ANNUAL REPORT

2002 - 2003

Pakistan Science Foundation

PAKISTAN SCIENCE FOUNDATION

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PAKISTAN SCIENCE FOUNDATION
CONSTITUTION AVENUE
ISLAMABAD

LETTER OF TRANSMITTAL

Dear Mr. Secretary,

I have the honour to enclose herewith the Annual Report of the Pakistan Science Foundation for the fiscal year 2002-2003, alongwith its audited accounts, as adopted by PSF Board of Trustees for submission to the National Assembly as required by the Pakistan Science Foundation's Act No. III of 1973.

With regards

Yours Sincerely

Dr. Farid A. Malik
Chairman
Pakistan Science Foundation
Islamabad

Secretary
Ministry of Science and Technology
Government of Pakistan
Islamabad

PAKISTAN SCIENCE FOUNDATION

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Dr. Farid A. Malik

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Dr Farid A. Malik (since 13.8.2002)	Chairman
Vacant	Member Science
Mr. Muhammad Owais Qureshi (since 13.11.2002)	Director/Member Finance

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1.	Prof. Dr. Shahzad A. Mufti (upto 13.8.2002)	Chairman
	Dr Farid A. Malik (since 13.8.2002)	Chairman
2.	Vacant	Member Science
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11. Dr. Ishfaq Ahmed, N.I., H.I., S.I., Special Adviser to the Chief Executive, Chief Executive Secretariat, Islamabad .

12. Lt. Gen. (R) Shujaat Hussain, Rector, National University of Science & Technology, Rawalpindi.

13. Prof. Misbah-ul-Ain Khan, House No.459-A, Block 'C', Faisal Town, Lahore.

14. Prof. Dr. M. Qasim Jan, Vice-Chancellor, Sarhad University of Computer & Management Sciences, Phase-V, Hayatabad, Peshawar.

15. Prof. Dr. Akhtar Kasi, Director, Centre of Excellence in Mineralogy, University of Balochistan, Quetta.

16. Dr. M. Sharif Bhatti, 197-A Ahmed Block, New Garden Town, Lahore.

17. Dr. Gulfaraz Ahmed, House No.71, Street No.1, F-6/3, Islamabad.

18. Dr. Fazal Ghani Khattak, Principal Engineer, Hydrocarbon Development Institute of Pakistan, Sector H-9, Islamabad.

19. Prof. Dr. Zafar H. Zaidi, Ex-Vice Chancellor, University of Karachi, Karachi **(Deceased)**

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LIST OF ABBREVIATIONS

Provinces

AJK	Azad Jammu and Kashmir
B	Balochistan
C	Centre
F	Frontier
P	Punjab
S	Sindh

Sponsoring Institutions

AKU	The Aga Khan University, Karachi
ARIQ	Agriculture Research Institute, Quetta
P-AU	Agricultural University, Faisalabad
BU	Balochistan University, Quetta
BZU	Bahauddin Zakaria University, Multan
CEMB	Centre of Excellence in Molecular Biology, Lahore
CEME	College of Electrical and Mechanical Engineering, Rawalpindi
CEWRE	Centre of Excellence in Water Resources Engineering, Lahore
GC	Government College, Lahore
GU	Gomal University, D.I. Khan
KU	Karachi University, Karachi
NARC	National Agricultural Research Centre, Islamabad
NIBGE	National Institute for Biotechnology and Genetic Engineering, Faisalabad
NSFC	National Science Foundation of China
PMNH	Pakistan Museum of Natural History, Islamabad
PINSTECH	Pakistan Institute of Nuclear Science and Technology, Islamabad
F-PU	Peshawar University, Peshawar
P-PU	Punjab University, Lahore
QAU	Quaid-i-Azam University, Islamabad
SALU	Shah Abdul Latif University, Khairpur, Sindh
SIUT	Sindh Institute of Urology & Transplantation, Karachi
SU	Sindh University, Jamshoro
PCCC	Pakistan Central Cotton Committee, Sakrand
UAA/UAAR	University of Arid Agriculture, Rawalpindi

Disciplines

Agr	Agricultural Sciences
Bio	Biological Sciences
Biotech	Biotechnology
Eng	Engineering Sciences
Med	Medical Sciences
Phys	Physical Sciences
Chem	Chemical Sciences
Earth	Earth Sciences
Envr	Environmental Sciences

EXECUTIVE SUMMARY

PAKISTAN SCIENCE FOUNDATION (PSF)

Pakistan Science Foundation is the 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 three broad categories:

i) To promote basic and fundamental research in universities and research institutes on scientific problems related to socio-economic needs/development of the country.

ii) To increase public awareness about science through science promotion activities by establishing museums, clubs, herbaria and planetaria etc.

iii) To establish centers for comprehensive scientific and technological information systems.

The activities of the Foundation revolve around these objectives, some of which 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 the PSF Science Wings, and are reflected as under:

RESEARCH SUPPORT

Research support is the principal programme of the Foundation for the promotion of basic and fundamental research relevant to the socio-economic needs of the country. During 2002-2003, a total of 134 projects in the fields of Agriculture, Biology, Biotechnology, Chemistry, Earth, Engineering, Medical and Physics came under consideration for funding. Among these, 68 projects were newly received while 66 had been carried over from the previous year. Out of these, 27 projects costing Rs.20.081 million were sanctioned in various fields. In addition, an amount of Rs.0.376 million was released to various institutions as institutional support grant for purchase of laboratory equipment, and accessories.

Monitoring and evaluation of the on-going research projects sponsored by the Foundation is an important function of the Research Support Programme. During the year 2002-2003, seventy nine (79) technical reports of ongoing studies including semi-annual and annual reports were received and assessed by the staff and experts. During the period under report, 22 studies/projects in various fields were completed. The final reports of these projects were reviewed by the subject experts.

One of the main achievements and usefulness of any research is the publication of its results in scientific journals. As many as 33 research papers from PSF funded projects were published in different scientific journals. In addition, 7 Ph.D., 35 M.Phil and 8 MSc (Hons) degrees were awarded to the Research Associates employed under PSF supported projects.

To enable scientists to share their knowledge and research experience with each other, the Foundation provides partial financial assistance to Universities and R&D organizations for organizing Science Conferences, Seminars, Symposia, Workshops etc. This is a continuing activity of the Foundation. The Foundation provided financial assistance amounting to Rs.0.670 million to various Universities and R&D organizations for organizing 13 National and International Science Conferences, Seminars, Symposia, etc.

