Fund (SDF) funded Project “Networking of Women Entrepreneurs (SMEs) from SAARC Countries”.

NEWSLETTERS AND REPORTS

- PASTIC Monthly Newsletters were compiled, edited and uploaded at PASTIC website.
- Monthly action plans / target reports were compiled.
- Quarterly reports were compiled.
- Year Book Report 2018-19 was compiled.
- Annual Report 2018-19 was compiled.
- Minutes of PASTIC Review Meetings were compiled.
- Monthly Progress Reports of PASTIC for MoST were prepared.

1.1.15 PASTIC SERVICES AWARENESS SEMINARS/STALLS

In order to publicize PASTIC Services & activities, PASTIC service awareness seminars and stalls were organized at universities' various departments regularly. Through this activity, PASTIC services are brought to 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 year 2019-20 following PASTIC Service Awareness Seminars/stalls have been organized:

PASTIC Services Awareness Seminars/Stall

Title	Date	Venue
PSC FAISALABAD		
Seminar on "PASTIC as National Information Hub: introduction to PASTIC services"	November 5, 2019	Faculty of Social Sciences, University of Agriculture Faisalabad
Seminar on "PASTIC as National Information Hub: introduction to PASTIC services"	November 6, 2019	Faculty of Agriculture, University of Agriculture Faisalabad
PNC ISLAMABAD		
PASTIC Services Awareness Seminar	August 20, 2019	Library Sciences Department, University of Peshawar
PASTIC Services Stall	December 16, 2019	Institute of Management Sciences, University of Baluchistan, Quetta
PSC KARACHI		
PASTIC Services Stall	December 5-7, 2019	Mehran UET, Jamshoro
PSC PESHAWAR		
PASTIC Services Awareness Seminar	August 20, 2019	Department of Library Sciences, University of Peshawar

1.1.16 HUMAN RESOURCE DEVELOPMENT

Another important activity of PASTIC is to impart training to information professionals and researchers through workshops / seminars on topics such as Computer Applications for Library Automation, Information Management, Searching Techniques, Research Tools & Techniques, IPRs, etc. In addition, PASTIC also organizes Awareness Seminars about PASTIC Services. In this regard, following training workshops / seminars were organized.

Trainings/Workshops/Seminars/Symposia/ Meetings Organized:

Title	Timings	Venue	Organized by
PSCFAISALABAD			
Training workshop on "Educational Research Method & Data Analysis SPSS Software"	August 6-7, 2019	Aziz Fatima Nursing College Faisalabad.	PSC Faisalabad
Training workshop on "Professional Ethics & Confidence Building"	October 22, 2019	Central Library of University of Agriculture, Faisalabad.	PSC Faisalabad
Seminar on "PASTIC as National Information Hub: Introduction to PASTIC services" was organized at Faculty of Social Sciences, University of Agriculture Faisalabad.	November 5-6, 2019	Faculty of Social Sciences, University of Agriculture Faisalabad.	PSC Faisalabad
Seminar on "PASTIC as National Information Hub: Introduction to PASTIC services" was organized at Faculty of Animal Husbandry, University of Agriculture Faisalabad.	November 14, 2019	Faculty of Animal Husbandry, University of Agriculture Faisalabad.	PSC Faisalabad
Training workshop on "Library Automation using PASTIC Cloud Koha Free Library Automation Software"	December 17-19, 2019	Central Library BahaudinZikreya University, Multan.	PSC Faisalabad in collaboration with BahaudinZikreya University, Multan.
Seminar on "Importance of Intellectual Property	June 5, 2020.	Sargodha Chamber of Commerce & Industry (SCCI)	PSC Faisalabad in collaboration with Sargodha Chamber of

Rights”			Commerce & Industry (SCCI).
Seminar/ Workshop on " Management by using <i>Mendeley</i> - Reference Management Software”	June 17, 2020	Library Ayub Agricultural Research Institute Faisalabad	PSC Faisalabad in collaboration with Main Library Ayub Agricultural Research Institute (AARI)
Workshop about SAARC Women SMEs Portal Awareness & ICT Capacity Building under SDF Funded Project titled “Networking and Capacity Building of Women Entrepreneurs (SMEs) from SAARC Countries”	December 11-13, 2019	PC/Avari Hotel Lahore	PNC & PSC Faisalabad
Workshop about SAARC Women SMEs Portal Awareness & ICT Capacity Building under SDF Funded Project titled “Networking and Capacity Building of Women Entrepreneurs (SMEs) from SAARC Countries”	December 18-30, 2019	Marriot Hotel Islamabad.	PNC & PSC Faisalabad
PNC ISLAMABAD			
Training workshop on “Research Tools and Techniques (SPSS)” to enhance quality of research	July 29-31, 2019	PASTIC National Centre Islamabad.	PNC
Seminar on “Media and Information Literacy”	Oct 22-23, 2019	PASTIC National Centre Islamabad.	PNC
Training workshop on SPSS	November 20-21, 2019.	PASTIC National Centre Islamabad.	PASTIC National Centre in collaboration with Institute of Specialized Training.
Training workshop on SPSS	November 26-28, 2019.	IT Lab of PASTIC National Centre, Islamabad.	PASTIC National Centre, Islamabad.
Training workshop on “Writing a Quality	November 29, 2019.	PASTIC National Centre Islamabad.	PASTIC National Centre in

Research Paper”			collaboration with Institute of Specialized Training.
Three workshops under SDF Project.	December 2019	PASTIC Sub-centers Karachi, Lahore & Islamabad.	PNC
Seminar on <i>Consortium of S&T and R&D libraries of Pakistan(CSTRDLP)</i>	January 8, 2020	PASTIC National Centre, Islamabad.	PNC
Training workshop on “EndNote”	February 13, 2020	IT Lab of PASTIC National Centre, Islamabad.	PNC
Training Workshop on "Research Tools and Techniques through SPSS"	March 11-12, 2020	PASTIC National Centre, Islamabad	PNC
Introduction of Consortium of Libraries of Pakistan to Librarians of the libraries of various universities of Lahore.	January 29-30, 2020	Various libraries of Lahore.	PASTIC National Centre Islamabad.
PSC KARACHI			
Training Workshop on "HEC Plagiarism Policy & Effective Usage of Turnitin Service”.	July 11, 2019	PSC Karachi	PSC Karachi
Training Workshop on "Literature Search &Endonote"	July 16, 2019	Institute of Pharmaceutical Sciences, Jinnah Sindh Medical University	PSC Karachi
Training workshop on "Essential of Statistics with SPSS”.	August 27-28, 2019	PSC Karachi	PSC Karachi
PASTIC Sub-Centre Karachi organized a Seminar on STATA Software	September 24–25 2019	PSC Karachi	PSC Karachi
Training workshop on “Senyan Library Management System (SLiMS) &Senayan	December 14, 2019	Government Boys Degree College, Larkana.	PASTIC Sub Centre Karachi in collaboration with Sindh College

Electronic Thesis and Dissertation System (SETIADI)”			Library Association (SCLA) Sukkar Region &SLiMS Community Karachi
Training workshop on "Applying Quantitative Research Techniques using SPSS”.	January 28-29, 2020	PSC Karachi	PSC Karachi
Awareness seminar on CSTRDLP	February 17, 2020.	Mehran University of Engineering & Technology, Jamshoro	Jointly organized by PASTIC, MUET Library and Online Information Centre Jamshoro
Training workshop on “Library Automation using PASTIC Koha cloud”.	February 25-27, 2020.	Sindh Agriculture University, Tandojam.	PSC Karachi
Awareness seminar on CSTRDLP	February 21, 2020	The Benazir Bhutto Shaheed University of Technology & Skill Development, KhairpurMirsat, Benazir Bhutto Shaheed University of Technology.	Jointly organized by PASTIC & The Benazir Bhutto Shaheed University of Technology & Skill Development, KhairpurMirsat Benazir Bhutto Shaheed University of Technology.
Awareness seminar was organized on CSTRDLP	February 24, 2020	University of Sindh, MirpurKhas Campus.	PASTIC & University of Sindh, Campus Mirpurkhas
Awareness seminar was organized on CSTRDLP	February 28, 2020	PSC Karachi	PSC Karachi
Training workshop on “Library Automation using PASTIC Koha cloud”	February 18-20, 2020	Chandka Medical College, Larkana	PSC Karachi
PSC LAHORE			
Training workshop on “KOHA”	December 11-13, 2019	The Quaid e Azam Library, Lahore	Jointly organized by PASTIC Library Islamabad, PASTIC Sub Centre, Lahore and The Quad e Azam Library Lahore.
PSC MUZAFFARABAD			
Training workshop on “Mendeley”	November 21, 2019	University of Azad Jammu & Kashmir.	PSC Muzaffarabad.

PSC PESHAWAR			
Seminar on “Protection of Research Outcomes for Commercialization”	July 18, 2019.	Sarhad University Peshawar	PASTIC Sub-centre Peshawar
Training workshop on “Mendeley”	October 1-2, 2019	COMSATS University Abbottabad Campus.	PSC Peshawar & PNC
workshop on SPSS	October 24-25, 2019	University of Peshawar	PSC Peshawar &PNC
Awareness workshop on “Breast Cancer”	November 13, 2019	Agriculture University Peshawar	PSC Peshawar
TISC-Seminar on “Protection of Research Outcomes For Commercialization”	December 5, 2019	University of Science & Technology Bannu.	PASTIC Sub Centre, Peshawar in collaboration with Technology Incubation Centre; ORIC University of Science & Technology Bannu
TISC-Seminar on “Protection of Research Outcomes for Commercialization”	December 6, 2019	Khushal Khan Khattak University Karak.	PASTIC Sub Centre, Peshawar in collaboration with ORIC - Khushal Khan Khattak University Karak
Workshop on “Basic Research data Analysis through SPSS”	January 8-9, 2020.	Abdul Wali Khan University Mardan	Jointly organized by PASTIC Sub-centre Peshawar, Department of Botany and Department of Biotechnology, Abdul Wali Khan University Mardan
Workshop on “End Note as Referencing Tool”	February 12, 2020	Video conference Hall- University of Peshawar.	Jointly organized by PASTIC Peshawar and ORIC-University of Peshawar
PSC-QUETTA			
NIL			

1.1.17 EXHIBITIONS ORGANIZED

- PASTIC Sub-centre Peshawar collaborated and facilitated a two-day KP Creative Fest 2020, on February 26-27, 2020 organized by Directorate of Science & Technology KPK.
- Science Exhibition and World Science Day for Peace & Development was celebrated at Science Centre, Pakistan Science Foundation Faisalabad on November 11-12, 2019.
- PASTIC and University of Agriculture Faisalabad, organized Expo entitled, “STEM & IT Innovations Expo: Innovative trends in Science, Technology, Engineering, Mathematics (STEM) and ICTs” on January 29, 2020 at Expo Centre UAF (23 organizations participated with 168 projects)
- Expo on “The Role of S&T Education for Industrial Development” was co-organized at PCSIR Laboratories Complex Lahore, on September 23-24,2019, on the directions of the Senate Standing Committee on Science and Technology.

1.1.18 Meetings/Workshops/Trainings/Seminars Attended by Pastic Officers

- Grand Meeting/Seminar Consortium/ Networking of S&T and R&D Libraries of Bahawalpur: Launching PASTIC Cloud Koha Free Library Automation Software on December 20, 2019 at elibrary Bahawalpur.
- PASTIC Sub-Centre Faisalabad held meetings with FCCI, FWCCI, SCCI, MWCCI and MCCI Chambers for Industrial Data.
- EXPO at Livestock Department Mega Event November 18, 2019.
- Seminar at Zoology department, University of Balochistan, Quetta in March 2020.
- World Science Day at November 11, 2019.
- Kashmir Day on February 5, 2020 at Smart Goal’s School, Quetta.
- Kashmir Day on February 6, 2020 at Geological Survey of Pakistan, Quetta.
- Deputy Director (STI), PSC Peshawar PASTIC actively participated in workshop titled: Provincial Science, Technology & Innovation (STI) Strategy/Policy, held on February 13, 2020 at Green Olive’s Restaurant, Peshawar.
- Attended Exhibition IEEE FAIR 2019 at Expo Centre, Karachi on 1-3 October 2019.
- Attended DUHS DICE Innovation Exhibition 2019 held at Expo Centre, Karachi on 17th October, 2019

- Held meeting with Vice Chancellor Dawood University of Engineering & Technology Karachi on 20-11-19 regarding data collection of S&T projects & Highly Qualified Scientist.
- Attended 1st International Conference Research Prospective in Pharmaceutical Sciences “Transforming New Paradigms in Industry & Academia Linkages” on 23rd -25th October, 2019 at Hamdard University, Karachi.
- Attended 2nd International Conference on Sustainable Development on Civil Engineering 2019 (ICSDC-2019), on December 05-07, 2019 at Mehran University of Engineering & Technology, Jamshoro.
- Attended Karachi International Book Fair (KIBF) 2019 held at Expo Centre, Karachi on 9th December, 2019
- Attended The 15th Nematological Event; a seminar-cum-workshop on “Significance of Nematode Identification for Better Crop Management”, which was jointly organized by Pakistan Society of Nematologists (PSN), National Nematological Research Centre (NNRC), University of Karachi with the support and cooperation of Pakistan Science Foundation (PSF) and ECO Science Foundation (ECOSF) on December 30-31, 2019, at the NNRC Karachi, Pakistan.
- Principal System Analyst, PASTIC participated in Senate meeting held on 05-12-2019.
- Principal System Analyst, PASTIC participated in restructuring meeting held on Oct 21, 2019 at MoST under the leadership of honorable Minister of Science and Technology.
- Principal System Analyst, PASTIC participated in meeting held at PSF regarding STFS LMS tender preparation for project extension, on Oct 21, 2019, at PSF.
- Principal System Analyst, PASTIC participated in three days training entitled “Project Preparation and Management in Public Sector” at PPMI, 8-to-10 January 2020.
- PASTIC IT section participated in “Post Covid-19 showcase” activity organized by MoST on 30th April 2020, Islamabad to demonstrate PASTIC developed “Covid-19 S&T Information Resource Portal”.
- Principal System Analyst, PASTIC participated in meeting held with Chinese delegation of Senior Scientists from Pakistan Study Centre, Beijing Technology & Business University, China on September 5, 2019.
- Principal System Analyst, PASTIC participated in UNESCO Information for All Programme (IFAP) conference on media and information literacy for the prevention of violent extremism 17 and 18 September 2019, Islamabad.

- Principal System Analyst, PASTIC received one-day training on PMES system (online) developed by planning commission on 22nd August 2019.
- Participated in “Pak-EU Seminar on EU Research and Innovation Staff Exchange (RISE): Bridging R&I Sector in Europe and Worldwide” on 2nd March 2020.
- Principal System Analyst, PASTIC participated in International Conference on “Climate-Resilient Smart Soil Management, Focusing Food Security, Ecosystems & Environment” 5th March 2020 at University of Haripur.
- Principal System Analyst, PASTIC participated in Shape Pakistan’s research strategy at Pakistan Research day 2020 at NUST on 19th February 2020.
- Principal System Analyst, PASTIC participated in Structuring and Processing Data into Elastic search at Information Technology University, Lahore on 21st January 2020.
- Participated in HEC’s Capacity Building Session on Case Study: Pakistan Development Review (January 5, 2020) and Guidelines for indexing in Scopus (January 21, 2021).

1.1.19 DEVELOPMENT PROJECT

Development Project entitled, “Modernization of PASTIC National Science Reference Library for effective Resource Sharing among S&T Libraries in Pakistan” was executed. Main objectives of the project are:

- Development of Information Communication Technologies (ICT’s) infrastructure for PASTIC National Science Reference Library.
- Development of Consortium of library & information scientists (librarians) of R&D organizations (CRDLP).
- Capacity building of library information scientists (librarians) for Library Automation, Digital Library & Library Management, etc.
- Revamping and strengthening of PNSR library.
- Organize awareness seminars for research scholars to promote / utilize the developed information resources.

1.1.20 MISCELLANEOUS ACTIVITIES

- Green Pakistan, Plantation at PASTIC National Centre Islamabad on August 27, 2019.
- Independence Day 14th August 2019 celebrated. The Science Centre/PASTIC Sub-Centre Faisalabad. The Science Centre/PASTIC Sub Centre Faisalabad were decorated with lighting/bunting and flags.

PASTIC Membership

1878 new members joined PASTIC and were added to PASTIC Services Membership Database.

**III. PAKISTAN MUSEUM OF NATURAL HISTORY
(PMNH)**

III. PAKISTAN MUSEUM OF NATURAL HISTORY (PMNH)

1.0 Natural History Research

Pakistan Museum of Natural History the only natural history of Pakistan was established in 1976 under Pakistan Science Foundation, Ministry of Science & Technology, (Government of Pakistan). Pakistan Museum of Natural History (PMNH) has four principal divisions namely Earth Sciences Division, Botanical Sciences Division, Zoological Sciences Division and Public Services Division. First three scientific divisions are engaged in the collection, identification and research activities pertaining to plants, animals, fossils, and mineral resources of Pakistan, while the fourth one is responsible for mass education and popularization of natural history through various displays, exhibits and dioramas. Researchers of PMNH carried out extensive field works from the Coast of Arabian Sea to the Alpine regions, roamed through barren areas for the collection of flora & fauna, rocks, fossils and minerals not only for research work but also for the purpose of education because education is also one of the main objectives of PMNH. For this purpose, PMNH regularly organized trainings, workshops, seminars, symposia and other educational interactive activities related to natural history, environment and Biodiversity of Pakistan. International days also been observed.