Scientific research is further supported by giving annual grant-in-aid to various societies for publication of technical journals. During the year, a total amount of Rs.0.185 million was released for the purpose.

SCIENCE POPULARIZATION

Popularization of Science is one of the statutory functions of Pakistan Science Foundation. Popularization and promotion of science has also been emphasized in the National Science and Technology Policy. The Foundation is engaged in science popularization activities at national level with the aim of increasing awareness about the role played by science in the development of a nation. In order to achieve this objective the Foundation has taken up a number of programs including science exhibitions, fairs, science film shows, popular science lectures and science quiz competitions etc. as summarized below

Science Caravan is a Mobile Science Exhibition that has been designed to increase public awareness about science and to motivate the younger generation of Pakistan towards the study of science. Through the Mobile Science Exhibition, the people living in rural and backward areas of the country are exposed to some of the most fascinating scientific and technological developments of modern world. All narrations are in national language, and are accompanied by simple illustrations. At present, five Science Caravan Units are operating in Balochistan, Sindh, NWFP, Punjab and Federal Area. During the year under report, the Caravan units organized 26 mobile exhibitions and planetarium shows, wherein 373 schools brought their students to witness the exhibition and planetarium/film shows.

The Foundation continued its science promotion activities such as Essay and Poster competitions, distribution of Science Magazines, Books, Posters and Leaflets among the schools, colleges and S&T organizations.

Laboratory equipment was purchased for donation to five High schools of NWFP & Punjab provinces. 50 copies of the book entitled: Water and New Technologies edited by renowned scientist Dr. Ashfaq Ahmed Special Advisor to the Prime Minister were acquired for distribution to various universities and R&D organizations. 12000 copies of Global Science were donated to High schools . 12th Intra & Inter Board Science Essay and Poster Competition were organized. During the report period, collaboration with UNESCO in their project "Breaking the Poverty Cycle of Women: Empowering the Adolescent Girls to become the Agents of Social Transformation continued.

PLANNING & DEVELOPMENT

During the report period, Development funds amounting to Rs. 11.294 million were received against the total allocation of Rs. 30.914million for the following five development projects.

1. **Financial Support to Scientific Societies in Pakistan.**

During the year under report an amount of Rs. 3.06 million was paid to 10 Scientific Societies

2. **Participation of Scientists and Technologists in International Conferences, Seminars and Workshops.**

During the report period, as many as 106 travel grant requests were received, out of which 79 requests were approved by the Foundation at a total cost of Rs.5.73 million, However, only 40 scientists could avail the grants. The remaining could not attend their conferences due to visa restrictions/non-availability of flights. Funds amounting to Rs. 3.289 million were released in this regard.

3. **Funding of Scientific and Technological Research in Universities and other R&D Organizations.**

During the period, 40 new projects, were approved for funding by the Foundation at an estimated cost of Rs. 24.38 million. Further, 30 semi annual and 1st annual reports of the ongoing projects were received and were processed accordingly.

4. **Career Development of Young Scientists.**

During the report period, a total of 19 projects were under process. Out of these, 9 research projects in Biological Sciences were approved for funding by the Foundation at a total cost of Rs. 1.668 million. In this way, 9 employed young scientists were provided grants for initiation of research work.

5. **Popularization of Science in Rural areas.**

During the year 2002-2003, An amount of Rs.3.500 million was released during the report period. Necessary items & equipment for the project were purchased through tenders.

PAKISTAN MUSEUM OF NATURAL HISTORY (PMNH)

The scientists and associated staff of Pakistan Museum of Natural History remained engaged in the collection, curation and preservation of natural history specimens and research on flora, fauna and geology of Pakistan. A number of field-works were carried out in various localities of Sindh, Punjab, NWFP, Northern Areas and AJK. About 6000 natural history specimens, comprising of plants, animals, rocks, minerals and fossils were collected and added to the reference collection of PMNH. Research was conducted on various aspects of the natural history of the country, which resulted in the production of many research articles. During this period, 14 research articles and several abstracts were published in national and international journals.

The Display Centre of Pakistan Museum of Natural History was inaugurated by Dr. Atta-ur-Rehman, then Minister of Science & Technology, on 30 th October, 2002.

Work on new development projects "Biodiversity of Pakistan: Databases and Global Networking" and "Virtual Orientation Gallery" was continued and nearing completion.

A PC-1 on 'Pakistan Institute of Natural Sciences (PINS)' has been prepared and submitted to Higher Education Commission for funding. It envisages the setting up of a higher degree-awarding institute in the fields of Natural Sciences utilizing the expertise of the PMNH scientists. A revised PC-1 Phase III for the completion of PMNH building has been submitted to Ministry of Science & Technology. Several research projects funded by Pakistan Science Foundation and other agencies were completed and new projects initiated by the scientists of PMNH. The officers of PMNH participated in training programme on Management.

PAKISTAN SCIENTIFIC AND TECHNOLOGICAL INFORMATION CENTRE (PASTIC)

PASTIC is one of the organs of PSF, established to undertake comprehensive scientific and technological information and dissemination. Its main objective is to collect, organize, classify and disseminate information in all disciplines of Science and Technology to the scientific community of Pakistan. With its National Centre at Islamabad and five sub-Centres at Karachi, Lahore, Quetta, Peshawar and Faisalabad PASTIC develops inter-library cooperation for sharing resources, establishes and maintains links with international/regional information networks/agencies. It trains information specialists in modern information handling and management techniques.

During the report period, more than 1384 requests for supply of articles were received, against which 883 were honored. 11416 references from International Databases on CD ROM were supplied to 585 researchers/users against 596 orders on S&T topics. Besides, this bibliographic information service and resources of PASTIC Sub-Centres, were strengthened by supplying databases on CD-ROM.

PASTIC publishes "Pakistan Science Abstracts" on regular basis. During the report period, PSA, 2000 Vol. 40, No. 1-4 was published. Besides, 32 Pakistani Scientific Journals were scanned and 398 research articles were abstracted, indexed and classified for next volume of PSA. PASTIC brings out Directory of Scientific and Technological Periodicals of Pakistan for which a web based database was developed and data of 250 scientific periodicals of Pakistan was computerized. Serial holdings record of 200 libraries was computerized for which a web based database was developed for the preparation of Union Catalogue. Under Reprographic Services of PASTIC, about 12,62,465 impressions, 3610 pages and 87,167 copies were printed and produced by the Reprography Unit against 99 jobs received from 11 organizations.

PASTIC library added to its collection some 411 issues of various S&T periodicals, 47 documents and 32 books. The subscription of 4 databases on CD-ROM was renewed and 3 new databases were purchased.

International liaison is the prominent activity of PASTIC as it is the National Focal Point for International/Regional Information Networks, like SAARC Documentation Center, WHO/CEHANET and UNEP/INFOTERRA. The PASTIC also acts as coordinating/collaborating body for UNDP/TIPS, UNESCO/ASTINFO etc. During the report period, information/data from these organizations was collected and disseminated to various institutions and professionals. In addition, WINISIS (English Version) was provided to nine organizations and Arabic Version to one organization. Also Training/Assistance was provided on WIN/ISIS Package to Librarians from different organizations at Islamabad.

A development project entitled Establishment of National Science and Technology Database/Information Network at PASTIC was under execution during the report period. Under the project, PASTIC imparted training on computer applications for Office & Library Automation. Furthermore, during the report period ten (10) workshops/trainings were organized at Islamabad, Lahore, Muzaffarabad, Faisalabad, Peshawar and Quetta.

Under Tips service information on 515 technological offers from 42 countries was provided to its subscribers in Pakistan. Similarly, information from 34 Pakistani companies about their products and services was disseminated to 50 TIPS member countries. TIPS organized a computer, office equipments & IT exhibition from 21-22 July, 2002 at Islamabad. White Meat Journal, Vol. 6, Issue No. 1, June 2002 was published and distributed to 204 organizations.

An initiative was undertaken for implementation of ISO 9000 in PASTIC. Public Service Section of PASTIC was under ISO Certification. As part of the activity, lectures and trainings were arranged for PSF/PASTIC & PMNH Officers on Management topics, ISO Certification and Quality Management. Establishment of Intellectual Property Service and Entrepreneurship Development Centre at National Centre and all its Sub-Centers were also underway.

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 having a bearing on the socio-economic needs of the country. 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 economy of the country.

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) 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/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 given in the chapters that follow.

CHAPTER - 1

ACTIVITIES & PROGRAMMES

The activities and programmes undertaken by the Foundation for the performance of its statutory functions can be broadly divided into the following four categories:

i. Establishment of Comprehensive Scientific and Technological Information and Dissemination Centers.

ii. Promotion and Financing of Scientific Research in the Country and the Utilization of the Research Results.

iii. Promotion and Popularization of Science in Society.

iv. International Liaison.

The first activity is carried out through Pakistan Scientific and Technological Information Centre (PASTIC), a subsidiary organization of PSF. While other functions i.e., research support and science popularization etc., are performed by the Science Wing of the Foundation. Functions of the Science Wing of PSF are further subdivided as under.

(I) **Research Support Section** is performing the following activities:

1. Research Support
    a) Grants for Research Projects
    b) 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. Planning and Development Program

(II) **Science Popularization Section**, which carries out science popularization activities including Science Caravans, Science Clubs, Science Fairs and holding Popular Science Lectures, Workshops, Conferences and Symposia.

In addition to PASTIC, the other subsidiary organization of PSF is the Pakistan Museum of Natural History (PMNH), 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.

The progress of the work carried out by the Science Wing of the Foundation, PMNH and PASTIC during the year 2002-2003 is summarized in the following pages.

PAKISTAN SCIENCE FOUNDATION (PSF)

1. RESEARCH SUPPORT

During the year under report, the Foundation carried out a number of programmes for the promotion of basic and fundamental research in universities and other institutions on scientific problems relevant to the socio-economic development of the country. These programmes include:

(a) Grants to research projects submitted by individuals or groups of scientists in the universities and research institutions throughout the country.

(b) Institutional support to scientific institutions for provision of equipment, literature, staff training facilities etc, to build institutional capability for conducting research.

(c) Support for participation in regional and international research programmes.

a) Grants for Research Projects

Research Support is the principal programme of the Pakistan Science Foundation for the promotion of basic and fundamental research having relevance to the socio-economic needs of the country. Under this programme, research proposals received on a prescribed format are processed for funding by the Foundation. The criteria for funding of research projects by the Foundation are; competence of the scientific personnel to carry out research, institutional capabilities i.e., availability of basic equipment and laboratory facilities, scientific merit of the proposed research projects and likelihood of completion of the proposed research within the stipulated time. Each proposal, after getting review report from expert in the particular field, is placed before the Relevant Technical Committee for technical evaluation and recommendations regarding provision of funds under various heads of expenditure proposed by the researchers. The proposal, if recommended by the Technical Committee, is then submitted to PSF Executive Committee for final approval.

During the report period, a total of 134 proposals remained under active consideration of the Foundation. Out of those, 68 were new proposals requesting funds totaling to Rs.106 million in the fields of Agriculture, Biology, Chemistry, Biotechnology, Earth Sciences, Engineering, Medical, and Physics. While 66 proposals, at various stages of their processing were carried over from previous year.

Out of the reviewed projects, during the year, 27 succeeded in getting the approval of the Foundation at a total cost of Rs. 20.081 million. List of the approved projects is at Annexure-II.

b) Institutional Support

Pakistan Science Foundation assists the universities and research institutions by providing them Institutional Support Grants for the purchase of equipment, chemicals,

literature etc. for research workers, who for one reason or another are unable to obtain these from their own institutions. This is meant to strengthen the research capabilities of those institutions to enable them to conduct research directed towards the solutions of the problems of national importance. During the report period, grants amounting to Rs.0.376 million were sanctioned to the following institutions for the purchase of equipments.

S. No.	Institution	Purpose	Amount
1.	Pakistan Museum of Natural History, Islamabad.	Digital Camera for Microscope.	Rs. 325,000/-
2.	Pakistan Museum of Natural History, Islamabad.	Purchase of printers	Rs. 51,000/-
		Total:	**Rs. 376,000**

2. RESEARCH MONITORING AND EVALUATION

The Foundation evaluates the technical progress as well as financial position of on-going projects continuously till the completion of the projects. During the report period, 101 semi-annual, 1st annual, 2nd annual and final reports were received and their progress evaluated as per procedures laid down by the Foundation.

a) On-Going Projects

During the year,79 reports (semi-annual, 1st annual and 2nd annual) were received. The PSF relevant staff scrutinized the semi-annual reports, whereas the annual reports, after initial scrutiny, were sent for evaluation to the subject experts to assess the interim progress of the projects. It may be mentioned that due installments of on-going projects are released only if their interim progress at the end of each project year is satisfactory. An amount of Rs. 12.759 million was released on account of due installments of ongoing and 1st installment of newly approved projects. A list of the semi-annual and annual reports is given in Annexure-III.

b) Completed Projects

Final Technical Reports of 22 research projects (Annexure-IV) were received during the year under report. The subject experts evaluated these reports and were subsequently submitted along with their evaluation reports to the relevant PSF Technical Committees for consideration and adoption. Brief summaries of these completed projects are given below.