PMNH has formed many national and international liaisons with the other research institutes in the country and from abroad. Due to these collective efforts of scientific and technical staff of PMNH and relations with other research institutions, PMNH has 1.5 million natural history specimens in its repositories. Research outcome of these field works, and National and International projects are published in the form research papers in reputed national and international journals. PMNH is not only conducting research on the natural resources of Pakistan which exists in the form of flora & fauna, rocks, fossils and minerals but also educating the students of Pakistan along with the common people with the help of informative, interactive, educative 3-dimensional dioramas and exhibits. Students of schools, colleges and universities from all over the Pakistan visit PMNH as a part of their educational tours. Scientific and Technical staff of PMNH also facilitate the students and researchers from the other universities and institutes by providing help in the research in the form of information, technical assistance, specimens as a loan and guidance in their research work.

1.1 Botanical Sciences Division

1.1.1 Field Works

Botanists from Botanical Sciences Division conducted field visit to Abbal-Moriwal, Tahseel Kot Momin district Sargodha for preservation of world's largest Banyan tree.

1.1.2 Collection of Natural History Specimens

Total: 2079

1.1.3 Cataloguing of Natural History Specimens

Total: 13686

1.1.4 Digitization of Natural History Specimens

Total: 1580

1.1.5 Research Papers

Published

- i. A Hussain, D. Potter, M Q. Hayat, **Sumaira Sahreen**, S A I Bokhari. 2019. Pollen Morphology and its systematic implications on some speies of Artemisis L. from Gilgit Baltistan, Pakistan. Bangladesh Journal of Plant Taxonomy, 26(2):157-168. **(impact factor 0.337)**.
- ii. Khan M.Z., Shabbir M.I., Saqib Z., **Gilani S.A.**, Jomezai N.U., Kiyani M.M., Malik M.A. 2020. Investigation of polyphenol profile, antioxidant activity and hepatoprotective potential of *Aconogonon alpinum* (All.) Schur roots. Open Chemistry 2020; 18: 516–536
- iii. Dilshad I., Khan A.M., Iqbal S., Moattaer K &**Gilani S. A.**2020.Influence of seed priming with PbSO₄ and FeSO₄ on germination and seedling growth of cabbage under NaCl stress. *Pure Appl. Biol.*, 9(1): 1085-1102, March, 2020 <http://dx.doi.org/10.19045/bspab.2020.90114>. Accepted: 09/01/2020
- iv. Khan A.S., Ahmad M., Zafar M., Athar M., Ozdemir F. A., **Gilani S.A.**, Sultana S., Ahmad S., Butt M. A., Majeed S and Khan S. U. **2020**. Morphological characterization of Hypnaceae (Bryopsida, Hypnales): Investigating four genera from Western Himalayas by using LM and SEM techniques. Microscopy Research and Technique. First published: 16 February 2020. <https://doi.org/10.1002/jemt.23458>
- v. Amir S. &**Gilani A.**, **2019**. Floral Diversity of Balkassar, District Chakwal Pakistan. FUUAST Journal of Biology. Vol: 9(2): 185-193.

1.1.6 Ongoing Research Projects.

Submitted for funding

- i. Preliminary proposal submitted to Pakistan Agricultural Research Council Islamabad entitle: Project title: BIOLOGICAL CONTROL OF DESERT LOCUST *SCHISTOCERCA GREGARIA* THROUGH INDIGINOUS ENTOMOPATHOGEN FUNGI, NEMATODES AND PARASITOIDS for funding.

1.1.7 Workshops Organized Trainings

Provided/Organized

- i. Two days training regarding mushroom cultivation and tissue technique was organized for Mr. Shehbaz from Gujranwala Punjab.

Conference attended

- i. Participation in International Conference of Smart Plantation “An Ultimate Solution to Climate Change” (ICSP 2020) on “An Ultimate Solution to Climate Change” at Department of Botany College for Women University, Lahore w.e.f 2nd to 4th March, 2020.

1.1.8 Internships

2 students conducted internship training from COMSATS University

Services rendered to other organizations

Guided the M.Sc., M.Phil. and Ph.D. students from COMSATS, NUST, Fatima Jinnah Women University Rawalpindi and QAU Islamabad.

1.1.9. No. of Students Supervised.

5 students from COMSATS University (under co-supervision).

1.1.10 Others

Display Activities

- i. Completion of the diorama on Invasive plants entitled “Natura vs. Invaders” with collaboration of CABI Pakistan at PMNH display gallery.
- ii. Completion of the diorama entitled “Forests of Pakistan” at PMNH display gallery.

Presentations/Lectures:

- i. Presented a lecture as invited speaker on “response of plant communities to soil characteristics on riverine, estuarine and coastline regions of Pakistan” in seminar “Advances in plant, soil and microbe’s interactions” held at Dept. of Botany, PMAS-UAAR, Rawalpindi.
- ii. Online lecture on Current Locust issue and its management as expert speaker with the students of University of Sialkot Punjab.
- iii. Online Telenor “Khushal Zameendar” local language programme on Cotton Boll diseases its identification and management.
- iv. Online Telenor “Khushal Zameendar” local language programme on Locust management through *Metarhizium* Fungus.

1.2 Earth Sciences Division

1.2.1 Field Work:

Geological field work was carried out in Gilgit Baltistan and its adjoining areas starting from 2nd November to 17 November, 2019. During the field work different areas Bisham, Kohistan, Dasu Chilas, Gilgit, Hunza, Karimabad, Khunjrab Pass, Hooper valley, Yasin valley and Skardu, shungus visited. The Purpose of the field work was to study the geological formations/ Stratigraphy of the above mentioned areas and as well as Biostratigraphy of Yasin Group exposed near Yasin village for collection of foraminiferas fossils for ESD repository. The study resulted in collection of 387 specimens consists of mainly Granodiorites, Diorites, Granites and Agglomerates Garnet and metamorphic rocks are mainly Mica Schist, Biotite Schist, talk, Blue Slate and Augen Gneiss etc. The Shighar & Shangus valleys have plenty of pegmatite intrusions, hosting various types of gemstones such as aquamarine, topaz, tourmaline, and fluorite, which are being excavated locally. The team visited the mines and collected samples of showing gem bearing rocks. Variety of gemstones from different mines of Shangus & Aliabad Karimabad & Aliabad area have also been collected and purchased for the display such as Aquamarine plate, rutile quartz, Mica flower plate, Beryl plate, Fluorite plates, Euxenite plate, Lapis Lazuli, Asphaltum (Salajeet), Garnet, feldspar plate, Amethysts plates, Amazonite plate, Tooth Quartz and Emerald and different colours of large quartz plates specimens.

The geological field work carried out from 16th June, 2020 to 24th June, 2020 in District Nagar, Yasin valley, Gilgit and its adjoining areas. Different igneous and metamorphic, as well as sedimentary rocks were observed and studied. The geological field work was

undertaken in Yasin valley and its adjoining areas to study the distribution of Yasin Group and its associated other geological formations. During field work systematic and integrated sedimentologic, biostratigraphic and petrographic study of Yasin Group has been carried out to deduce the clues of its depositional environment. During fieldwork geological section of 650 meter was measured near Yasin Village but in other areas the thickness exceeds more than 1000 meter. Different lithological and bio facies has been observed in the study area. In addition, rock samples and fossils were collected from each bed of outcrop for detail biostratigraphic and petrographic studies. The lithology of Yasin Group mainly consists of conglomerates consisting of boulders and cobbles of limestone, volcanic and sandstones. Lava flows mostly andesitic along with tuff agglomerate and red shale. Slate quartzite, sandstone with subordinate volcanic limestone with minor serpentinite bodies and thick massive bedded shelly limestone with subordinate tuffs agglomerate quartzite and slate has been observed. At the Garotian Shal, on the track to Chumar Khan Pass, the Yasin Group is well exposed showing a sequence of tuff, agglomerates, quartzite, conglomerates and limestone. At the section west of Yasin village the sequence of Yasin group is characteristically red and green and consist of massive and shaly limestone, slate, trachytic and rhyolitic tuffs, trachytic agglomerates and thin flows of trachyte and olivine basalt. Total 570 specimens of different species of fossils and rock have been collected. In Chotrekhand area showings of copper deposit has also been visited. Copper samples were collected for chemical analysis to determine total % of Cu & Au content. The rocks observed in the areas are low to high Grade metamorphic, including chlorite Schist, Slate and Augen Gneiss and Igneous rocks including Granodiorites, Diorites, Granites, Agglomerates and Sulphide zone. The rock samples have also collected of different geological formations exposed in the Nagar and Gulmit areas. Collected specimens are of igneous but mainly metamorphic due to presence of Main Collision Zone between Eurasian and Indian Plate. The Metamorphic rocks are mainly Garnet Mica Schist, Biotite Schist, Blue Slate, Gneiss and Igneous rocks including Granodiorites, Diorites, Granites,

Agglomerates and Sulphide zone. Mines of Blue Spinal, black mica & corundum gemstones from Aliabad & Ahmadabad have also visited and samples were collected from different mines of Aliabad and Gulmit.

1.2.2 Research Publications:

- i. 1 Monograph Published “Dienerian (Early Triassic) ammonoids from the Northern Indian Margin”, Volume 63 David Ware, Hugo Bucher, Thomas

Brühwiler, Elke Schneebeli-Hermann, Peter A. Hochuli, Leopold Krystyn, Ghazala Roohi, Khalil Ur-Rehman, Amir Yaseen November 2018 Print ISBN:9781119522867, Online ISBN:9781119522812, DOI:10.1002/9781119522812

- ii. Shah, M.M., Rahim, H.U., Hassan, A., Mustafa, M.R., Ahmad, I., (2019). “Facies control on selective dolomitization and its impact on reservoir heterogeneities in the Samana Suk Formation (middle Jurassic), Southern Hazara Basin (NW Himalaya, Pakistan): an outcrop analogue” *Geosciences Journal*, 55:295-314.
DOI: <https://doi.org/10.1007/s12303-019-0026-7>
- iii. Rahim, H.U., Shah, M.M., Corbella, M., Navarro-Ciurana, D., 2020 “Diagenetic evolution and associated dolomitization events in the middle Jurassic Samana Suk Formation, Lesser Himalayan Hill Ranges, NW Pakistan.” *Carbonates and Evaporites* 35(101):1-26.
DOI: <https://doi.org/10.1007/s13146-020-00634>

1.2.3 Display Activities:

i. Gems and Minerals of Pakistan Diorama Completed

As per mandate of PMNH to provide informal education to the common men particularly to the young masses and to create awareness among the people about the natural potential wealth of Pakistan, new diorama “Gems and Minerals of Pakistan” created. In this diorama, precious metals and gemstones like iron, copper, chromite, bauxite, emerald, topaz, ruby, amazonite, quartz, tourmaline and others ores and minerals have been displayed in their raw and crystal form. Through this diorama people may have an idea about the existence of gems and minerals in natural environment and their potential value to our economy.

ii. Display of Koh-I-Noor (Replica) at PMNH

This historical world largest diamond “Koh-I-Noor” is the symbol of loyalty, grace and affection. By keeping in view of his historical entity, PMNH officials acquired replica of Koh-I-Noor. which is now displayed in the newly constructed “Gems and Minerals of Pakistan” Diorama. This unique piece of natural art is the center of attraction for the visitors.

Koh-I-Noor (Replica) displayed in the “Gems and Minerals of Pakistan” Diorama

1.2.4 Laboratory Work:

Cataloguing of 470 vertebrate & invertebrate fossils for the Proper preservation of scientific materials/specimens in ESD reference collection.

Digitization of 280 vertebrate & invertebrate fossils for the Proper preservation of scientific materials/specimens in ESD reference collection.

Study of 40 thin sections for micropaleontological fossils research.

Maintained the fossils record and curated the paleontology laboratory, ESD.

1.2.5 Education Programme:

- i. Supervision of 02 Ph.D. scholars of Pakistan Institute of Engineering & Applied Sciences (PIEAS), Islamabad.
- ii. Thin sections prepared to study the microfossils and Petrographic studies for university students.
- iii. Internship and Supervision of 16 BS Geology students from University of Haripur, Haripur.
- iv. Internship of four students from Quaid-i-Azam University, Islamabad on Stratigraphy and Paleontology.
- v. One-month supervision and training to students from Bahria University Islamabad on depositional environment and sedimentary petrography.

1.3 Zoological Sciences Division

1.3.1 Field works

- i. Dr. Muhammad Abbas Associate Curator ZSD and Mr. Khurram Hussain Skeleton Preparator ZSD proceeded for 26 days' fieldwork to Chitral and Gilgit Baltistan areas for the collection of Insect fauna from 25th June to 20th July 2019
- ii. Mr. Rafaqat Masroor Associate Curator ZSD along with Mr. Riaz Ahmed Senior Skeleton Preparator ZSD proceeded for 15 days' fieldwork to Muzzaferabad and Neelum Valley from 22nd July to 05th August 2019. This field work resulted in collection of 35 lizard specimens.
- iii. Mr. Rafaqat Masroor Associate Curator ZSD proceeded to Peshawar, Torkham, Kohat, Kalabagh, Chumbisurla, Thal and Salt Range for collection of Amphibians and Reptiles from 15th-30th September 2019 along with Dr. Daniel Jablonski, Researcher from Comenius University, Bratisava, Czech Republic.
- iv. Dr. Shabir Ali Amir, Dr. Muhammad Abbas and Rafaqat Masroor conducted sixteen days' fieldwork for the collection of Invertebrates/insects, fishes, amphibians and reptiles from Balochistan/Sindh and its adjoining areas

including Chiltan Hazaganji National Park, Nushki Conservancy, Ziarat, Harnai, Mastung w.e.f. 15th to 30th November 2019.

- v. A team of ZSD headed by Muhammad Asif Khan, Associate Curator ZSD visited Bahawalpur on 09th-14th March 2020 for excavation of Rhinoceros skeleton from Lal-Sohanra National Park, Bahawalpur. This skeleton was buried in February 2019 after death of valuable specimen.

1.3.2 Laboratory Work

- i. Collection of Natural History specimens: 1979
- ii. Cataloguing of Natural History specimens: 1500
- iii. Digitization of Natural History specimens: Nil
- iv. Stuffed 04 animals
- v. Study skins prepared 45 animals
- vi. Head Skeletons prepared 29 animals
- vii. Refilled and leveled ethanol in 10,000 glass jars of fish, amphibians, reptiles and invertebrates wet collection
- viii. Rearranged and replaced naphthalene bolls in 116 insect drawers
- ix. Received 26 dead animal specimens from CDA Maragzar Zoo Islamabad. All specimens are in process of preservation at Taxidermy laboratory.
- x. Received 03 dead animal specimens from Loi Bher Wildlife Park, Rawalpindi. All specimens are in process of preservation at Taxidermy laboratory
- xi. Received 01 Puma from Bahawalpur Zoo, 01 Common Leopard from AJK Wildlife, 1 Common Loopard from KPK Wildlife, 13 snakes from National Institute of Health, Islamabad.
- xii. Collected one stuffed Black Bear specimen from Bioresource Research Centre on 08th July 2020.
- xiii. Identified, rearranged and catalogued 1979 zoological specimens (insects, amphibian, reptiles, fishes and mammals)
- xiv. Collected 94 tissue samples for molecular studies, 24 marine fishes (Bombay duck & Blind goby), 35 lizards, 01 snake (Indian Krait) during fieldwork
- xv. Carried out debugging trail of two insect drawers, two Pelicans and one stuffed Himalayan Ibex in Reefer Chamber at -30C from 15th to 23rd July 2019
- xvi. Submitted in the 303 DNA sequences of coastal fishes of Pakistan in Gene Bank and BOLD

- xvii. Prepared 149 distributional maps of different Carabid species from northern Pakistan
- xviii. Prepared 926 digital photographs of 149 Carabid species from northern Pakistan
- xix. Freeze debugging of 12 insect drawers and 90 study skins in Reefer Chamber facility for 14 days (two batches each for seven days)
- xx. Prepared 149 Carabid species photographic plates (collaged in Photoshop software)
- xxi. Identified 27 mammalian skins through hair analysis technique at Carnivore Conservation Laboratory, Quaid-e-Azam University, Islamabad. These skins were confiscated by Zoo & Wildlife Management Islamabad as illegal wildlife trafficking.

1.3.3 Research Papers

International Research Papers (7 papers)

- i. Jablonski, D., Regan, J.M., Holzheuser, C., Farooqi, J., Basit, A. and Masroor, R. 2019. Additional data to the herpetofauna of Afghanistan. *Herpetozoa*, 32: 177-193.
- ii. Christophe Dufresnes, Glib Mazepa, Daniel Jablonski, Ricardo Caliani Oliveira, Tom Wenseleers, Dmytro A. Shabanov, Markus Auer, Raffael Ernst, Claudia Koch, Héctor E. Ramírez-Chaves, Kevin Patrick Mulder, Evgeniy Simonov, Arthur Tiutenko, Dmytro Kryvokhyzha, Paul L. Wennekes, Oleksandr I. Zinenko, Oleksiy V. Korshunov, Awadh M.
- iii. Al-Johany, Evgeniy A. Peregontsev, Rafaqat Masroor, Caroline Betto-Colliard, Mathieu Denoël, Leo J. Borkiny Dmitriy V. Skorinov, Roza A. Pasyukova, Lyudmila F. Mazanaeva, Juriy M. Rosanov, Sylvain Dubey and Spartak Litvinchuk. 2019. Fifteen shades of green: The evolution of Bufotes toads revisited. *Molecular Phylogenetics and Evolution*, Volume 141, December 2019, 106615
- iv. Jablonski, Daniel & Basit, Abdul & Masroor, Rafaqat. (2020). *Afghanodon mustersi* (Afghanistan Stream Salamander). *Predation*. 51. 287.
- v. Jablonski, Daniel & Masroor, Rafaqat. (2020). *Dendrelaphis tristis* (Common Bronzeback Tree Snake). *Herpetological Review*. 51. 273-274.
- vi. Vamberger, Melita & Spitzweg, Cécilia & Silva, Anslem & Masroor, Rafaqat & Praschag, Peter & Fritz, Uwe. (2020). Already too late? Massive trade in Indian star tortoises (*Geochelone elegans*) might have wiped out its phylogeographic differentiation. *Amphibia-Reptilia*. 41. 133-138. 10.1163/15685381-20191215. Masroor, Rafaqat & Khisroon, Muhammad & Khan, Muazzam & Jablonski, Daniel. (2020). A new species of *Eremias* (Squamata: Lacertidae) from the arid mountains of Pakistan. *Zootaxa*. 4786. 101-121. 10.11646/zootaxa.4786.1.8.
- vii. Masroor, Rafaqat & Khisroon, Muhammad & Khan, Muazzam & Jablonski, Daniel. (2020). A new species of *Microgecko Nikolsky*, 1907 (Squamata:

- Gekkonidae) from Pakistan. Zootaxa. 4780. 147-164. 10.11646/zootaxa.4780.1.7.
- viii. Masroor, Razaqat & Khisroon, Muhammad & Jablonski, Daniel. (2020). A case study on illegal reptile poaching from Balochistan, Pakistan. Herpetozoa. 33. 67-75. 10.3897/herpetozoa.33. e51690.