Brief Summaries of completed Projects

Project No. **P-AU/Agr (155)**

Project Title: **Breeding for Seedless Kinnow- A Biotechnology Approach.**

Duration:	3-Years
Date of Initiation:	01.10.1994
Date of Completion:	30-09-1997
Location of Scheme:	University of Agriculture, Faisalabad.
Principal Investigator:	Dr. Mohammad Mumtaz Khan
Total Expenditure:	Rs.3,12,040/-

Main Objectives:

- To regenerate triploid/seedless kinnow plants embryo rescue after 2 N x 4 and 4 N x 2 crosses.
- To cross 4 N kinnow with 2 N citrus specimen other than kinnow followed by embryo rescue.
- To induce embryonic callus from immature crossed embryos and to regenerate triploid populations.
- To regenerate triploid/seedless kinnow plants from endosperm explants taken from diploid kinnow seeds.
- To confirm the ploidy of regenerated plant by cytological examination and morphological comparison.

Summary of work done:

Interploid crosses were made to produce triploid by exploiting tetraploid and diploid Kinnow, Succari and Sweetlime parents. Diploid Kinnow was found to be the best seed parent and tetraploid Kinnow as a better pollen parent for fruit set but seed set was better when tetraploid was used as seed parent.

The problem of embryo abortion was successfully solved by invitro embryo rescue. Embryogenic callus from zygotic embryos was also induced and regeneration was achieved.

Morphological comparison was also made between diploid, tetraploid, and hybrids which indicated many variations in angle of leaf petiole, length of leaf blade (cm), petiole and stem girth. All the hybrids were placed under similar growth conditions in a greenhouse. In visual observation the differences were found in surface, texture and shape of leaf, upper and lower surface and color of leaf.

Number of chloroplasts were directly proportional to the ploidy level of the plant. The chloroplast number of tetraploid plants was almost twice than that of diploid plants. On the basis of number, width, length of stomata and number of chlroplasts, several

hybrids were found authenticated triploids on the basis of four stomatal parameters. One can not fully rely on stomatal parameters for characterization of hybrids because difference in these parameters are dependent on cultivar type. Cytological studies revealed high proportion of triploids in crosses of 4x crossed with 2x Kinnow. Low proportions were found in 4x Kinnow used as pollen parent with 2x Kinnow and Succari seed parent.Tetrploid Kinnow seed parent crossed with diploid Succari also yielded low number of triploids.

The colchicine treatment induced significant morphological differences for all parameters studied. Statistical analysis showed significant differences for shoot length, leaf length and width, chloroplast density and nonsignificant differences for sprouting percentage and days to bud sprout. Differences were observed in surface, texture and shape of leaf, upper and lower surface and colour of leaf.

Induction of callus and embryogenesis from juice vesicles, albedo tissues and immature embryos of diploid and tetraploid Kinnow was carriedout. Callus initiation occurred from the juice vesicles and albedo tissues on all the nutrient medium within 15 and 30 – 40 days respectively. Callus initiation from embryos was much delayed i.e two months. Maximum callus growth was observed on cultures from albedo tissues of tetraploid origin and in juice vesicles of diploid origin.

The research venture would have helped in the development of different protocols for the in virto regeneration of seedlessness/triploidy in Kinnow leading towards the elimination of the complaints regarding juice bitterness during processing.

Project No.	**F-GU/Agr (158)**
Project Title:	**Evaluation of the Economics of Various Rice-Based Cropping Systems under D.I. Khan Conditions.**
Duration:	3-Years
Date of Initiation:	01-05-1995
Date of Completion:	30-04-1998
Location of Scheme:	Gomal University, D.I. Khan.
Principal Investigator:	Dr. Khalil Ahmed
Total Expenditure:	Rs.2,91,053/-
Main Objectives:	• To study the total biological and economic yield from different cropping systems. • To study the economic of the different crops on the fertility level and yield of succeeding

crop.

- To study the effect of different crops on the fertility level and yield of succeeding crop.
- Based on these studies recommendations of the most economical cropping systems will be made to the growers/farmers of the locality.

Summary of work done:

The following two sets of experiments were under taken to assess one of the best cropping system and its economics.

1. Studies of different cropping systems
2. Effect of different NP fertilizer levels on different cropping systems.

Studies on different cropping systems.

The experiment was designed to study the agro-economic relationship of eight different pre-assigned legume and non legume cropping systems, including five legumes and five non legumes crops and a fallow during summer (Kharif) followed by wheat during winter (rabi) season. This trial was completed in two years. All the cropping systems were arranged in randomized complete block design (RCBD) using three replications. The experiment was established by laying out 24 plots of 5 meters in width and 15 meters in length. The experiment was initiated in its first phase during kharif 1995 with the sowing of different pre-assigned crops in the respective (randomised) plots. After the harvest of first phase crops, the other legume and non-legume crops including different systems were planted during rabi 1995-1996 in their respective plots. This complete one cycle of the cropping systems. During second year in 2^{nd} cycle of the trial pre-assigned different kharif crops were sown in the respective plots

During kharif 1996, and again the 4^{th} phase crops were planted in all plots during rabi 1996-97.

Effect of different NP fertilizer levels on different cropping systems

The experiment was conducted at the same locations in RCB Design in split plot arrangement with three replications.

In both cycles, all the agronomics practices were kept uniform for planting rice. The land was prepared to fine and firm seedbed by ploughing and harrowing. The stubbles of the previous wheat crop were incorporated in the soil by using rotavator. The coarse rice variety IR-6 kg ha^{-1} was planted. The whole of phosphorus was applied at the rate of 60 kg ha^{-1}. The whole of phosphorus was applied at the time of final seedbed preparation. The nitrogen was applied at two stages i.e. half of the nitrogen at the time of final land

preparation while the remaining half at panicle emergence stage. Transplanting was done on a flooded soil by trained manual labour using 30 days old seedlings. Plant to plant and row to row distances were maintained at 20 Cm. Five centimeter irrigation water were maintained in plots from transplanting till maturity. The supply of irrigation water was stopped one week before harvesting when signs of maturity appeared.

Maize variety AZAM, both for fodder and grain purpose was planted in their respective plots according to pre-assigned randomization using recommended agronomic practices and were kept uniform in case of maize fodder. The seeds are increased while row-row and plants-plant distances were decreased.

In both the cycles all the agronomic practices were kept uniform for planting wheat. The land was prepared to fine and firm seedbed by ploughing and harrowing. A recommended wheat variety Inqilab-91 was planted with the help of man driven single row hand drill in rows 30. Cm apart. Nitrogen at the rate of 120 kg/ha and phosphorus at the rate of 60 kg/ha was applied. The whole of the phosphorus was applied at the time of final seedbed preparation. The nitrogen was applied at two stages i.e. half of the nitrogen at the time of final land preparation while the remaining half with second irrigation.

During kharif 1996, cotton crop was planted on a well-prepared fine and firm seedbed. A recommended cotton variety *Karishma* was planted in rows 75 cm apart. The sowing was done with dibbling three seeds per hill to ensure a uniform stand later thinned to one plant per hill. The holes were filled by sand in order to avoid compaction of the soil. Nitrogen at the rate of 120 kg/ha and phosphorus at the rate of 60 kg/ha were applied. The whole of the phosphorus was applied at the time of final seedbed preparation. The nitrogen was applied in two split doses i.e. the first dose was given with first irrigation while the second dose was applied at flowering stage. All the other agronomic practices were kept constant and uniform for cotton crop in different cropping systems.

All rabi legume crops were established using agronomic practices recommended for each crop. After the harvest of first phase crops (Kharif 1995), land was prepared for the second phase (rab 1995-96) to plant different legume crops. The field layout was established according to the pre-assigned different legume crops in different cropping systems are Gram *(Cicer arietinum L.)* Berseem *(Trifolium alexandrinum L)* Pea *(Pisum sativum L).* Mung bean *(Vigna radiata L) Wilezek)* Sysbania *(Sesbania aculeate L)* as green manure crop.

Project No.	**P-AU/Agr (192)**
Project Title:	**Development of Maize Population for Fodder Purposes.**
Duration:	3-Years

Date of Initiation:	01-05-1997
Date of Completion	30-04-2000
Location of Scheme:	University of Agriculture, Faisalabad.
Principal Investigator:	Dr. Syed Sadaqat Mehdi
Total Expenditure:	Rs.2,19,037/-

Main Objectives:

- Selection and intercrossing of plants having faster growth rate and heavy foliage for fodder.
- Establishing relationship among plant traits for the development of maize population for fodder purposes.
- Estimating the genetic components of various plants for improving the population.
- Development of a maize population with increased tonnage of fodder.

Summary of work done:

One hundred S0 families selected out of 500 families on the basis of fresh shoot weight were further evaluated for green fodder yield under field conditions. The value of genetic coefficients of variation was found high (29.97%) for green fodder yield per plant suggesting greater variability for the said trait. Green fodder yield had positive and significant phenotypic correlation with number of leaves per plant and plant height. High relative expected genetic advance (18.82%) was also found for green fodder yield compared to other indicated traits.

On the basis of genetic coefficient of variation, interrelationships and relative expected genetic advance, it is concluded that green fodder weight can be used as selection criteria while selecting superior S, families in maize. A selection intensity of 20% from the families revealed an average improvement of 424.2 g compared to 234.6 g green fodder yield. Twenty selected S, families (out of one hundred families) were inter-crossed, seed multiplied and bulked to have a new maize population called 'Intercrossed Population'. The newly developed maize fodder population (i.e Intercrossed Population) was compared for fodder traits with other five maize genotypes, raised for fodder purposes. Their comparisons revealed that Intercrossed Population performed better for number of leaves per plant, plant height and green fodder yield.

Project No. **P-AU/Agr (223)**

Project Title: **Development of Commercial Diet for Rearing of Lacewing, *Chrysoperla Carnea:* A Biological Control Agent.**

Duration:	2-Years
Date of Initiation:	01.07.1999
Date of Completion:	30-06-2001
Location of Scheme:	PCSIR Labs Complex, Lahore.
Principal Investigator:	Dr. A.F.M. Ehteshamuddin
Total Expenditure:	Rs.2,09,160/-
Main Objectives:	• To develop artificial diets separately for larvae and adults of *Chrysoperla carnea.* • To develop an economical method for its mass-rearing. Mass-rearing of the lacewing in the laboratory.

Summary of work done:

For mass-rearing of the green lace-wing, *Chrysoperla carnea,* in the laboratory, two sets of artificial diets, one for the adults and the other for the larvae of this predator, were prepared for testing. The artificial diets prepared for rearing of the adults were tested by studying the fecundity. The diets for larval rearing were tested by studying the larval developmental time, per cent pupation and emergence of the adults.

The number of eggs laid on diet A ranged from 352-611 (avg. 474.75) with an oviposition period of 33-44 (avg. 38.75) days. The diet B provided 296.5 eggs on an average with productive life span of 26.25 days. The diet C showed promising results with the highest range of 639-657 (avg. 646.25) eggs and 43-44 (avg. 43.5) days of productive life span. When these averages of fecundity and productive life span of females were compared with those obtained by feeding the natural diet of honey-water solution (50:50), it was found that all the three diets were good enough to rear the adults successfully in the laboratory.

But when the three artificial diets were compared with each other, it was found that the diet C was much better than the diets B and A for mass-rearing of the adult insects.

Out of three artificial diets tested for larvae, two diets showed successful development of larvae. The larval span on diet A ranged from 15-17 days with an average of 16.25 days. The pupation and emergence of adults from pupae ranged from 76-89 and 73-90 per cent respectively. The larval span on diet B ranged from 21-24 days with an average of 22.75 days. The pupation and emergence of adults from pupae ranged from 51-55 and 62-78 per cent respectively. The diet C showed very poor results because even a single larva could not pupate successfully. When the average figures of larval span and percent pupation and emergence of larvae of the green lace-wing fed on artificial diets A and B were compared with those obtained by feeding the larvae on natural diet of aphids, it was found that the artificial diet A showed satisfactory results with slightly prolonged

larval span and less per cent pupation and emergence, while the diet B showed double period of larval development than the natural diet of aphids. So it was concluded that the artificial diet A can be used for mass-rearing of the larvae in laboratory due to its cheapness and easy formulation than the natural diet.