National Research Papers

Nil

1.3.4 Technical Reports/Books (2)

- i. Prepared Amphibians and Reptile Field Guide for Eco-tourist Guides of PSLEP Project area for promotion of Ecotourism in selected Valleys of Gilgit Baltistan
- ii. Prepared Butterfly Field Guide for Eco-tourist Guides of PSLEP Project area for promotion of Ecotourism in selected Valleys of Gilgit Baltistan.

1.3.5 Ongoing Research Projects

International Projects

- i. A bilateral research project proposal selected for funding under PSF-NSFC programme. The project title was “Cooperative development of an innovative auto-ID platform for the beetles from China and Pakistan”. Under this project 6900 beetle images prepared.
- ii. Joint Research proposal under PSF-NSFC 3rd call “Cooperative development of an innovative auto-ID platform for the beetles from China and Pakistan”. A PMNH delegation comprised of Dr. Muhammad Abbas Associate Curator ZSD and Dr. Razaqat Masroor Associate Curator ZSD and Khurram Hussain, Skeleton Preparator ZSD visited China during December 2019. Various future strategies were discussed with the Chinese counterparts at Beijing 15-27th December 2019

Programme Initiated and Completed

- i. Completion of New Diorama “World of Animals” in display area of PMNH
A new state of the art Diorama was added to PMNH gallery “World of Animals”. It was joint project of ZSD (Dr. Khalid Mahmood Director, Mr. Muhammad Asif Khan Associate Curator, Mr. Razaqat Masroor Associate Curator and Mr. Mishkat Ullah Associate Curator, Mr. Mukhtiar Khan APS to Director)) and PSD (Mr. Rahat Saeed Operational Manager, Mr. Nusrat Hussain Zaidi Exhibit Designer, Muhammad Ashfaq Senior Modeler, Mr. Abdul Rasool Calligrapher).

The diorama has been designed in monotone (white) with 19 animals arranged on floor and walls of the display. The project was initiated in November 2018 and inaugurated by Federal Minister for Science and Technology on 26th July 2019.

- ii. Completion of the stuffing of very rare “Indian Rhinoceros” in display area of PMNH Indian Rhinoceros specimen stuffed and displayed at PMNH Dino Gallery, this task was completed by the end of May 2020.
- iii. Progress on stuffing of Indian Elephant specimen

Indian Elephant stuffing is in progress; iron & fiber glass structure has been completed while fixing of skin is in progress.

1.3.6 Workshops organized

Jointly organized training workshop on “Design, survey and analysis of Wildlife Populations” by Pakistan Museum of Natural History (PMNH, Snow Leopard Foundation (SLF), Ministry of Climate Change (UNDP-Pakistan from 1-12 July 2019 at National Information Technology Board Islamabad.

1.3.7 Trainings

Provided/organized

- i. Delivered lecture on “Why we study Insects” at Biological Science Department, COMSAT University, Islamabad on 3rd December 2019.
- ii. Delivered a lecture on “Insect and their ecology” at ZSD insect repository to the students of Department of Entomology, PMAS Arid Agriculture University, Rawalpindi on 28th January 2020.

1.3.8 Internships

- i. Guided 5 students of Department of Biological Sciences, NUST, Islamabad regarding entomological and mammalian collection, stretching, labeling and preservation on 22nd to 23rd July 2019.
- ii. Delivered lecture on mammalian taxonomy and taxidermy to students from NUST, Islamabad.
- iii. Supervising an “A level” student Mr. Muhammad Zaryab regarding insects (butterflies) identification, collection and preservation from 20th September 2019 to 7th November 2019.

1.3.9 Services Rendered to Other Organizations

- i. Facilitated Dr. Sameera Arshad, Qaud-i-Azam University, Islamabad regarding her research work on “Identification of Birds through Feathers” (Dr. Sameera is volunteering as visiting researcher on PMNH’s Birds repository collection).
- ii. Checked and sent report of M. Phil thesis entitled “Distribution, systematic and illegal harvest of freshwater turtle in District Mardan, Khyber Pakhtunkhwa. For the University of Haripur, Khyber Pakhtunkhwa, Pakistan.
- iii. Supervised 2 Ph.D. student of PMAS Arid Agriculture University Rawalpindi
- iv. Identified 27 mammalian skins by hair analysis at Quaid-e-Azam University. These skins were confiscated by Zoo & Wildlife Management Islamabad as illegal wildlife trafficking.

1.3.10 No. of Students Supervised:

05 (2 PhD and 03 M. Phil)

1.3.11 Others

Workshops/trainings/seminars attended

- i. All ZSD officers attended training workshop on “Design, survey and analysis of Wildlife Populations” jointly organized by PMNH, Snow Leopard Foundation, Ministry of Climate Change, UNDP-Pakistan from 1st to 12th July 2019 at National Information Technology Board Islamabad.
- ii. Attended one-day symposium on “The role of Science in Wildlife Management” organized by Department of Animal Sciences, Quaid-e-Azam University on 08th July 2019 at Geosciences Auditorium Islamabad.

National/international collaboration/ liaison

- i. Submitted project proposal entitled “Flatfish systematics and ecology in the Northern Arabian Sea: Impact of over-exploitation on marine environment” under 2020 Smithsonian Institution Fellowship Program
- ii. Processed 13 Neuropteran specimens loan request of Mr. Muhammad Asghar Hassan, Ph. D Scholar, Department of Entomology, China Agriculture University, Beijing-China on 19th September 2019.
- iii. Facilitating Dr. Sameera from Quaid-e-Azam University, working on taxonomy of avian wings.
- iv. Meeting with Joint. Secretary Ministry of Climate Change regarding Sustainable Forest Management Project publications.
- v. Briefed and Facilitated media persons from APP news Channel.
- vi. Facilitate the visit of Chinese delegation (Beijing Association of Science and Technology) visit to PMNH.
- vii. A meeting held with Air Commodore PAF flight safety for developing collaborative research work concerning PMNH and Pakistan Air Force to

address airstrike hazards in aviation on 27th December 2019 at Committee Room, PMNH.

- viii. Develop collaboration with Forest, Wildlife & Fisheries Department, Punjab to acquire Rhinoceros skeleton buried at Lal-Sohanra National Park, Bahawalpur.
- ix. Organized one-day Wildlife Exhibition at University of Haripur for celebration of World Wildlife Day on 4th March 2020. Exhibition was visited by more than 1500 students.

IV. PSF PHOTO GALLERY

Glimpse of Science Caravan Exhibition



Glimpse of World Science Day November 11, 2019



Glimpse of Popular Science Lecture



Glimpse of Asian Science Camp 2019 China



Glimpse of IJSO 2019 Qatar



Students Building Robots in IBSE Workshop Arranged by SKOOL 21




Students at Department of Mechatronics Engineering, NUST Students at NCP, QAU, Islamabad




Student Presenting his Research Project in Summer Camp 2020 at PC Rawalpindi

Research Projects of a 3rd Batch Student






Bio diesel Production from Algae
Taoseef Zafar¹ and Habib-ur-Rehman Athar²
 Government Post Graduate College Muzaffargarh
 Institute of Pure and Applied Biology, Bahauddin Zakariya University Multan 60800, Pakistan



Introduction

Shortage of fuel resources is great concern for all of us in these days biofuel from algae can be easily cultivated and biofuel can also be easily extracted from algae. About 50% of their weight is oil so they can be better replacement for oil- based fuels.




Cultivation of algae
 Algae are aquatic photosynthetic non-flowering plants that can be cultivated easily on the place where excess water is the place where excess water is easily available. Their growth rate is very fast due to which they can be cultivated easily .It is being carried out either in open ponds or either in enclosed photobioreactors.

Extraction of Biodiesel from algae

Most of Biodiesel is extracted from microalgae. Dilution, micro emulsification, pyrolysis and transesterification are four

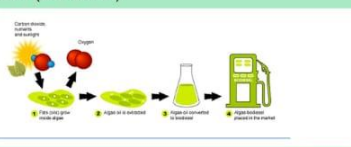
techniques are help fuel for the production of viscous oil.



BIOFUEL PRODUCTION FROM ALGAE

Transesterification and catalytic Catalytic cracking has usually been adopted to convert fat in the cell of microalgae into gasoline and diesel

Triglycerides +3methanol Glycerine+3methyl ester (Bio diesel)



Advantages Disadvantages of Biodiesel

Biodiesel is a clean source of energy. It is auseful source of production of green energy.

However disadvantages include.

- High feedstock cost
- Inferior storage and oxidative stability.
- Lower volumetric energy content and in
- some causes higher NOX exhaust.

Future Prospects

In future biodiesel from algae may serve as major source of energy. Present researches on it.


Conclusion

Algae is a well-known organism that its characteristic is prominent for biofuel production and wastewater remediation. The process optimization and combinations with other chemical and biological processes have generated efficiency, in which bio-oil yield is up to 41.1%. Through life cycle assessment, algae bio-energy achieves high energy return than fossil fuel. Thus, the algae-based technologies can reasonably be considered as green approaches.

Acknowledgement:

The first author acknowledged the funding this project from Pakistan Science Foundation (PSF), Islamabad under Science Talent farming Scheme (STFS) Batch III.

Research Projects of a 3rd Batch students




Genetic Engineering and its Role in Agriculture

Amnah Bashir¹ and Habib-ur-Rehman Athar²

¹PSF roll #5001283 Govt. Degree College for women, Layyah

²Institute of Pure and Applied Biology, Bahauddin Zakariya University Multan, Pakistan



Introduction

Over the years, genetic engineering has become more common in agriculture. Globally, there are over 25 countries that grow genetically engineered crops on approximately 420 million acres of land, and those numbers are increasing every year. In the United States, about 80% of corn and cotton and 93% of soybeans that are produced are genetically modified. There is a wide variety of types of genetic engineering used in agriculture. One of the most common types of genetic engineering is to insert the genes for bacteria into the crop.

Benefits & Risks

Engineering crop resistances to insect and plant pathogen pests offers opportunities to reduce the use of insecticides and fungicides in crop production. Care must be exercised to avoid breeding toxic chemicals such as alkaloids into the crop or reducing the nutrient makeup. Genetic engineering to create herbicide-resistant crops has the advantage of expanding the array of herbicide types for weed control. Also, there is a danger that increasing the number of herbicide-resistant crops will encourage wider herbicide use and will contribute to environmental problems.

Methods

1. Gel Electrophoresis

Gel electrophoresis is a technique used to separate charged molecules on the basis of size and charge.

3. Cloning

In general, cloning means the creation of a perfect replica. The word is used to describe the creation of a genetically identical copy.

Future Prospectus

In addition to pesticide and herbicide resistant crops, agricultural crops will also be modified to resist diseases and produce higher protein concentrations, minerals and delayed fruit ripening.

Conclusion

It can be concluded that sustainable integration of conventional agricultural practices with modern biotechnology can enable the achievement of food security for present and future generations.

Acknowledgement

The first author acknowledged the funding of this project from Pakistan Science Foundation, Islamabad under Science Talent Farming Scheme Batch III.

STFS 3rd Batch Toppers



Foreign Delegates from Beijing Association of Science and Technology (BAST), Beijing Academy of Science and Technology (BJAST) and Chinese Association of Science and Technology (CAST) with Officers of PSF during their visit



V. PASTIC PHOTO GALLERY AND NEWS CLIPPINGS



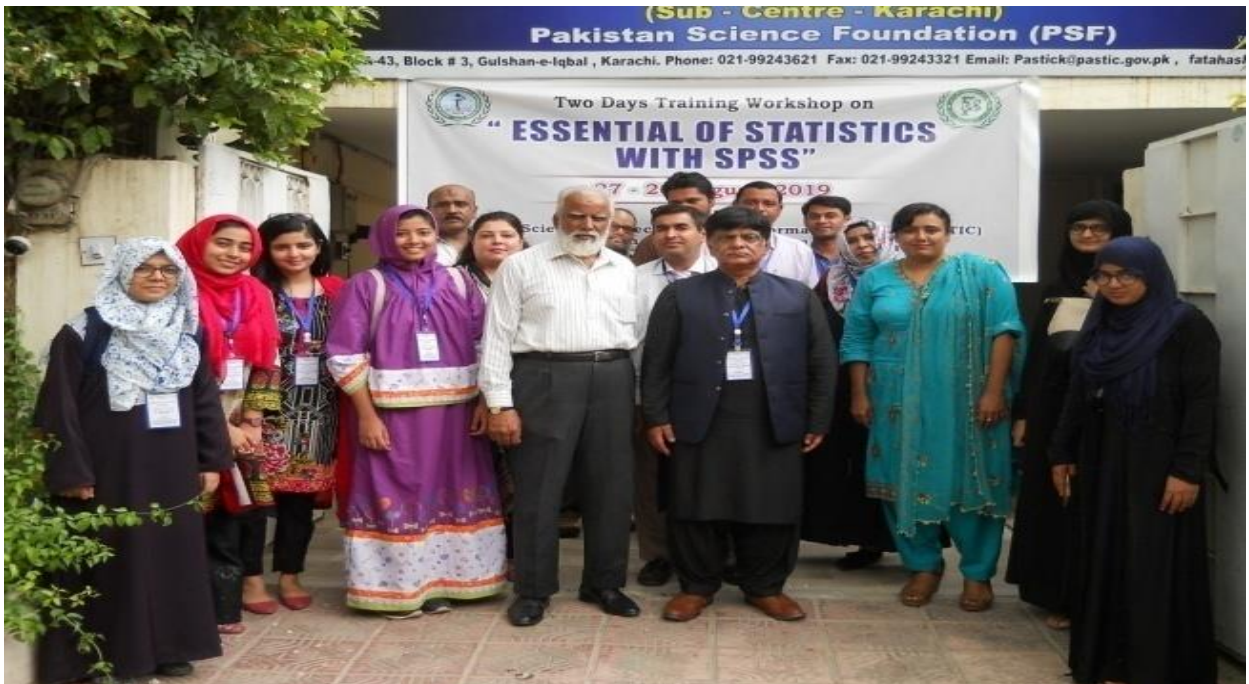
Director General, Institute of Scientific and Technical Information of China (ISTIC), Prof. Dr. Zhao Zhiyun, receiving souvenirs from Director General PASTIC, Prof. Dr. Muhammad Akram Shaikh on July 2, 2019 at PASTIC National Centre Islamabad.



Group photo of Chinese Delegation from Institute of Scientific and Technical Information of China (ISTIC) led by Prof. Dr. Zhao Zhiyun, with PASTIC officials on July 2, 2019 at PASTIC National Centre Islamabad.



Mr. Muhammad Hasnain, Deputy Director, PASTIC Faisalabad, participating in Tree Plantation at SC Faisalabad on August 27, 2019



A Group Photo of the Participants during the Training Workshop on "Essentials of Statistics with SPSS" on August 27-28 2019, at PASTIC Sub-Centre Karachi



Mr. Shafqat Mahmood, Minister for Federal Education, Professional Training and Heritage, and DG PASTIC Prof. Dr. Muhammad Akram Shaikh, during the conference on Media and Information Literacy (MIL) for prevention of Violent Extremism, on September 17th -18th, 2019.



Prof. Dr. Muhammad Akram Shaikh, DG PASTIC, the chair of the National Committee, UNESCO Information for ALL Programme (IFAP), presenting an overview of the IFAP and PASTIC on September 17, 2019.



Mr. Aman Ullah Yaseenzai, Governor of Balochistan, Chief Guest, at opening ceremony, along with Prof. Dr. Javeid Iqbal, Vice Chancellor, University of Balochistan, and Mr. Abdul Khaliq Sial, In-Charge, PASTIC Sub Centre Quetta, on September 24th, 2019.



Prof. Dr. Muhammad Akram Shaikh, DG PASTIC, delivering his speech at the Inauguration Ceremony of the workshop on “Tools for Media Information Literacy (MIL)” on October 22nd -23rd, 2019 at PASTIC National Center, Islamabad.



UNESCO's Representative in Pakistan, Vibeke Jensen, delivering her speech at the Inauguration Ceremony of the workshop on "Tools for Media Information Literacy (MIL)" on October 22nd -23rd, 2019 at PASTIC National Center, Islamabad.

第四届“一带一路”中巴科技与经济合作学术论坛
 The 4th Academic Forum on China-Pakistan Scientific Technology and Economic Cooperation under the "Belt and Road" Initiative

北京工商大学 Beijing Technology and Business University November 9, 2019 2019.11.9



Group photo of participants of "4th Academic Forum China-Pakistan Scientific and Technology and Economic Cooperation (under the belt and road initiative)" on November 9th, 2019, at Beijing, China.