Project No.	**F-AU/Agr (232)**
Project Title:	**Assessment of Soil Losses, Runoff Estimates and Changes in Some Physicochemical Properties of Soil under Different Cropping Systems.**
Duration:	3-Years
Date of Initiation:	01-07-1999
Date of Completion:	30-06-2002
Location of Scheme:	NWFP Agricultural University, Peshawar.
Principal Investigator:	Dr. Farmanullah Khan
Total Expenditure:	Rs.3,24,398/-
Main Objectives:	• To study the effect of cropping system on soil erosion and some physio-chemical properties of the experimental soil. • To study the effect of rainfall intensity on surface runoff and soil erosion. • To study the effect of rainfall intensity and surface runoff on critical distance of rill initiation, rill dimension and rill order.

Summary of work done:

The suitability of the soil for crop production is based on the quality of the soil's physical, chemical and biological properties. One of the naturally occurring process that may detrimentally affect soil properties and subsequent crop production is soil erosion.

Nutrient loss is an important aspect of surface erosion since nutrients are concentrated in the surface layer. The concentration of plant nutrients and organic matter is high in eroded sediment as they are closely associated with finer fractions of soils. Erosion reduces soil quality through the loss of clay particles, nutrients and organic matter, degradation of soil structure, decreased rooting depth and decreased soil storage capacity for crop production.

Various measures like crop and soil management practices can be adopted to control fertility of the soil on sloping lands. The type of inter-crops for a cropping system can be selected on account of their efficiency in controlling soil erosion and for their

beneficial influence on the growth and yield of major crops. Therefore, it is important to develop data for cropping pattern, management practices, erosion modeling and simulation to minimize soil and nutrients loss on sloping.

Experimental design was RCB with three replications. The treatments maintained were, wheat, barley + lentil and control (bare) in Rabi season and maize, maize+ mung-beans and control (bare) in Kharif season. Sowing of wheat and barley was done on 20-10-2000 and sowing of maize was done on 22-06-2001. A fertilizer rate of 120-90-60 kg N-P2O5-K2O ha-1 was applied to both of the crops. Fertilizer sources were urea for N, SSP for P and potassium sulphate for K. Nitrogen fertilization was done in two splits, half at sowing time and remaining half after few days of crop growth.
All the usual cultural practices were being followed during the growth period of the crops. Various field visits were made to the site to check the growth of the crops and to collect the necessary data.

The results obtained showed that total runoff, soil loss and nutrient losses were much higher from bare plots as compared to cropped plots. In Rabi season, losses of N, P and K from bare plots were 57, 53 and 49% higher respectively from the N, P and K losses from barley legume inter-cropping whereas in Kharif season, losses of N, P and K from bare plots were 39%, 49% and 38% higher respectively from the N P K losses from maize-legume inter cropping. The losses of other nutrients were also higher from bare plots as compared to inter-cropping and mono cropping. Losses of N P K in runoff were higher as compared to the losses of N P K in sediment.

The loss of nutrients was closely related to the amount of sediment and runoff from the plots. More losses of nutrients from bare plots were the results of high loss of soil and runoff from bare plots. Soil erosion, total runoff, organic matter and nutrient losses were more in the early stage of the crops, when the surface cover was comparatively less. The losses of the above parameters decreased as the surface cover increased due to crop growth. Surface cover reduced soil erosion by more than 44% during Rabi season and by more than 51% during Kharif season. The increase in soil loss due to increase in rainfall was presumably due to increased kinetic energy associated with increasing intensity. The loss of organic carbon through sediment was higher from all the plots during both the seasons followed by the loss of K, Mn, N, Fe, P, Cu and Zn. Nutrient enrichment ratio of the sediment was greater than 1 for all nutrients, indicating higher losses of nutrients in the sediment.

Very good correlation was observed for runoff and soil loss with organic matter and plant nutrient losses. The positive correlation for runoff and soil loss with organic matter and plant nutrients losses may be due to the fact that soil fertility is mainly associated with the surface soil because the surface soil contributes a large share of the nutrients used by the plants. Due to their higher concentration in the surface soil, organic matter and plant nutrients can be easily washed away by surface runoff. Equations to represent the amount of sand, silt and clay for different treatment under different rainfall conditions were also developed, which can be helpful to understand the mechanism of surface erosion. The equations revealed that as compared to sand and clay particles, silt particles were higher in sediment due to their weak aggregation.

It can be concluded from this study that inter-cropping of barley legume and maize-legume is an effective cropping system for reducing long term soil runoff and nutrient losses from the slopping land. Furthermore, small reduction in runoff velocity due to vegetation resulted in a major reduction in soil erosion. Generally, good soil cover is recommended to amend soil physico-chemical properties of the eroded soils and selection of proper cropping system and crop rotation is necessary for conservation oriented farming. Proper fertilizer management is needed to increase water and fertilizer use efficiency. Further, innovative management practices are required to buildup P level to enhance crop productivity in these areas.

Project No.	**F-AU/Agr (258)**
Project Title:	**Identification and Field Evaluation of Bio-Control Agents of the Family Braconidae (*Hymenoptera*) Against Important Crop Pests of Pakistan.**
Duration:	3-Years
Date of Initiation:	15-06-1999
Date of Completion:	14-06-2002
Location of Scheme:	NWFP Agricultural University, Peshawar.
Principal Investigator:	Dr. Inayatullah
Total Expenditure:	Rs.1,52,437/-

Main Objectives:

- To explore the braconid fauna and to find out the geographical distribution of these parasites in NWFP.
- To investigate the host and seasonal occurrence and abundance of some braconid parasites of important pests.
- To construct a key for the identification of these parasites.

Summary of work done:

Field efficacy of braconid parasites was studies in the field and laboratory. Tomato fruitworm, Tobacco budworm, Chickpea pod borer, Cutworms, Aphids, Fruit flies, Okra fruit borer and Scale insects were also included in the studies.

Tomato fruitworm in lab showed that 1% larvae were attacked by the braconid *Cotestia glamerata* and one perecent by the ichneumonid *Campoletis chlorideae* at Peshawar. At Dargi area no parasitism was recorded.

Studies on cutworm parasites showed tht 11% larvae were parasitized during 2000 and 15% during 2002 by tichinid fly in Swabi and Mardan areas. No braconid was reared from cutworm.