Prof. Dr. Muhammad Akram Shaikh (Director General PASTIC) presenting souvenir to Mr. Guo Guangsheng, President/ Professor, Beijing Academy of Science and Technology (BJAST)



Group photo of Chinese delegation from Beijing Academy of Science and Technology (BJAST), People's Republic of China visiting PASTIC in November 2019



Dr. Raja Razi-ul-Hasnain, Secretary Pakistan Science Foundation, inaugurating the celebration of World Science Day for Peace & Development, at Science Centre Faisalabad in November 2019



Project Coordinator, Dr. Saima Tanveer (SAARC WE PORTAL) addressing participants about PORTAL and training workshop at Karachi in December 2019



Project Coordinator, Dr. Saima Tanveer, with honorable guests at the SAARC women portal awareness workshop at Islamabad in December 2019



Ms. Ulfa tJahan Moon, Director, BWCCI presenting bouquet to Mr. Saifullah Azim, Project Coordinator, and Mr. Nabi Bux, Resource Person from PASTIC National Centre Islamabad in December 2019



Distribution of certificates by Vice Chancellor UAF, Prof. Dr. Muhammad Ashraf (HI, SI), January 2020



Deputy Director, PASTIC Sub Centre Karachi, delivering presentation during the training workshop on "Applying Quantitative Research Techniques using SPSS" in January 2020.



Syed Habib Akhter Jaffri, Principle Librarian, PASTIC and Mr. Ali Raza Khan, Deputy Director (STI), PSC Lahore, visited Government College University, Lahore for introduction of Consortium of S&T and R&D libraries of Pakistan to librarians in January 2020



Mr. Syed Habib Akhter Jafri, Principal Librarian, addressing the participants during "Seminar on Consortium of S&T and R&D Libraries of Pakistan (CSTRDLP)" held on February 17, 2020 at Mehran University of Engineering & Technology, Jamshoro



PASTIC Sub-Centre Peshawar collaborated and facilitated a two-day KP Creative Fest 2020, on February 26-27, 2020 organized by Directorate of Science & Technology KPK. Mr. Fawad Chaudary (Federal Minister for S&T), addressing the audience at KP Creative Fest 2020



Prof. Dr. Muhammad Akram Shaikh, DG PASTIC, presenting Souvenir to Mr. Jigme Thinley, Project Coordinator from Bhutan, during a two days consultative meeting of project coordinators under the project “Networking and Capacity Building of Women Entrepreneurs (SMEs) from SAARC Countries” in March 2020



Dr. Saima Tanveer, Project Director, delivering welcome address during the two-days consultative meeting of Project coordinators under the project “Networking and Capacity Building of Women Entrepreneurs (SMEs) from SAARC Countries” in March 2020



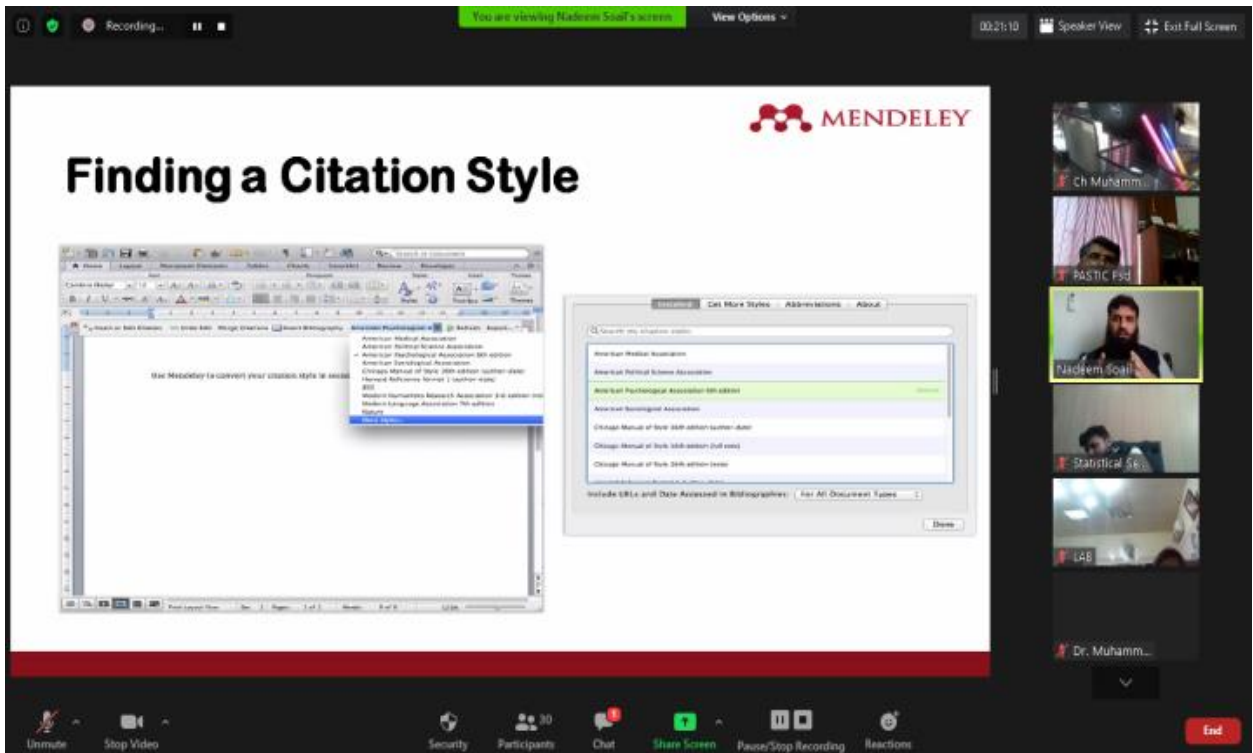
Mr. Saifullah Azim, Principal System Analyst, with Mr. Tahir Masoud, System Analyst and Mr. Nabi Bakhsh, Assistant Web Manager at Post Covid-19 showcase to demonstrate entrepreneurial capabilities to combat and overcome covid-19 in April 2020



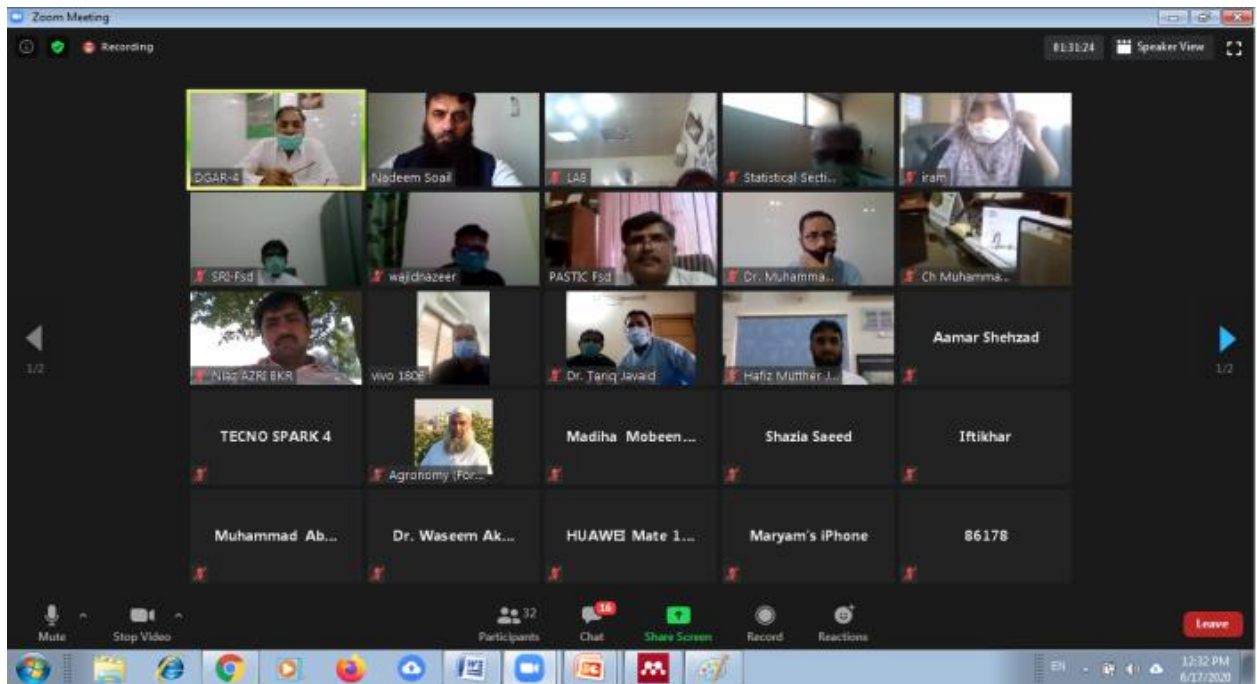
A Glimpse of PASTIC, PSF, BTBU, CAST-China Work Meeting at PASTIC National Centre Islamabad in June 2020



PASTIC, PSF, BTBU, CAST-China Work Meeting at PASTIC National Centre Islamabad in June 2020



A Glimpse of Online Seminar/Workshop titled “Management by using Mendeley- Reference Management Software”, held at PASTIC National Centre Islamabad in June 2020



A Glimpse of Online Seminar/Workshop titled “Management by using Mendeley- Reference Management Software”, held at PASTIC National Centre Islamabad in June 2020



Mr. Muhammad Hasnain, Deputy Director, SC Faisalabad addressing the participants of the SAARC Women Entrepreneurs PORTAL Awareness Workshop in December 2019 at Lahore



Prof. Dr. Muhammad Akram Shaikh, DG PASTIC and Punjab Excise and Taxation Minister, Hafiz Mumtaz Ahmad, visiting stalls at PASTIC-UAF STEM & IT EXPO in January 2020



A view of a display stall at PASTIC-UAF STEM & IT EXPO in January 2020



Display stall of Govt. MC Model School at PASTIC-UAF STEM & IT EXPO in January 2020



Prof. Dr. Muhammad Akram Shaikh, DG PASTIC and Punjab Excise and Taxation Minister, Hafiz Mumtaz Ahmad, visiting stalls at PASTIC-UAF STEM & IT EXPO in January 2020



Prof. Dr. Muhammad Ashraf, UAF Vice Chancellor, presenting souvenir to Mr. Ghaffar Ahmed, Assistant Director Accounts, PASTIC National Centre Islamabad, during PASTIC-UAF STEM & IT EXPO in January 2020

NEWS CLIPPING

روزنامہ ایکسپریس فیصل آباد، جمعرات، 30 جنوری، 2020ء

DAILY EXPRESS

روزنامہ ایکسپریس فیصل آباد

پاکستان کے 11 خبرسروں سے یک وقت مشالغ ہونے والا واحد اخبار



فیصل آباد: صوبائی وزیر حافظ ممتاز احمد، وائی بی زرعی یونیورسٹی ڈائریکٹر محمد اشرف صدر مجید سکندر اعظم، محمد اکرم شیخ نمائش کا افتتاح کر رہے ہیں

زرعی یونیورسٹی کے زیر اہتمام ایکسپو سنٹر میں آئیڈیا نمائش

صوبائی وزیر حافظ ممتاز احمد، وائی بی زرعی یونیورسٹی ڈائریکٹر محمد اشرف اور دیگر نے افتتاح کیا

فیصل آباد (جنگ رپورٹر) زرعی یونیورسٹی فیصل آباد میں کانچ و یونیورسٹی طلبہ کے مابین سائنس و ٹیکنالوجی، ایگریکلچر، مینیجمنٹ اور انٹرنیشنل ٹیچنالیٹی میں نئے آئیڈیاز پر مبنی نمائش ایکسپو سنٹر میں منعقد کی گئی۔ نمائش پاکستان سائنس و ٹیکنالوجی انڈسٹری انڈسٹری کے آئیڈیاز پر مبنی نمائش کے تحت منعقد ہوئی۔ وائی بی زرعی یونیورسٹی کے آئیڈیاز پر مبنی نمائش کے تحت منعقد ہوئی۔ وائی بی زرعی یونیورسٹی کے آئیڈیاز پر مبنی نمائش کے تحت منعقد ہوئی۔ وائی بی زرعی یونیورسٹی کے آئیڈیاز پر مبنی نمائش کے تحت منعقد ہوئی۔

روزنامہ ایکسپریس فیصل آباد، جمعرات، 30 جنوری، 2020ء

روزنامہ ایکسپریس فیصل آباد



صوبائی وزیر ایکسپو سنٹر میں سائنس و ٹیکنالوجی نمائش کا افتتاح کرتے ہوئے

ایکسپو سنٹر میں نمائش، 50 تقابلی اداروں کے طلبہ کی شرکت

حکومت تعلیم اہلکار نے صوبائی وزیر ایکسپو سنٹر حافظ ممتاز احمد

وائی بی زرعی یونیورسٹی ڈائریکٹر محمد اشرف صدر مجید سکندر اعظم، محمد اکرم شیخ نمائش کا خطاب

فیصل آباد (جنگ رپورٹر) زرعی یونیورسٹی فیصل آباد میں کانچ و یونیورسٹی طلبہ کے مابین سائنس و ٹیکنالوجی، ایگریکلچر، مینیجمنٹ اور انٹرنیشنل ٹیچنالیٹی میں نئے آئیڈیاز پر مبنی نمائش ایکسپو سنٹر میں منعقد کی گئی۔ نمائش پاکستان سائنس و ٹیکنالوجی انڈسٹری انڈسٹری کے آئیڈیاز پر مبنی نمائش کے تحت منعقد ہوئی۔ وائی بی زرعی یونیورسٹی کے آئیڈیاز پر مبنی نمائش کے تحت منعقد ہوئی۔ وائی بی زرعی یونیورسٹی کے آئیڈیاز پر مبنی نمائش کے تحت منعقد ہوئی۔

VI. PMNH PHOTO GALLERY



Fig. No. 1: Inauguration of the newly established diorama on Invasive Plants with collaboration of CABI and PMNH in February 2020



Fig. No. 02: A panoramic view of newly established diorama on Invasive Plants



Gemstones Mines at Shungus Sulfide Mineralization in Ghizer Valley



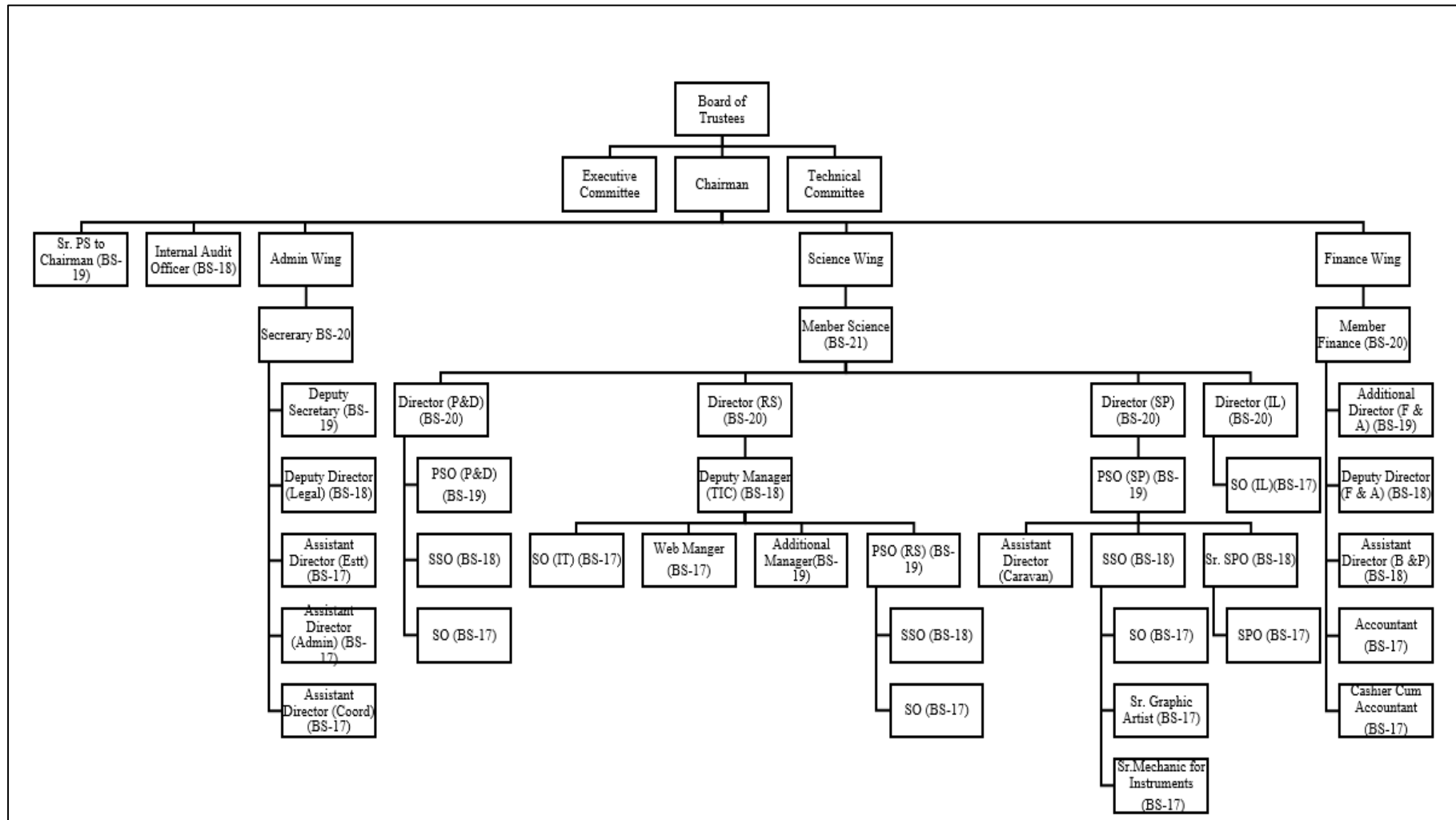
A newly established Diorama of Gems& Minerals of Pakistan



Koh-I-Noor (Replica) displayed in the “Gems and Minerals of Pakistan” Diorama

VII. ORGANIZATION AND ADMINISTRATION

Organizational Chart of Pakistan Science Foundation (PSF)

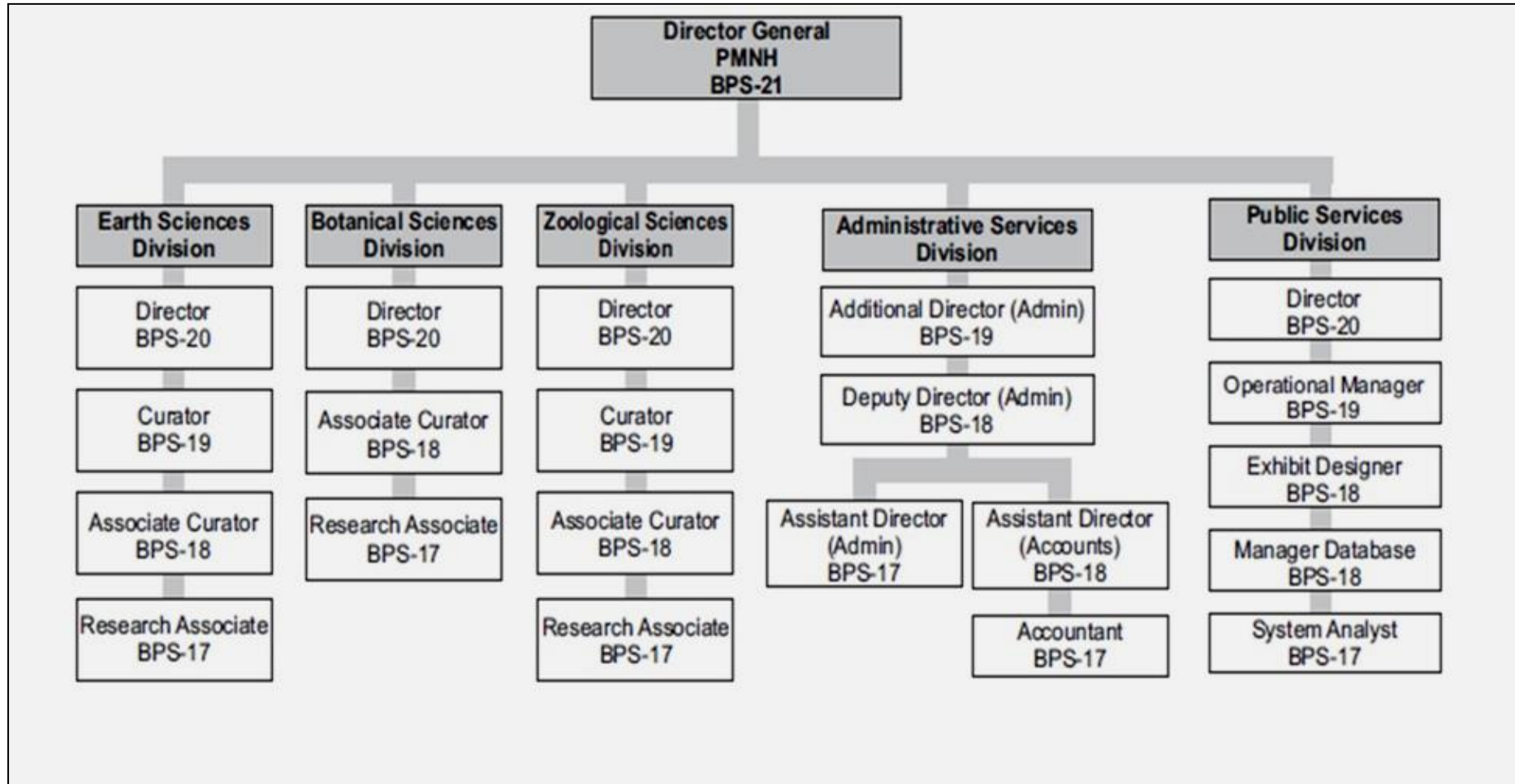


**PAKISTAN SCIENCE FOUNDATION
ISLAMABAD**

GRADE WISE ACTUAL SANCTIONED STRENGTH

Sr. No	Name of Post	BPS	Total
1	Chairman	22	1
2	Member Science	21	1
3	Member Finance	20	1
4	Secretary	20	1
5	Director (P&D)	20	1
6	Director (SP)	20	1
7	Director (RS)	20	1
8	Director (IL)	20	1
9	Additional Director (F&A)	19	1
10	Principal Scientific Officer	19	3
11	Deputy Secretary	19	1
12	Additional Manager	19	1
12	Sr. Science Promotion Officer	18	1
13	Sr. Scientific Officer	18	3
14	Deputy Manager (TIC)	18	1
16	Dy. Director (F&A)	18	1
17	Dy. Director (Legal)	18	1
18	Internal Audit Officer	18	1
19	Asstt. Director (B&P)	18	1
20	Scientific Officer	17	9
21	Scientific Officer (IT)	17	1
22	Web Manager	17	1
23	Asstt. Director (Coord	17	1
24	Asstt. Director (Estt)	17	1
25	Asstt. Director (Admn)	17	1
26	Asstt. Director (Caravan)	17	6
27	Accountant	17	2
28	Science Promotion Officer	17	1
29	Sr. Mechanic for Instruments	17	1
30	Sr. Graphic Artist	17	1
31	Cashier-cum-Accountant	17	1
32	PS to Chairman	17	1
	Sub Total (BS-17 to BS-22)	-	50

Organizational Chart of Pakistan Museum of Natural History (PMNH)



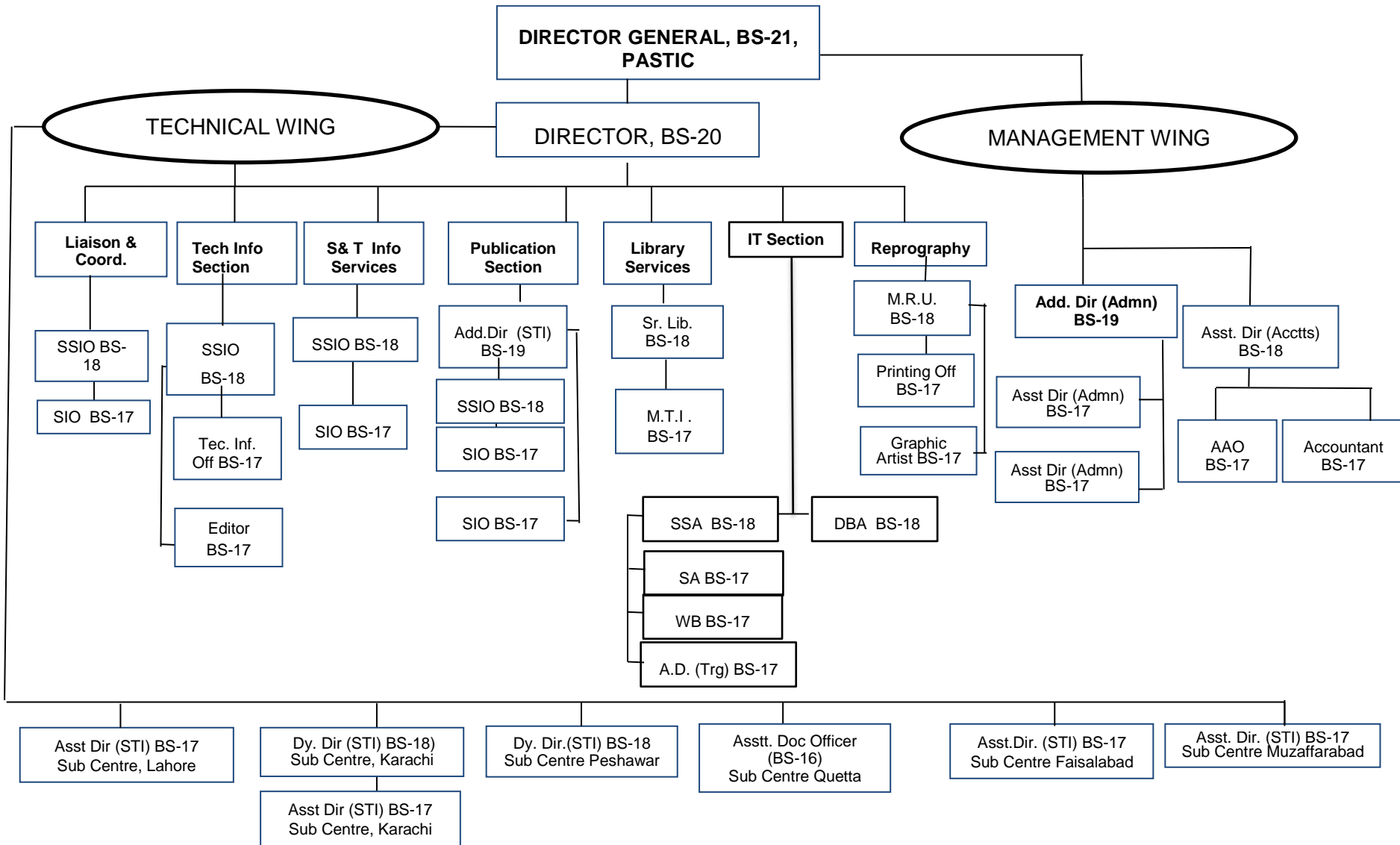
**PAKISTAN MUSEUM OF NATURAL HISTORY
ISLAMABAD**

GRADE WISE ACTUAL SANCTIONED STRENGTH

Sr. No.	BPS	Designation	Number of Posts		
			No. of Posts	Filled	Vacant
1.	21	Director General	1	-	1
2.	20	Director	4	1	3
3.	19	Curator	2	1	1
4.	19	Operational Manager	1	1	-
5.	19	Additional Director (Admin	1	-	1
6.	18	Associate Curator	10	6	4
7.	18	Exhibit Designer	1	1	-
8.	18	Deputy Director (Admin)	1	1	-
9.	18	Assistant Director (Accounts)	1	-	1
10.	18	Manager Data Base	1	1	-
11.	17	Assistant Director (Admin)	1	1	-
12.	17	Accountant	2	1	1
13.	17	Research Associate	18	10	8
14.	17	System Analyst	1	1	
		Sub Total	45	25	20
15.	16	Assistant Librarian	1	-	1
16.	16	PA to D.G	1	1	-
17.	16	Sr. Modeler	1	1	-
18.	16	Superintendent	1	1	-
19.	16	Assistant Research Associate	2	-	2
20.	16	Casting Staff	1	-	1
21.	16	Teacher Guide	1	1	-
22.	16	Associate Artist	2	2	0
23.	16	Taxidermist	2	-	2
24.	16	Fossil Technician	1	-	1
25.	16	Assistant Private Secretary	3	3	-
26.	16	Accounts Assistant	1	1	-
27.	16	Computer Operator	1	1	-
		Total Officer	18	11	7
28.	15	Children Education Programmer	1	-	1
29.	15	Office Assistant	1	1	-

30.	15	Purchase Assistant	1	1	
31.	15	Data Control Assistant	1	1	-
32.	14	Sr. Skeleton Preparator	1	-	1
33.	14	Sr. Drying & Fumigating Assistant	1	-	1
34.	14	Repository Assistant	2	1	1
35.	14	Sr. Collection Incharge	2	2	-
36.	14	Photographer	1	1	-
37.	14	Store Keeper	1	1	-
38.	12	Calligrapher	1	1	-
39.	12	Sr. Incharge Embalming	1	1	-
40.	12	Drying & Fumigating Assistant	1	1	-
41.	12	Collection Incharge	2	2	-
42.	12	Skelton Preparator	1	1	-
43.	11	U.D.C	2	2	-
44.	9	Carpenter	1	1	-
45.	9	Museum Guide	2	1	1
46.	9	L.D.C	2	2	-
47.	7	Electrician	1	-	1
48.	7	Painter	1	-	1
49.	7	Tracer	1	1	-
50.	7	L.M.O	1	1	-
51.	5	Field Assistant	12	11	1
52.	4	Dispatch Rider	1	1	-
53.	4	D.M.O	1	1	-
54.	4	Driver	5	4	1
55.	1	Security Guard	14	12	2
56.	1	Naib Qasid	7	7	-
57.	1	Sanitary Worker	5	4	-
58.	1	Gardener	1	1	-
59.	1	Helper	5	4	1
		Total Staff (BS-1 to 15)	80	67	13
		Total (BS-16)	18	11	7
		Total BS-17 & above	45	25	20
		Total Officers & Staff (BS-1 to 21)	143	103	40

Organizational Chart of Pakistan Scientific and Technological Information Centre (PASTIC)



**PASTIC NATIONAL CENTRE
ISLAMABAD**

FOR NON-DEVELOPMENT SIDE

sr. #	Post	BPS	Sanctioned	Filled	Vacant	By Direct	By Promotion
1	Director General	21	1	1	0	1	-
2	Director	20	1	1	0	-	-
3	Additional Director (A&F)	19	1	1	0	-	-
4	Additional Director (STI)	19	1	1	0	-	-
5	Principal System Analyst	19	1	1	0	-	-
6	Principal Librarian	19	1	1	0	-	-
7	Deputy Director (STI)	18	5	5	0	-	-
8	Manager Reprographic Unit	18	1	1	0	-	-
9	Database Administrator	18	1	0	1	-	1
10	Senior Scientific Information Officer	18	8	7	1	1	-
11	Deputy Director (Admin)	18	1	1	0	-	-
12	Assistant Director (Accounts)	18	1	1	0	-	-
13	PS to D.G	18	1	1	0	-	-
14	Senior Manager Technology Information	18	1	1	0	-	-
15	Assistant Director (Training)	17	1	0	1	1	-
16	Scientific Information Officer	17	2	2	0	-	-
17	System Analyst	17	1	1	0	-	-
18	Web Manager	17	1	1	0	-	-
19	Printing Officer	17	1	0	1	-	1
20	Graphic Designer	17	1	0	1	1	-
21	Assistant Director (Admn)	17	2	2	0	-	-
22	Technology Information Officer	17	1	0	1	1	-

	(Marketing)						
23	Editor	17	1	1	0	-	-
24	Assistant Accounts Officer	17	1	1	0	-	-
25	Accountant	17	1	1	0	-	-
26	Superintendent (Admin)	17	2	2	0	-	-
27	Assistant Scientific Information Officer	16	3	1	2	1	1
28	Assistant Documentation Officer	16	1	1	0	-	-
29	Assistant Programmer	16	2	1	1	-	1
30	Assistant Web Manager	16	1	1	0	-	-
31	Assistant Manager Reprographic Unit	16	1	0	1	1	-
32	Assistant Printing Officer	16	4	3	1	1	-
33	Assistant Private Secretary	16	2	2	0	-	-
34	Assistant (Admn)	16	7	7	0	-	-
35	Assistant Accounts	16	1	1	0	-	-
36	Senior Data Control Assistant	15	2	2	0	-	-
37	Assistant (Admn)	15	1	1	0	-	-
38	Data Control Assistant	14	7	7	0	-	-
39	Layout Artist	14	1	1	0	-	-
40	Marketing/Field Assistant	14	1	0	1	1	-
41	Graphic Assistant	14	1	1	0	-	-
42	Mechanical Supervisor	14	1	0	1	1	-
43	Senior Offset Printer	14	2	1	1	1	-
44	Stenotypist	14	2	2	0	-	-
45	Library Assistant	12	1	1	0	-	-
46	Data Entry Operator	12	2	2	0	-	-
47	Technician	11	1	1	0	-	-
48	Offset Printer	11	1	1	0	-	-
49	Technical Assistant	11	1	1	0	-	-
50	Senior Carpenter	11	1	1	0	-	-

51	Upper Division Clerk	11	9	9	0	-	-		
52	Lower Division Clerk	7	10	9	1	-	1		
53	Electrician	7	1	1	0	-	-		
54	Assistant Offset Printer	7	3	2	1	-	1		
55	Driver	7	2	2	0	-	-		
56	Bindery Assistant	5	2	2	0	-	-		
57	Driver	5	2	2	0	-	-		
58	Offset Machine Assistant	5	2	2	0	-	-		
59	Drivers	4	4	4	0	-	-		
60	Duplicating Machine Operator	4	1	0	1	1	-		
61	Dispatch Rider	4	1	1	0	-	-		
62	Head Mali	3	1	1	0	-	-		
63	Record Sorter	3	1	1	0	-	-		
64	Photo Attendant	4	1	1	0	-	-		
65	Patent Attendant	4	1	1	0	-	-		
66	Security Guard	3	5	5	0	-	-		
67	Qasid	3	8	8	0	-	-		
68	Qasid	2	1	1	0	-	-		
69	Photo Attendant	2	1	1	0	-	-		
70	Patent Attendant	2	1	1	0	-	-		
71	Library Attendant	2	2	1	1	-	1		
72	Bindery Helper	1	1	1	0	-	-		
73	Sanitary Workers	1	3	3	0	-	-		
74	Mali	1	2	2	0	-	-		
75	Security Guard	1	3	3	0	-	-		
76	Naib Qasid	1	9	9	0	-	-		
GRAND TOTAL		164		145		19		12	7

VIII. FINANCIAL STATEMENTS

**PAKISTAN SCIENCE FOUNDATION
ISLAMABAD**

S U M M A R Y

**SUMMARIZED BUDGET / REVISED ALLOCATION, ACTUAL EXPENDITURE OF 2019-20
(NON-DEVELOPMENT) UNDER BUDGET ID-1700 PAKISTAN SCIENCE FOUNDATION (PSF).**

Object Code.	Heads/Classification	Budget Position & Actual Expenditure <u>2019-20</u>				
		Budget Allocation <u>2019-20</u>	Revised Budget Allocation After Re-appropriation <u>2019-20</u>	% of Allocation	Actual Expenditure <u>2019-20</u>	% of Expenditure
1	2	3	4	5	6	7
	TOTAL BUDGET ALLOCATION	234.160 (M)	230.850 (M)		230.015 (M)	
A01	EMPLOYEE RELATED EXPENSES (A + B)	125,420,000	116,920,000	50.6%	116,864,369	50.8%
A011-1	A). Pay (a + b)	76,150,000	71,450,000	31.0%	71,450,000	31.1%

A01101	a). Pay of Officers	47,150,000	47,150,000	20.4%	47,150,000	20.5%
A01151	b). Pay of other Staff	29,000,000	24,300,000	10.53%	24,300,000	10.56%
A012	B). Allowances (c + d)	49,270,000	45,470,000	19.7%	45,414,369	19.7%
A012-1	c). Regular Allowances	39,270,000	32,470,000	14.1%	32,470,000	14.1%
A012-2	d). Other Allowances	10,000,000	13,000,000	5.63%	12,944,369	5.63%
A02	PROJECT PRE-INVESTMENT ANALYSIS (STATUTORY FUNCTIONS) (a + b)	48,000,000	48,000,000	20.8%	48,000,000	20.9%
A02201	a). Grant for Research & Institution Support	39,850,000	39,850,000	17.3%	38,182,081	16.6%
A02201	b). Science Promotion Activities	4,400,000	4,400,000	1.91%	7,266,529	3.16%
	c). Planning & Development Section	3,750,000	3,750,000	1.62%	2,551,390	#DIV/0!
A03	OPERATING EXPENSES	37,013,000	35,983,000	15.6%	35,941,738	15.6%

A04	EMPLOYEES RETIREMENT BENEFITS	20,000,000	26,000,000	11.3%	26,000,000	11.3%
A05	GRANTS SUBSIDIZE & LOAN ADVANCES/OTHERS	1,000	221,000	0.10%	221,000	0.10%
A06	TRANSFERS	1,201,000	1,201,000	0.52%	1,201,000	0.52%
A09	EXPENDITURE ON ACQUIRING OF PHYSICAL ASSETS	1,100,000	1,100,000	0.48%	362,157	0.16%
A13	REPAIR & MAINTENANCE	1,425,000	1,425,000	0.62%	1,425,000	0.62%
	Grand Total :-	234,160,000	230,850,000	100%	230,015,264	100%

→ Re-appropriated of **Rs.9.220 million** during F.Y 2019-20 under different Budgetary Head of accounts, within "A01-Employees Related Expenses, and A03-Operating Expense and A-04 Employees Retirement Benefits (**Re-appropriations order of MoST is enclosed**).