Chickpea podborer (*Helicovera armigera)* larvae were parasitized by the braconid apanteles sp. a Karak areas. One percent larvae were attacked.

No braconid was recorded from fruit flies (*Bactocera dorsalis)* on guava at Peshawar during 2000. At Kohat area 3.8% parasitism was recorded during 2001 by the braconid Opitus sp.

On Okra fruitborer (*Earias insulana)* 0.66% parasitism by the braconid *Rogas testacius* was recorded at Peshawar. On scale insect no parasite was found.

Aphid parasites on wheat and brassica were studied in detail all the three years. Data collected during 2000 showed that on brassica 35% and on wheat crop 29% parasitism were recorded at Peshawar. At swabi these figures were 39% and 67% for Brassica and wheat crops respectively.

During 2001, 38% and 24% aphids on brassica and wheat respectively were parasitized at Peshawar, while at Swabi percent parasitism was 30 and 60 on brassica and wheat respectively. Data collected during 2002 revealed that on wheat aphids the percent parasitism was 40.29% at Swabi and Peshawar respectively. One brassica 22.35% aphids were parasitized at Peshawar and 22.10% at Swabi. Surveys for collection of braconids were conducted at different ecological zones of the NWFP from 1999 to 2002.

The survey revealed that 111 species on 66 genera and 18 subfamilies are occurring in the NWFP. The subfamilies are *Agathidinae, Alysiinae, Aphidiinae, Blacinae, Braconinae, Cardiochelinae, Cheloninae, Doryctinae, Euphorinae, Helconinae, Homobobinae, Horiinae, Macrocentrinae, Metheorinae, Microgastrinae, Neoneurinae, Opiinae and Rogadinae.*

Project No:	**S-KU/Bio (277)**
Project Title:	**Assessment of Biological Activity in Marine Cynobacterial Species form Coastal and Near-shore Environments.**
Duration:	3-Years
Date of Initiation:	01-07-1998
Date of Completion:	30-06-2001
Location of Scheme:	CEMB, University of Karachi, Karachi.
Principal Investigator:	Dr. Pirzada J.A. Siddiqui
Total Expenditure:	Rs. 3,50,007/-

Main Objectives:

- Isolation and characterization of cyanobacteria from coastal waters and screening of potential cyanobacterial strains that produce biologically active compounds.
- To test the cyanobacterial extracts for antibacterial and antifungal activity, antineoplastic activity and other toxic metabolites (using biological assays).

Summary of work done:

Cyanobacteria are known to produce a multitude of bioactive compounds. Some of these novel compounds are toxic for domestic and wild animals, birds, fish and even human beings, whereas, some metabolites are cytotoxic and show promise as killers of algae, bacteria and fungi. Some may even serve as agents for attacking tumor cells and viruses. Emerging reports on marine organisms indicate that marine ecosystem harbours a whole world of organisms that are capable of producing a range of fine chemicals. A number of cyanobacterial species were isolated from the field material collected from intertidal zone and the coastal blooms. In total 15 isolates and two mixed cultures (from bloom) of cyanobacteria were screened for the possible biological activity and toxicity. Crude extracts from all isolates and mixed cultures were tested for anti-microbial activity (against bacteria and fungi), haemolytic activity, effect on coagulation of blood, and lethality using rat bioassay. The present study forms a baseline data and more detailed future research is likely to develop on the toxins and other bioactive compounds from marine cyanobacteria.

Project No. **P-PU/Bio (304)**

Project Title: **Micropropagation of Jojoba (*Simmondsia chinensis*) an Oil Yielding Plant of High Commercial Value.**

Duration: 2-Years

Date of Initiation: 01-06-2000

Date of Completion: 30-05-2001

Location of Scheme: University of the Punjab, Lahore.

Principal Investigator: Prof. Dr. Javed Iqbal.

Total Expenditure: Rs.3,83,092/-

Main Objectives:

- To develop a system for *in-vitro* culture of jojoba tissues leading to the recovery of regenerated shoots with high frequency.

- To optimize the conditions for rooting of these shoots and explore the conditions influencing the establishment of plants in soil.

Summary of work done:

To explore the callogenic and organogenic potential of different explants, five explants (leaf, cotyledon, stem shoot apices and nodal segments) were used on two, media MS and B5 (containing different concentrations of NAA, IAA, GA3, 2,4-D, BAP, Kin and 2ip). Callus was initiated in all explants at all supplementation of auxins and cytokinin. Callus induction and its proliferation varied depending upon the explant type, its size and hormonal combination. However, 0.5 cm long nodal explant proved best for callogenesis.

The combination MS+5mg/l IAA and 10 mg/l BAP proved the best because it formed 100% callus after 14 days. The callus obtained from nodal explant also proved best for regeneration. Shoots were obtained after 30 days of inoculation on the medium used for callogenesis . For rooting out of different combination MS+10 mg/l IBA and 1mg/l IAA proved the best as 90% rooting was achieved in this combination in 25 days.

For in vitro micropropagation two explants i.e shoot apex and nodal segments of variable sizes were used on two media, MS and SH supplemented with various concentrations of IAA and BAP. Of the two explants of variable sizes used, 2.5 cm long nodal segment were found more efficient in shooting and its proliferation. Out of two media, MS and B5 MS+5mg/l IAA + 10 mg/l BAP proved best as it gave 100% regeneration in 10 days. Micro propagated shoots from nodal segments failed to root when transferred on MS medium probably due to release of phenols which retards rooting. Special stem wound technique was adopted with these shoots prior to placing them on MS medium containing different concentration of sucrose and IBA. The shoots having vertical incision just above their cut ends and dipped in 0.8% PvP and 20.3 mg/l IBA proved best in rooting response when later placed on ½ MS+ 2.03 mg/l IBA and 1.5% sucrose.

Nodal segments were also explored for embryogenic potential. Out of different concentration MS containing 1.5 mg/l NAA+2.0 mg/l 2ip, induced embrogenesis. Terminal nodes proved best for callusing than subterminal one. After 4 weeks of initiation, callus contained numerous globular shaped pre-embroids, which after 6 weeks of initiation changed to heart shaped and after 8-10 weeks into torpedo shaped embroyids.

Cultures for shooting, rooting and embryogenesis were maintained under three light systems with varying photoperiod and intensity. Photosystem-I proved best for its suitability for shooting, rooting and embryogenesis.

In vitro regenerated plantlets (callogenic and micro propagated) were successfully transferred to clay pots filled with autoclaved sand and compost (1:1). Under high moisture condition, these plantlets grew well and after two weeks of hardening plant lets were shifted to large pot. They acclimatized well to low moisture environmental stress.