→ During the year 2019-20 funds of **Rs.3.310 million** have been Surrender under Budgetary head "A01-Employees Related Expenses & and A03-Operating Expenses.(**Orders enclosed**).

PAKISTAN AND TECHNOLOGICAL AND INFORMATION CENTER ISLAMABAD

**SUMMARIZED POSITION OF BUDGET ALLOCATION / REVISED ALLOCATION, ACTUAL EXPENDITURE
2017-18 & BUDGET ALLOCATION AS PER NIS / BUDGET ESTIMATES 2018-19 AS PER NIS (PROPOSED)
IN RESPECT OF PASTIC CURRENT EXPENDITURE (NON-DEVELOPMENT)**

		Budget Position & Actual Expenditure <u>2017-18</u>				Budget Estimates Proposed <u>2018-19</u>			
Code No.	Heads/Classification	Budget Allocation As Per NIS 2017-18	Revised Budget Allocation 2017-18 after Additional Grant	% age of Allocation	Actual Expenditure <u>2017-18</u>	% age of Expenditure	Budget Allocation <u>2018-19</u> (As Per NIS)	% age of Allocation	Budget Estimates <u>2018-19</u> (Proposed)
1	2	3	4	5	7	8	9	10	11
	TOTAL BUDGET ALLOCATION	135.450(M)	148.521(M)	-	138.521(M)	-	192.801(M)	-	192.801(M)
A01	Employee Related Expenses	76,696,000	89,767,000	60.44%	89,767,000	64.80%	96,000,000	49.79%	96,000,000
A011-1	Pay	46,000,000	59,071,000	39.77%	58,681,629	42.36%	63,200,000	32.78%	63,200,000

A011 01	Pay of Officers	30,000,0 00	39,770,0 00	26.7 8%	39,481,5 28	28.5 0%	44,000,0 00	22.8 2%	44,000,0 00
A011 51	Pay of other Staff	16,000,0 00	19,301,0 00	13.0 0%	19,200,1 01	13.8 6%	19,200,0 00	9.96 %	19,200,0 00
A012	Allowan ces	30,696,0 00	30,696,0 00	20.6 7%	31,085,3 71	22.4 4%	32,800,0 00	17.0 1%	32,800,0 00
A012 -1	Regular Allowan ces	26,346,0 00	26,346,0 00	17.7 4%	26,735,3 40	19.3 0%	26,950,0 00	13.9 8%	26,950,0 00
A012 -2	Other Allowan ces	4,350,00 0	4,350,00 0	2.93 %	4,350,03 1	3.14 %	5,850,00 0	3.03 %	5,850,00 0
A02	Project Pre- investm ent Analysti s / PASTIC Functio ns	12,000,0 00	12,000,0 00	8.08 %	1,981,74 8	1.43 %	12,000,0 00	6.22 %	12,000,0 00
A03	Operati ng Expense s	20,902,0 00	20,902,0 00	14.0 7%	20,935,8 80	15.1 1%	31,092,0 00	16.1 3%	31,092,0 00

A04	Employees Retirement Benefits	23,000,000	23,000,000	15.49%	23,000,000	16.60%	48,000,000	24.90%	48,000,000
A05	Grants Subsidies and Write off Loans / Advances / Others	1,000	1,000	0.00%	-	0.00%	1,000	0.00%	1,000
A06	Transfers	1,300,000	1,300,000	0.88%	1,285,304	0.93%	1,300,000	0.67%	1,300,000
A09	Expenditure on Acquiring of Physical Assets	501,000	501,000	0.34%	501,000	0.36%	2,000,000	1.04%	2,000,000
A13	Repair & Maintenance	1,050,000	1,050,000	0.71%	1,050,068	0.76%	2,408,000	1.25%	2,408,000
-	Grand Total	135,450,000	148,521,000		138,521,000		192,801,000		192,801,000

PAKISTAN MUSEUM OF NATURAL HISTORY

**SUMMARIZED POSITION OF BUDGET ALLOCATION / REVISED ALLOCATION, SURRENDER AND ACTUAL EXPENDITURE
2019-20 AND BUDGET ALLOCATION AS PER NIS/BUDGET ESTIMATES 2020-21 AND PROPOSED AS PER NIS IN RESPECT OF PMNH
CURRENT EXPENDITURE (NON-DEVELOPMENT)**

Code No.	Heads/Classification	Budget Position & Actual Expenditure <u>2019-20</u>						Budget Estimates Proposed <u>2020-21</u>		
		Budget Allocation <u>2019-20</u>	Revised Budget Allocation <u>2019-20</u>	% age of Allocation	SURRENDER AMOUNT	Actual Expenditure <u>2019-20</u>	% age of Expenditure	Budget Allocation <u>2020-21</u> (As Per NIS)	% age of Allocation	Budget Estimates <u>2020-21</u> (Proposed)
1	2	3	4	5		6	7	8	9	10
	TOTAL BUDGET ALLOCATION	156.500 (M)	142.878 (M)		1.430 (M)	141.448 (M)		180.649 (M)		180.649 (M)
A01	Employee Related Expenses	86,586,000	79,736,000	55.81%	107,087	79,628,913	56.30%	85,041,000	47.08%	85,041,000
A011-1	Pay	51,536,000	44,467,000	31.12%	-	44,467,000	31.44%	50,500,000	27.95%	50,500,000
A01101	Pay of Officers	35,836,000	28,767,000	20.13%	-	28,767,000	20.34%	33,900,000	18.77%	33,900,000

A01151	Pay of other Staff	15,700,000	15,700,000	10.99%	-	15,700,000	11.10%	16,600,000	9.19%	16,600,000
A012	Allowances	35,050,000	35,269,000	24.68%	107,087	35,161,913	24.86%	34,541,000	19.12%	34,541,000
A012-1	Regular Allowances	27,800,000	25,650,000	17.95%	2,667	25,647,333	18.13%	25,141,000	13.92%	25,141,000
A012-2	Other Allowances	7,250,000	9,619,000	6.73%	104,420	9,514,580	6.73%	9,400,000	5.20%	9,400,000
A02	Project investment Pre-analysis	9,000,000	9,000,000	6.30%	1,069,651	7,930,349	5.61%	11,000,000	6.09%	11,000,000
A03	Operating Expenses	28,727,000	27,855,000	19.50%	17,864	27,837,136	19.68%	27,585,000	15.27%	27,585,000
A04	Employees Retirement Benefits	22,000,000	22,000,000	15.40%	-	22,000,000	15.55%	32,000,000	17.71%	32,000,000
A05	Grants Subsidieze & Loan Advances/Others	1,000	1,000	0%	1,000	-	0%	10,000,000	6%	10,000,000

A06	Transfers	901,000	901,000	0.63%	1,000	900,000	0.64%	954,000	0.53%	954,000
A09	Expenditure on Acquiring of Physiscal Assets	5,815,000	815,000	0.57%	7,532	807,468	0.57%	10,939,000	6.06%	10,939,000
A13	Repair & Maintenance	2,570,000	2,570,000	1.80%	225,370	2,344,630	1.66%	3,130,000	1.73%	3,130,000
	Grand Total :-	155,600,000	142,878,000	100%	1,429,504	141,448,496	100%	180,649,000	100%	180,649,000

ANNEXURES

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 are 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 thereto;

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.

2. **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 provisions of this Act, to acquire, hold and dispose of property, both movable and immovable, and shall by the said name sue and be sued.

(3) The head office of the Foundation shall be at Islamabad.

4. **Functions of the Foundation--**(1) The Foundation shall function as a financing agency for –

- (i) the establishment of comprehensive scientific and technological information and dissemination centres;
- (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 centres, 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 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 Foundation.- (1) The Chairman of the Board shall be the Chairman of the Foundation and shall be appointed from amongst 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. 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 with out assigning any reason

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

THE GAZETTE OF PAKISTAN, EXTRA., FEB. 2, 1973 [PART 1

8. Meetings of the Board---(1) The meetings 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 other whole-time members of the Board.

11. Delegation of powers.—The Board may, from time to time, delegates to the Chairman or the Executive Committee such of its powers and functions as it may consider necessary.

12. Adhoc Committees.—The Foundation may set up ad hoc 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 Government donations and endowments ; and income from other sources.

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 report.—(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 alongwith the audited accounts of the Foundation.

(2) The annual report alongwith 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.

ANNEXURE-II

**LIST OF PROJECTS APPROVED BY EXECUTIVE COMMITTEE DURING
2019-20**

S. #	Project Title & No.	P.I. Name, Designation & Address	Total Cost in Pak. Rs.
1.	PSF/Res/P-CUI/Chem (600) Fabrication of Bio-mimic Photosensitive Thin Film for Efficient Tissue Adhesion	Dr. Arslan Ahmed Assistant Professor Interdisciplinary Research Centre in Biomedical Materials (IRCBM) COMSATS University Islamabad Lahore Campus	2,626,041/-
2.	PSF/Res/KPK-HU/Biotech (238) Development of an Optical Aptasensor for the Detection of Microbial Agents from Food Samples	Dr. Muhammad Ali Assistant Professor Department of Microbiology University of Haripur Haripur	3,085,500/-
3.	PSF/Res/C-IBGE/Med (509) Exploring Predictive Biomarker for Aplastic Anemia: An appropriate Tool for Diagnosis and Treatment	Dr. Sadia Rehman Principal Scientific Officer Institute of Biomedical and Genetic Engineering (IBGE) Islamabad	2,222,580/-

ANNEXURE-III

LIST OF SEMI-ANNUAL, ANNUAL AND FINAL TECHNICAL REPORTS OF ON-GOING PROJECTS DURING 2019-2020.

a. Semi Annual Technical Reports

S #	Project No.	Project title	Report
1.	C-NESCOM/Agr (497)	Wild Olive (<i>OleaCuspedata</i>) utilization as Root Stock for Oil Plants through Different Topworking Techniques	2 nd
2.	PSF/Res/KPK-PU/Bio (661)	Molecular Characterization of <i>Clostridium perfringens</i> and development of Toxide Vaccine	2 nd
3.	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
4.	PSF/Res/S-ICCBS/Chem (596)	Structural and Function Study of Metabolites of Fluorinated Drugs Produced by Fungal Transformation of Fluorinated Steroids	1 st
5.	PSF/Res/KPK-PU/Earth (96)	Shale Gas Potential of the Kohat Sub-basin, Indus Basin, Pakistan	1 st
6.	PSF/Res/KPK-AWKU/Med (459)	Development of Coumarin Based Compounds for U2OS Bone Cancerous Cell Treatment	1 st
7.	PSF/Res/P-UHS/Med (478)	Comparison of Salivary Aquaporin-5 Levels in Patients with Type-II <i>Diabetes mellitus</i> and Healthy Individuals	1 st
8.	PSF/Res/CP/S-AKU/Med (488)	Analysis of Population-Specific Epitope and Drug-resistance Mutations in HIV-1 in Pakistan	1 st

b. First Annual Technical Report

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/KPK-PU/Bio (661)	Molecular Characterization of <i>Clostridium perfringens</i> and development of Toxide Vaccine
3.	PSF/Res/S-ICCBS/Chem (596)	Structural and Function Study of Metabolites of Fluorinated Drugs Produced by Fungal Transformation of Fluorinated Steroids
4.	PSF/Res/P-CIIT/Engg (124)	Synthesis of Chemically Modified Polymeric Membranes for Biogas Purification and Natural Gas Sweetening
5.	PSF/Res/P-UET.TX/Engg (152)	Design and Implementation of real time Cooperative MIMO Communication Platform for Next Generation Wireless Communications
6.	PSF/Res/P-UHS/Med (478)	Comparison of Salivary Aquaporin-5 Levels in Patients with Type-II <i>Diabetes mellitus</i> and Healthy Individuals
7.	PSF/Res/CP/S-AKU/Med (488)	Analysis of Population-Specific Epitope and Drug-resistance Mutations in HIV-1 in Pakistan
8.	PSF/Res/P-UHS/Med (492)	Identification of Genetic Mutations causing Familial Oculocutaneous Albinism (OCA) in Pakistani Families and Elucidation of Biochemical Mechanism of Disease
9.	PSF/Res/P-FCC/Phys (202)	Quasilinear Theory of Electromagnetic Instabilities with Non-Maxwellian Distribution Functions
10.	PSF/Res/P-IUB/Phys (189)	Synthesis and Characterization of Nano-ferrites for Thermoelectric Power Generation

c. Second Annual Technical Report

S.#	Project No.	Project Title
1.	PSF/Res/S-AKU/Med (479)	Understanding the Association of SIRT1 Genetic Variants with Microenvironment of the Oocyte in Infertile Female
2.	PSF/Res/S-ICCBS/Med (431)	A Data Base Development of the Unique Metabolic Pathways of the Infectious Pathogens

d. Final Technical Reports

Sr. No.	Project No.	Project Title
1.	PSF/P-AU/Agr (467)	Bio management of Alligator weed through its utilization as compost and organic mulch
2.	PSF/Res/KPK-MU/Chem (461)	The Efficient and Facile Synthesis of Asymmetric

		Aldol Adducts Catalyzed by Bifunctional Diamine Organo-catalysts
3.	PSF/Res/S-SU/Chem (465)	Metal Ion Imprinted Polymers (MIIPs): Novel Material for Pre-Concentration and Separation of Total Arsenic in Aqueous Systems
4.	PSF/Res/S-PCSIR/Chem (478)	Synthesis of Heterocyclic Organic Compounds for Drug Development
5.	PSF/Res/P-CIIT/Chem (570)	Development of Mechanically Reinforced Silica Based Bioactive Glass (SiO ₂ CaO-P ₂ O ₅) Polymer Composites for Potential Application in Osteochondral Defect Site
6.	PSF/Res/P-CIIT/Engg (159)	Evaluating the performance and Power Effectiveness of Asynchronous Processors Customized for many Core Systems
7.	PSF/Res/C-SEECS/Engg (164)	iDOC: A Portable, Cost Effective Diagnostic Screening Device for Early Dengue Fever Detection
8.	PSF/Res/C-NORI/Med (497)	Prediction of Gastric Cancer in <i>Helicobacter pylori</i> Infected Gastric Mucosa
9.	PSF/Res/KPK-IBMS/Med (487)	Status of Iron balance and Thalassaemia trait in District Peshawar, Khyber Pakhtunkhwa
10.	PSF/Res/C-CIIT/Med(297)	Next Generation Granular Biomedical Ceramics for Rapid Bone Defect Repair
11.	PSF/Res/P-LUMS/ Phys (159)	Development of Low Field, Low Cost, Reconfigurable NMR and MRI

ANNEXURE-IV**SCIENTIFIC PULICATIONS PRODUCED THROUGH PSF SUPPORTED
COMPLETED PROJECTS DURING 2019-20**

S.No.	Project No.	Publication
1.	PSF/Res/ P-UVAS/Bio (416)	Sadia A, Jabbar MA, Deng Y, Hussain EA, Riffat S, Naveed S, & Arif M. (2012) A survey of aflatoxinM1 in milk and sweets of Punjab, Pakistan, Food Control
2.	PSF/ Res/Biotech/S- KU/Med (80)	One paper was published in international journal, entitled: ‘Monoclonal Antibodies a diagnostic tool’ Muhammad Saleem and Mustafa Kamal, African Journal of Biotechnology 7 (8): 923-925, 2008 and PSF was acknowledged for the financial support One report in newsletter was published that entitled: “Monoclonal Antibodies, A Brief Review Application” Muhammad Saleem and Mustafa Kamal, Eastern Mediterranean Health Genomics and Biotechnology 2 (9): 1-3, 2008

ANNEXURE-V**DEGREES AWARDED TO RESEARCHERS THROUGH PSF SUPPORTED
COMPLETED PROJECTS DURING 2019-20**

S. No.	Project No.	Name of the Researcher	Degree awarded
1.	PSF/Res/ P-UVAS/Bio (416)	Ms. Asma Sadia	PhD
		Mr. Kabir AhmedChohan	M.Phil
		Ms. Saira	M.Phil
2.	PSF/Res/P-FCC/Bio (434)	Mr. Mohsin Arshad	M.Phil
		Mr. Qasim Mahmood	M.Phil
3.	PSF/ Res/Biotech/S- KU/Med (80)	Mr. Muhammad Saleem	M.Phil
4.	PSF/Res/KPK-KUST/Med (283)	Muhammad Yaqoob	M.Phil

ANNEXURE-VI

LIST OF APPROVED CONFERENCES /SYMPOSIUMS /WORKSHOPS/
SCIENTIFIC SURVEY DURING YEAR 2019-2020

Sr. No.	Title of Conference/Symposium/Workshop	Name and Address of Organizer	Amount Rs. (million)
1.	International Symposium on Advances in Mechanical Engineering (ISAME) 2019 at PIEAS Islamabad on September 16-18, 2019	DR. Kamran Rasheed Qureshi HoD Pakistan Institute of Engineering & Applied Sciences (PIEAS), Lehrtar Road, Nilore, Islamabad	0.2
2.	2 nd International Conference on Applied and Engineering Mathematics-2019 on August 27 -29, 2019	Prof. Dr. Muhammad Tahir Chairman Department of Mathematics HITEC University Taxila	0.2
3.	Two days workshop “Control Strategies for Mealybug pests in Gilgit-Baltistan at University of Baltistan Skardu on August 19 -20 , 2019	Dr. Muhammad Ali Assistant Professor Department of Biological Science University of Baltistan Skardu	0.1
4.	2 nd International Conference on Nanoscience & Nanotechnology (ICONN-2019) at LUMS, Lahore on November 1-2, 2019	Dr. Irshad Hussain Associate Professor Department of Chemistry & Chemical Engineering, Lahore University of Management of Sciences (LUMS), Lahore	0.2
5.	1 st International Workshop on “Recent Trends in Electric Machine Design” at COMSATS University Islamabad, Abbottabad Campus on September 26-27, 2019	Dr. Faisal Khan Assistant Professor Electrical and Computer Engineering Department COMSATS University Islamabad, Abbottabad Campus	0.2

6.	4 th Conference on Emerging Materials and Processes (CEMP) 2019 at SCME, NUST, Islamabad on on October 30-31, 2019	Prof. Dr. Arshad Hussain Dean/Principal School of Chemical and Materials Engineering (SCME), National University of Sciences and Technology, Islamabad	0.2
7.	1 st International Conference on Agricultural Engineering & Technologies (ICAET) at SAU Tandojamon 05-06 November 2019	Dr. Khalil Ahmed Ibupoto Dean/Principal Faculty of Agricultural Engineering Sindh Agricultural University Tandojam	0.2
8.	1 st International Industrial Chemistry Conference 2020 at Department of Chemistry, NED University of Engineering and Technology, Karachion January 10-11, 2020	Dr. Saeeda Nadir Ali Associate Professor Department of Chemistry NED UET, Karachi	0.2
9.	International Symposium on Strategic Value addition and Innovation in Food Agriculture at MNS University of Agriculture Multan on 09-10 October, 2019	Dr. Zulfiqar Ali Director Institute of Plant Breeding and Biotechnology MNS University of Agriculture Multan	0.2
10.	Crop Management Strategies for Enhancing Farm Productivity in Punjab at Main Library, Ayub Agricultural Research Institute, Faisalabadon October 28, 2019	Dr. Hafiz Muhammad Akram Director Agronomy Research Institute Agricultural Research Institute Faisalabad	0.1

17.	National Conference “Recent Advances in Pure and Applied Mathematics (RAPAM’19)” at Quaid-e-Azam University of Engineering Science and Technology (QUEST) Nawabshah on December 18-19, 2019	Dr. Khuda Bux Amur Professor & Chairman Department of Mathematics and Statistics QUEST, Nawabshah	0.080
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11.	3 rd International Conference on Innovative Biological and Public Health Research at Bukhari Auditorium, GC University Lahore on November 13-14, 2019	Dr. Atif Yaqub Chairperson Department of Zoology Government College University Lahore	0.2
12.	3 rd International Conference on Robotics and Automation in Industry (ICRAI) at NUST College of EME, Rawalpindi on October 21-22, 2019	Dr. Javaid Iqbal Dean NUST College of Electrical and Mechanical Engineering Peshawar Road, Rawalpindi	0.2
13.	1 st National Conference on “Recent Advances in Theoretical and Experimental Physics at Department of Physics, Islamia College University, Peshawar on February 24-25, 2020	Dr. Aurang Zeb Associate Professor Chairman Department of Physics Islamia College Peshawar	0.1
14.	Optical Characterization of Agri. and Biological Media at NILOP, Nilore, Islamabad on December 5, 2019	Dr. Babar Manzoor Atta Principal Scientist National Institute of Lasers and Optronics (NILOP), Nilore, Islamabad	0.035
15.	2 nd International Conference Climate Smart Agriculture: The way towards sustainability at MNS University of Agriculture, Multan on November 26-27, 2019	Mr. Abdul Ghaffar Associate Professor/Chairman Department of Agronomy MNS-University of Agriculture Multan	0.2
16.	3 rd International Conference on Computing, Mathematics and Engineering Technologies-ICoMET 2020 at Sukkur IBA University, Sukkur on January 29-30, 2020	Dr. Rida-e-Zainab General Chair (iCoMET 2021) Assistant Professor Department of Mathematics Sukkur IBA University	0.2

17.	National Conference “Recent Advances in Pure and Applied Mathematics (RAPAM’19)” at Quaid-e-Azam University of Engineering Science and Technology (QUEST) Nawabshah on December 18-19, 2019	Dr. Khuda Bux Amur Professor & Chairman Department of Mathematics and Statistics QUEST, Nawabshah	0.080
18.	7 th International Symposium on Biomedical Materials: Science & Technology Innovation and the Knowledge Economy at COMSATS University Islamabad, Lahore Campus on December 11-12, 2019	Dr. Aqif Anwar Chaudhry Head Interdisciplinary research Centre in Biomedical Materials (IRCBM) COMSATS University Islamabad Lahore Campus	0.2
19.	Present and Past Dengue Infection Scenario in Pakistan and Future Control Strategies at Geo Auditorium QAU, Islamabad on December 9, 2019	Dr. Naveeda Akhtar Qureshi Associate Professor Department of Animal Sciences QAU, Islamabad	0.2
20.	International Conference on Climate-Resilient Smart Soil Management at University of Haripur, Haripur on March 05-07, 2020	Dr. Ali Raza Gurmani Associate Professor Department of Soil Science The University of Haripur Haripur	0.2
21.	International School on Physics and Allied Disciplines (ISPAD-2020) at NCP Complex, Islamabad on March 09-13, 2020	Dr. Hafeez R. Hoorani Director General National Centre for Physics (NCP), Islamabad	0.2
22.	2 nd PROBE 2020-Molecules to Mechanisms at Department of Physiology, University of Karachi, Karachi on January 07-09, 2020	Dr. Taseer Ahmed Khan Chairman Department of Physiology, University of Karachi, Karachi	0.1

23.	International Conference on Mechanical Engineering 2020 (ICME-20) in UET, Lahore on January 29-30, 2020	Prof. Dr. Tauseef Aized Department of Mechanical Engineering University of Engineering and Technology, Lahore	0.2
24.	1 st International Conference on Recent Advances in Agronomy at Bahauddin Zakariya University, Multan on February 10-12, 2020	Prof. Dr. Shakeel Ahmad Department of Agronomy Bahauddin Zakariya University, Multan	0.2
25.	Cancer Bio Conference 2020 at University of Punjab on February 13-15, 2020	Dr. Nousheen Zaidi Associate Professor Department of Microbiology and Molecular Genetics Cancer Biology Lab., University of the Punjab Lahore	0.1
26.	4 th International Workshop on X-Rays Crystallography in Structural Biology at Islamai University, Bhawalpur on February 25-27, 2020	Dr. Maqsood Ahmed Assistant Professor Department of Chemistry Islamai University Bhawalpur	0.2
27.	International Horticulture Conference at Institute of Agricultural Science, University of the Punjab, Quaid-e-Azam Campus Lahore on February 26-28, 2020	Dr. Muhammad Shafiq Assistant Professor Institute of Agricultural Science, University of the Punjab, Quaid-e-Azam Campus Lahore	0.2
28.	International Seminar on “Small Hydropower Development and Rural Electrification for South Asian Countries” from Jan 13-14, 2020 at Marriot Hotel, Islamabad	Dr. Afzal Hussain Seminar Coordinator PCRET Islamabad	0.2
29.	3 rd International Pak Turk Conference on Emerging Science and Technology at GIK Institute Topi, Swabi on April 14-16,2020	Prof. Dr. Jameel –Un-Nabi Pro-Rector GIK Institute Topi, Swabi	0.2

30.	1 st International Industrial Chemistry Conference 2020 at Department of Chemistry, NED University of Engineering and Technology, Karachi on January 10-11, 2020	Dr. Saeeda Nadir Ali, Associate Professor, Department of Chemistry NED UET, Karachi	0.2
31.	Beneficial Microbes & Sustainable Crop Production at the University of Agriculture, Peshawar on February 19-20, 2020	Dr. Amanullah Khan Associate Professor Department of Agronomy University of Agriculture, Peshawar	0.1
32.	International iiScience Int'l Conference 2020 Light Generation, Sensing and Energy Sources at Women University, Multan on March 02-04, 2020	Dr. Malika Rani Chief Organizer The Women University, Multan	0.2
33.	Mechanism of Disease and Poultry Pathology at University of Veterinary and Animal Sciences, Lahore on March 2-4, 2020	Dr. Asim Aslam Professor/Chairman Department of Pathology University of Veterinary and Animal Sciences, Lahore	0.2
34.	International Workshop on 2D Materials and Quantum Effect Devices at PIEAS on March 03-05,2020	Dr. Muhamamd Aftab Rafique Head Department of Physics and Applied Mathematics Pakistan Institute of Engineering and applied Sciences (PIEAS), Nilore, Islamabad	0.2
35.	International Workshop on Use of GIS Techniques and Stable Isotope for Sustainable Development in Agriculture and Environment at University of Haripur, Haripur on March 10-11,2020	Dr. Ali Raza Gurmani Associate Professor University of Haripur, Haripur	0.2

36.	16 th National Honeybee Farming and Management Training Workshop at Department of Zoology, Punjab University, Quaid-e-Azam Campus, Lahore on April 07-10, 2020	Prof. Dr. Javed Iqbal Qazi Chairman Department of Zoology Honeybee Research Program Punjab University Quaid-e-Azam Campus Lahore	0.1
37.	1 st International Conference on “Innovations in Agriculture to Ensure Food Security in Changing Climate on April 02-03, 2020	Dr. Wajid Nasim Jatoi Associate Professor Department of Agronomy The Islamia University Bhawalpur	0.2
38.	2 nd International Conference on Emerging Trends in Earth and Environmental Sciences “ETEES-2020 March 4-6, 2020 at College of Earth & Environmental Sciences, University of the Punjab, Lahore	Prof. Dr. Sajid Rashid Ahmad Principal College of Earth & Environmental Sciences, University of the Punjab Lahore	0.2
39.	2 nd International Public Health Conference February 25-27, 2020 at Khyber Medical University, Peshawar	Prof. Dr. Zia ul Haq Dean, Faculty of Public Health & Social Sciences Khyber Medical University Hayatabad Peshawar	0.2
40.	International Conference on Sustainable Agriculture in Climate Change Scenario April 15-17, 2020 at College of Agriculture, University of Sargodha	Dr. Muhammad Athar Nadeem Principal College of Agriculture University of Sargodha Sargodha	0.2
41.	Two-day Workshop on Confocal Microscopy June 2-3, 2020 at NILOP, Islamabad	Dr. Aziz ul Rehman Senior Scientist, NILOP, Islamabad	0.035
42.	2 nd National Conference on Recent Trends in Physics and Materials Sciences March 25-26, 2020 at University of Science and Technology Bannu	Dr. Abdul Manan Assistant Professor Department of Physics University of Science and Technology Bannu	0.1

43.	2 nd Invention to Innovation Summit, Islamabad April 15-16, 2020 at Quaid-i-Azam University, Islamabad	Prof. Dr. Muhammad Ali T.I. Vice Chancellor Quaid-i-Azam University, Islamabad	0.2
		Total	7.350
Scientific Survey			
1.	Epidemiological Prevalence Survey of Polycystic Ovary Syndrome in different areas of Pakistan	Dr. Maria Khan Panni Assistant Professor Department of Bioengineering and Space Biosciences Institute of Space Technology Islamabad	0.2

ANNEXURE-VII

**RESEARCH PROJECTS RECOMMENDED BY THE PSF-NSLP
TECHNICAL COMMITTEE**

Sr. #.	Project No. and Title	Name, Designation & Address of PI
1.	Diversity of Rhizobacteria Associated with Chickpea and Cluster Beans Growing in Marginal Lands PSF/NSLP/P-UoL(757)	Dr. ZahidMumtaz Assistant Professor Institute of Molecular Biology and Biotechnology The University of Lahore, Lahore
2.	Promotion of Improved Varieties of Buckwheat through Seed Production Villages Temperate Area of Gilgit-Baltistan PSF/PSF/NSLP/ GB-PARC (727)	Mr. Muhammad Ayub Senior Scientific Officer Pakistan Agricultural Research Council (PARC) Agri. Research Station Sadpara Road, Satellite Town Skardu
3.	Breeding Heat Tolerant and High Yielding Chickpea (<i>Cicerarienum</i>) Genotypes PSF/NSLP/KP-NIFA (724)	Dr. Iqbal Saeed Senior Scientist, Nuclear Institute for Food & Agriculture, Peshawar
4.	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 PSF/NSLP/P-UVAS (747)	Dr. Nabila Gulzar Assistant Professor Department of Dairy Technology, UVAS Ravi campus, Lahore
5.	Production and Characterization of Modified Starches from Mango Processing Waste PSF/NSLP/S-KU (735)	Dr. AnjumNawab Assistant Professor, Department of Food Science & Technology, University of Karachi, Karachi.
6.	InOvo administration of Various Biological Supplements and vaccine to improve immunity and production performance of commercial broiler chicken NSLP/B-LUAWMS (763)	Dr. FazulNabiShar Assistant Professor, Faculty of Veterinary and Animal Sciences, Lasbela University of Agriculture Water and Marine Sciences (LUAWMS), Uthal, Balochistan,

7.	Development, evaluation and commercialization of potato culls and processing wastes as concentrate source in animal feed for cost effective feed formulation NSLP/P-UAF(783)	Dr. Muhammad Sharif Associate Professor, Institute of Animal and Dairy Sciences, University of Agriculture, Faisalabad.
8.	Preparation and evaluation of bovine serum and chicken egg derived immunoglobulins for the treatment of <i>Staphylococcus aureus</i> mastitis in cattle and buffaloes NSLP/P-AAU(790)	Prof. Dr. Arfan Yousaf Faculty of Veterinary and Animal Sciences, PMAS-Arid Agriculture University, Muree Road, Rawalpindi
9.	Rainwater Harvesting to Improve Groundwater Storage and Quality in Saline and Water Scarce Environment NSLP/C-PCRWR(888)	Mr. Zamir Ahmad Soomro Regional Director, Regional Office, PCRWR, Main Raiwind Road, Lahore
10.	Large Scale Reclamation of Farm Lands Using Innovative Bio-solid Fertilizer from Different Agro-waste, Sewage Slurry and Microbes NSLP/KP-AWKUM(827)	Dr. Javed Nawab Assistant Professor TTS Department of Environmental Sciences Abdul Wali Khan University Mardan
11.	Development of a phyto-protease and its comparative assessment with different commercial proteases used in poultry feed production NSLP/KP-UAP(768)	Dr. Asad Sultan Assistant Professor, Department of Poultry Science, University of Agriculture, Peshawar. 03101981073, asadzia2003@yahoo.com
12.	Development of Loop Mediated Isothermal Amplification (LAMP) for detection of important tick-borne hemoparasitic diseases of bovines NSLP/KP-VRI(759)	Dr. Said Sajjad Ali Shah Research Officer, Parasitology lab, Veterinary Research Institute, Peshawar. 03329271193, sajjadsheikh0695@gmail.com
13.	Molecular quantification and breeding of heritage chickens (<i>Asil</i>) for better feed efficiency NSLP/P-UAAR(773)	Dr. Nasir Mukhtar Assistant Professor Department of Poultry Science, Faculty of Vet & Animal Sciences PMAS-Arid Agriculture University Rawalpindi
14.	Development of probiotic formulation to mitigate mycotoxicity and fortify the growth potential of livestock feed NSLP/C-CIIT(820)	Dr. M. Nadeem Hassan Assistant Professor (TTS) Department of Biosciences, Academic Block III, COMSATS University, Park Road Islamabad
15.	Assessment of water conservation strategies for cooling dairy animals during summer NSLP/P-UVAS(840)	Dr. Muhammad Qamer Shahid Associate Professor Department of Livestock Production, UVAS, Ravi Campus, Pattoki

ANNEXURE-VIII

LIST OF PROGRESS REPORTS RECEIVED DURING 2019-20

A. Semi annual reports

Sr. No.	Project No.	Project Title	Reports
1.	PSF/NSLP/KP-AU (647)	Development of simple photo-bioreactor for quality algal biomass and oil Production	1 st
2.	PSF/NSLP/B-BU(714)	Develop Web-accessible Documented and Illustrated Information on Plants of Balochistan	1 st
3.	PSF/NSLP/KP-AU (646)	Improvement in anti-tick vaccine efficacy against Pakistani strain <i>Rhipicephalus (Boophilus) microplus</i>	1 st
4.	PSF/NSLP/P-CIIT (664)	Evaluating the Potential of Zero Energy Cool Chambers (ZEEC) for Horticultural Crops	1 st
5.	PSF/NSLP/P-UAF (670)	Spectrochemical Studies of Pollutants in Soil, Water and Vegetation Using Laser Induced Breakdown Spectroscopy	1 st
6.	PSF/NSLP/C-IIU (683)	Development of Edible Vaccine Against Mastitis in Livestock by Transgenic Forage Grass	1 st
7.	PSF/NSLP/P-UVAS (689)	Use of Indigenous Fruit Extracts as Nutraceuticals and Their Therapeutic Efficacy Against <i>Clostridium perfringens</i> in Broiler Chicken	1 st
8.	PSF/NSLP/P-UAAR (695)	Molecular Cloning and Heterologous Expression of Endopolygalacturonase gene in <i>E. coli</i> as a Promising Application for Food Industry	1 st
9.	PSF/NSLP/P-UVAS (697)	Evaluation of Biological and Trans-Placental Potentials of Tick-Borne Diseases in Cattle	1 st
10	PSF/NSLP/P-FCCU(699)	Evaluation of Selected Phytase Transgenic Wheat Lines in Soil under Contained Environment	1 st
11	PSF/NSLP/P-UVAS(701)	Isolation, Molecular Characterization of Pathogenic Bacteria and Development of Fish Vaccine for Culturable Fish Species of Pakistan	1 st
12	PSF/NSLP/P-UCP(712)	Optimization, Validation and Multiplexing of 11 ChrXMiniSTRs in Pakistani Population	1 st
13	PSF/NSLP/P-BZU(713)	Formulation, Fabrication and	1 st

		Characterization of Self Assembling Bioreducible Chitosan Based Nanoparticles for Biomedical Applications	
14	PSF/NSLP/KP-NIFA (705)	Pilot scale production and popularization of compost tea as organic fertilizer nutrient source	1 st
15	PSF/NSLP/KP-AU (646)	Improvement in anti-tick vaccine efficacy against Pakistani strain <i>Rhipicephalus (Boophilus) microplus</i>	1 st
16	PSF/NSLP/P-FJWU(711)	Design and Application of Photocatalytic Nanocoatings for Treatment of Polluted Water	1 st
17	PSF/NSLP/C-QU (568)	Isolation of Brucella Species from Cattle and Buffaloes and Construction of a Gene Knock out Vaccine against Bovine Brucellosis	2 nd
18	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.	2 nd
19	PSF/NSLP/P-NIAB(658)	Control of Excessive Fruit Drop in Citrus and Improvement in Yield and Quality through Plant Nutrients and Growth Regulators Management	2 nd
20	PSF/NSLP/C-CIIT (663)	Exploring Potential of Eco Friendly Allelochemicals and Their Analogs to Manage Weed Infestation in Wheat (<i>Triticumaestivum</i> L.)	2 nd
21	PSF/NSLP/KP-UAP (691)	Physico-chemical and Hormonal Effects of Acupuncture Combined with Clonidine and Morphine Drug to Provide Analgesia in Goats	2 nd
22	PSF/NSLP/C-NARC (595)	DNA Based Identification of Adulteration in Meat and its Products	2 nd
23	PSF/NSLP/AJK-MUST (620)	Effect of Non-Catalytic Domain on Characteristics of Endoglucanase (Ce19A) from Locally Isolated <i>Bacillus licheniformis</i>	2 nd
24	PSF/NSLP/P-AU (489)	Development of Technology Rich Seeds for Improving the Performance of Crops	2 nd
25	PSF/NSLP/S-PARC (603)	Selection and Development of Chilli Varieties from Indigenous and Exotic Material in Lower Sindh	2 nd
26	PSF/NSLP/KP-AU (270)	Genetic Transformation of <i>Brassica Carinata</i> for Low Viscosity Biodiesel Production	3 rd

27	PSF/NSLP/P-AU (531)	Delivery of Protein and Micronutrients to School going Children through Shelf Stable Ready to Eat Crispy Nutribars	3 rd
28	PSF/NSLP/P-FCCU (655)	Insect Resistance Management by Vegetative Insecticidal Protein (VIP) Based Biopesticide	3 rd
29	PSF/NSLP/P-AU(167)	Development of Information Management System for Commercial Broiler and Layer Farm Data	3 rd
30	PSF/NSLP/P-BZU (394)	Nutritional Profiling and Antioxidant Potential of Selected Vegetables Waste and its Utilization for the Production of Value Added Foods	3 rd
31	PSF/NSLP/KP-NIFA(492)	Breeding high Yielding Mungbean (<i>VignaRadiata</i>) <i>L.Wilczek</i> genotypes for the agroclimatic conditions of Kuram Agency	3 rd

B: First Annual Reports

Sr. No.	Project No.	Project Title
1.	PSF/NSLP/KP-AU (647)	Development of simple photo-bioreactor for quality algal biomass and oil Production
2.	PSF/NSLP/B-BU(714)	Develop Web-accessible Documented and Illustrated Information on Plants of Balochistan
3.	PSF/NSLP/KP-AU (646)	Improvement in anti-tick vaccine efficacy against Pakistani strain <i>Rhipicephalus (Boophilus) microplus</i>
4.	PSF/NSLP/P-CIIT (664)	Evaluating the Potential of Zero Energy Cool Chambers (ZEEC) for Horticultural Crops
5.	PSF/NSLP/P-UAF (670)	Spectrochemical Studies of Pollutants in Soil, Water and Vegetation Using Laser Induced Breakdown Spectroscopy
6.	PSF/NSLP/C-IIU (683)	Development of Edible Vaccine Against Mastitis in Livestock by Transgenic Forage Grass
7.	PSF/NSLP/P-UVAS (689)	Use of Indigenous Fruit Extracts as Nutraceuticals and Their Therapeutic Efficacy Against <i>Clostridium perfringens</i> in Broiler Chicken
8.	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
9.	PSF/NSLP/P-UVAS (697)	Evaluation of Biological and Trans-Placental Potentials of Tick-Borne Diseases in Cattle
10.	PSF/NSLP/P-FCCU(699)	Evaluation of Selected Phytase Transgenic Wheat Lines in Soil under Contained Environment
11.	PSF/NSLP/P-UVAS(701)	Isolation, Molecular Characterization of Pathogenic

		Bacteria and Development of Fish Vaccine for Culturable Fish Species of Pakistan
12.	PSF/NSLP/P-UCP(712)	Optimization, Validation and Multiplexing of 11 ChrXMiniSTRs in Pakistani Population
13.	PSF/NSLP/P-BZU(713)	Formulation, Fabrication and Characterization of Self Assembling Bioreducible Chitosan Based Nanoparticles for Biomedical Applications
14.	PSF/NSLP/KP-NIFA (705)	Pilot scale production and popularization of compost tea as organic fertilizer nutrient source
15.	PSF/NSLP/KP-AU (646)	Improvement in anti-tick vaccine efficacy against Pakistani strain <i>Rhipicephalus (Boophilus) microplus</i>

C: Second Annual Progress Reports

Sr. No.	Project No.	Project Title
1.	PSF/NSLP/C-QU (568)	Isolation of Brucella Species from Cattle and Buffaloes and Construction of a Gene Knock out Vaccine against Bovine Brucellosis
2.	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.
3.	PSF/NSLP/P-NIAB(658)	Control of Excessive Fruit Drop in Citrus and Improvement in Yield and Quality through Plant Nutrients and Growth Regulators Management
4.	PSF/NSLP/C-CIIT (663)	Exploring Potential of Eco Friendly Allelochemicals and Their Analogs to Manage Weed Infestation in Wheat (<i>Triticumaestivum</i> L.)

D: Final Reports

Sr. No.	Project No.	Project Title
1.	PSF/NSLP/KP-AU (270)	Genetic Transformation of <i>Brassica Carinata</i> for Low Viscosity Biodiesel Production
2.	PSF/NSLP/P-AU (489)	Development of Technology Rich Seeds for Improving

		the Performance of Crops
3.	PSF/NSLP/S-PARC (603)	Selection and Development of Chilli Varieties from Indigenous and Exotic Material in Lower Sindh
4.	PSF/NSLP/KP-UAP (691)	Physico-chemical and Hormonal Effects of Acupuncture Combined with Clonidine and Morphine Drug to Provide Analgesia in Goats
5.	PSF/NSLP/P-AU (531)	Delivery of Protein and Micronutrients to School going Children through Shelf Stable Ready to Eat Crispy Nutribars
6.	PSF/NSLP/C-NARC (595)	DNA Based Identification of Adulteration in Meat and its Products
7.	PSF/NSLP/AJK-MUST (620)	Effect of Non-Catalytic Domain on Characteristics of Endoglucanase (Ce19A) from Locally Isolated <i>Bacillus licheniformis</i>
8.	PSF/NSLP/P-FCCU (655)	Insect Resistance Management by Vegetative Insecticidal Protein (VIP) Based Biopesticide
9.	PSF/NSLP/P-FJWU(711)	Design and Application of Photocatalytic Nanocoatings for Treatment of Polluted Water
10.	PSF/NSLP/P-AU(167)	Development of Information Management System for Commercial Broiler and Layer Farm Data
11.	PSF/NSLP/P-BZU (394)	Nutritional Profiling and Antioxidant Potential of Selected Vegetables Waste and its Utilization for the Production of Value Added Foods
12.	PSF/NSLP/KP-NIFA(492)	Breeding high Yielding Mungbean (<i>Vigna Radiata</i>) <i>L. Wilczek</i>) genotypes for the agroclimatic conditions of Kuram Agency

ANNEXURE-IX

LIST OF RESEARCH PUBLICATIONS PRODUCED FROM NSLP FUNDED PROJECTS DURING 2019-20

Sr. No.	Project No	Publications
1.	DNA Based Identification of Adulteration in Meat and its Products PSF/NSLP/C-NARC (595)	Muhammad Naeem Riaz, Sahir Hameed Khattak, ShehlaShoukat, Tahira Kamal, AttiqaJameel, Sania Begum, Akbar Nawaz, S. Ghazanfar, Yusuf Zafar and Ghulam Muhammad Ali. 2019. Mitochondrial genome based identification/ authentication of meat animal species using Mono/ Multiplex PCR: A public health perspective”. The Journal of Animal and Plant Sciences (Under review: Paper ID: Biot-18-0024).
2.	DNA Based Identification of Adulteration in Meat and its Products PSF/NSLP/C-NARC (595)	Shabana Iqbal, AnamMehwish, Sahir Hameed Khattak, Tahira Kamal, Sania Begum, Akbar Nawaz, Ghulam Muhammad Ali, Ahmad Ali & Muhammad NaeemRiaz. 2019. Mitochondrial Cytochrome b gene based identification of meat animal species of Pakistan. Sarhad Journal of Agriculture.
3.	Development of Technology Rich Seeds for Improving the Performance of Crops PSF/NSLP/P-AU (489)	Afzal, I., T. Javed, U. Nawaz and S.M.A. Basra. 2019. Development of coating technology for improving seed quality of direct seeded rice under submergence conditions.Acta Sci. Pol. HortorumCultus.
4.	Development of Technology Rich Seeds for Improving the Performance of Crops PSF/NSLP/P-AU (489)	Afzal, I., T. Javed, U. Nawaz and S.M.A. Basra. 2019. Does seed coating influence emergence, growth and yield of spring maize under cool conditions. International Journal of Agriculture and Biology.

**LIST OF APPROVED PROJECTS UNDER PSF-NSFC CHINA JOINT INITIATIVE
(3rd CALL)**

Sr. No	Project Title	Name, Designation, Department and Organisation of Pakistani PI	Chinese PI name and Address
1.	Cooperative development of an innovative auto-ID platform for the beetles from China and Pakistan	Muhammad Abbas PMNH, Garden Avenue, Shakarparian, Islamabad.	Ming BAI Box-92, Institute of Zoology, Chinese Academy of Sciences no. 1, Beichen west road Chaoyang District Beijing P.R. China
2.	Integration of ultrasound and nano technology based approaches for enhancing the therapeutic efficacy of prostate cancer	Dr. Waheed S. Khan Nano-Biotechnology Group, NIBGE Jhang road, Faisalabad	Prof. Dr. Zhifeidai No. 05, Yiheyuan road Haidian District Beijing 100871 china
3.	Designing of super molecularnanocarriers based chemotherapy to overcome side effects of anti-cancer drugs and improve their efficacy by co-drug delivery enhanced bioavailability	Prof. Dr. Muhammad Raza Shah International Center for Chemical and Biological Sciences H.E.J. Research institute of chemistry, University of Karachi	Prof. Dr. Dong-Sheng Guo College of Chemistry, Nankai University, Tianjain China
4.	Molecular mapping and map based cloning of disease resistance genes and developing new disease resistant wheat germ plasm	Dr. Awais Rasheed Department of plant sciences, QAU, Islamabad.	Prof. Xian Chu Xia Institute of Crop sciences ChineseAcademy of Agricultural Sciences Beijing, China
5.	Multi-Omics Analysis to investigate Chemotherapeutic Drug resistance associated Biomarkers &Molecular mechanism in Colorectal Cancer	Dr. SaminaEjaz Department of Biochemistry & Bio technology Bagdad Campus Faculty of Science the Islamia University of Bahawalpur, Pakistan	Prof. Dr. Shufang Liang, State key laboratory Biotherapy & Cancer Centre, West China Hospital, Sichuan University No. 17, 3 rd section of peoples South road Chengdu.

6.	Mining for private/unique genes preserve in rare rapessed (brassica napus)germ plasm regulating drought and salinity tolerance and special seed nutrition quality based on genome structural variation analysis of a core collection	Prof. GhulamJilani Institute of Soil Science PMAS Arid Agricultural University, Rawalpindi	Prof. Lixi Jiang Department of Agronomy,College Of Agriculture and Bio Technology, ZheJiangUniversity, Hang Zhou, China
7.	Sustainable bio energy development in emerging economies under global changes: current practice, prescription, response and management	Dr. Muhammad Abid Assistant Prof Centre for Climate Research and Development, COMSATS University, Park Road, Islamabad.	Prof. Dr. Shiwei Yu School of Economic and Management China University of Geo Sciences Wuhan, China
8.	Inter-generational epigenetic transmission of <i>staphylococcus aureus</i> mastitis and functional validation of resistance genes in China & Pakistan dairy cattle	Dr. Tahir Usman College of Veterinary Sciences and Animal Husbandry, Garden Campus, Toru Road , Abdul Wali Khan University, Mardan.	Prof. Yuying College of Animal Science & Technology, China Agricultural University Number:02 Yuanming Yuan West road, Haidin district Beijing China
9.	Revealing mechanistic basis of salt secretion in halopythic grasses to improve salinity stress tolerance in cereal crops	Prof. BilqueesGul Institute of Sustainable Halophyte Utilization, University Of Karachi.	Prof. Sergey Shabala Foshan university, Jiangwanyilu no.1, Foshan, China

ANNEXURE –XI

**SCIENTIFIC CONFERENCES/ SEMINARS/ SYMPOSIA/ WORKSHOPS FUNDED
FINANCIAL SUPPORT TO SCIENTIFIC SOCIETIES IN PAKISTAN (PHASE-II)**

Sr. No	Topic	Nature of the Event
1.	International Conference on “Recent Innovations in Molecular Sciences”	Conference
2.	Mountainous Agriculture and Soil Health	Seminar
3.	Sustainable Soil Management under Changing Climate	
4.	18 th International Congress of Soil Science on “Wise Soil Management Ensures Better Environment and Livelihood”	Conference
5.	Preparing for Our Digital Economy	Symposium
6.	The Future of Engineering in Pakistan	Symposium
7.	Climate Change and Capture of Co2	Symposium
8.	Emerging Technologies	Symposium
9.	Knowledge Management and Academia: Need for Knowledge Survey	Workshop
10.	Technology Impact Assessment	Workshop
11.	Block Chain	Workshop
12.	Parameters of Technology Transfer	Workshop
13.	Assessing Data and Information Quality	Workshop
14.	Plant Life of South Asia	Symposium
15.	40 th Pakistan Congress of Zoology	Conference
16.	15 th Islamic Countries Conference on Statistical Sciences	Conference
17.	8 th International and 15 th National Weed Science Conference “Sustainability through Vegetation Management “	Conference
18.	World Water Day 2020: Water and Climate Change	Seminar
19.	Solid Waste Disposal and Recycling	Seminar
20.	Gems Cutting and Polishing	Workshop
21.	Problems of Mining, Mineral Processing and Exports	Symposium

LIST OF JOURNALS 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 Physiological Society	Pakistan Journal of Physiology
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.	Pakistan Journal of Weed Science	Weed Science Society of Pakistan
10.	International Journal of Economic and Environmental Geology	Society of Economic Geologists & Mineral Technologists (SEGMITE)

Sr. No.	Title of Conference/workshop Symposium	Name and Address of Organizer
1.	4 th Invention to Innovation Summit Balochistan-2019 on September 24-25, 2019	Prof. Emeritus Dr. Javeid Iqbal Pride of Performance (Edu) Vice Chancellor University of Balochistan, Balochistan
2.	Project Automatic Garbage Collector Robot	Dr. Arsalan Ansari Department of Electronic Dawood University of Engineering & Technology Karachi (0.2405 m)