Project No.	**S-KU/Bio (319)**
Project Title:	**Distribution and Abundance of Juvenile Fish Stock in Korangi Creek.**
Duration:	2-Years
Date of Initiation:	01-06-2000
Date of Completion:	31-05-2002
Location of Scheme:	Centre of Excellence in Marine Biology, University of Karachi, Karachi.
Principal Investigator:	Prof. Dr. S. Makhdoom Hussain
Total Expenditure:	Rs. 3,26,431/-
Main Objectives:	• Stock assessment of juvenile fishes in creeks (Korangi creek and Phitti creek). • Size and age composition of juvenile fishes. • Estimation of parental stock and spawning concentrations of juvenile fish in the study area. • Analysis of zooplankton samples to estimate the distribution and abundance of fish eggs in the area during pre-post-monsoon seasons. • Study of fishing methods and techniques used by local fishermen in the area. • Study of Hydrography and its influence on fish fauna (Seasonal fluctuations in catches).

Summary of work done:

Towards the East coast of Karachi, there is network of creeks, which spreads from the main Korangi and Phitti creeks channels. The primary objective of the present study was to quantify the existing fish stocks, their density, seasonal occurrence, distribution and stability. During these studies, data on juvenile fish stocks and their seasonal distribution and abundance in the creek system was collected. Sampling from Korangi and adjacent creeks started from June 2000 and continued till December 2002. The data on juvenile fish stocks was collected from stations Nos. 34 – 123. Major localities covered during the sampling period were, Korangi Creek, Port Qasim, Shun creek, Thermal power station and Rutto Kot.

Gill nets with three different mesh size 3,5,2.25 and 1.5 inched were used to catch adult and juvenile fish. The fish species collected belonged to various groups; pelagic, demersal and bottom dwellers. A total of 72 species belonging to 30 families were collected, one species belonged to *Elasmobranchii*.

The study gives basic information on the distribution of juveniles and adults fish stocks, abundance in rank of their occurrences, total biomass of juvenile fish stocks and their seasonal occurrence during the one & half year sampling in the different localities of the Korangi creek system and provides a concept for future planning and management in the region.

Project No:	**C-NARC/Bio (321)**
Project Title:	**Pathobiology, Molecular Characterization and Control of Avian Influenza Viruses.**
Duration:	2-Years
Date of Initiation:	01-07-2000
Date of Completion:	30-06-2002
Location of Scheme:	National Agricultural Research Centre, (NARC) Islamabad.
Principal Investigator:	Dr. Khalid Naeem
Total Expenditure:	Rs. 233,767/-
Main Objectives:	• Isolation of avian influenza viruses from field outbreak of avian influenza • Development of antigens and protocols for AGPT, ELISA and direct fluorescent antigen detection assay (DFA) for avian influenza diagnosis. • Serotyping and further characterization of avian influenza viruses isolates. • Studies on the pathogenesis of the new isolates. • Development of inactivated avian influenza viruses vaccine (s) using specific strain (s).

Summary of work done:

The study was conducted to evaluate the role of avian influenza viruses causing severe respiratory tract infection in chickens. By undertaking serological evaluation of the blood samples collected from different parts of the country using HI and ELISA, it was found that AIVs were present among broilers, breeders, and layer flocks throughout the country. With the help of various antibody determination and virus isolation techniques, AIV serotypes H9N2 and H7N3 were specifically detected from the field

outbreaks. The isolated viruses were further characterized on the basis of their biological and molecular characteristics. A polymerase chain reaction (PCR) based diagnostic assay was also established for the detection of AIV from the field specimens.

To further evaluate the pathogenicity of new isolate of H9N2 serotype alone or in association with other pathogens, it was inoculated in experimental birds via different routes. The birds were later on separately challenged with IBV, ORT or *E. coli*. The virus isolation and sero monitoring data of these experiments revealed a significant role of E. coli in aggravating the conditions of the birds earlier infected with AIV. In another experiments, it was found that, in chemically immuno suppressed birds AIV, infection by H9N2 produced high mortality with out respiratory signs.

The results revealed that more than serotype of AIV existed in poultry flocks throughout the country which are causing the respiratory tract infection of previously unknown etiology alone and/or in association with secondary infection by other bacterial as well as viral pathogens.

Project No.	**C-PMNH/Bio (327)**
Project Title:	**Mushrooms and Toad-stools of Margala Hills and Adjacent Areas, Islamabad.**
Duration:	1-Year
Date of Initiation:	01-09-2001
Date of Completion:	31-08-2002
Location of Scheme:	Pakistan Museum of Natural History (PMNH) Islamabad.
Principal Investigator:	Dr. Mrs. Kishwar Nazir
Total Expenditure:	Rs.1,38,235/-
Main Objectives:	• To survey the Margalla hills and adjacent area for the collection of material. • To measure the ecological data; altitude, temperature, soil samples, plant in the surroundings or associated to them or on which they grow and to preserve their habitat through coloured photographs. • To study the samples eco-systematically by noting their macro characters such as: color, presence or absence of annuals/volva/stipe, shape and color of pileus (Cap) measurements of different parts, microscopic character; type of trama, shape and measurements of basidium, basidiospores etc. • To collect and identify the material according to their habitats under the following headings:

parasitic, saprophytic, and mycorrhizal altitude.

- To categorize edible and medicinal mushrooms and toad-stools separately.
- To subject edible mushrooms to prepare spawn of edible mushrooms to be used for cultivation.

Summary of work done:

More than 600 samples of Mushrooms and Toadstools (macrofungi) were collected during September 2001 to August 2002 from Margalla hills and adjoining areas. The altitude ranges from 465 to 1656 meter (the lowest top). The geology of the area represented by variety of rocks and vegetation is mixed consisting of pine, oak and other broad-leaved trees, shrubs, herb and grasses. Under this environment the soil of the area during rainy season enfavour the growth of mushrooms from April to October. The massive number of mushrooms bloom in August and September. The delicate taxa have short span of life while the perennial and hard mushrooms like Polypores & Fomes continue to grow through out the year.

Two hundred species were identified by following the procedure (key) for morphological and microscopic characters. They were arranged orderly under the system of classification by Bon 1987, which was compared with Alexopolous et. al. (1996).

The identified species of three subclasses and two classes were: the subclass Agaricomycetidae (*Agaricales*) has 15 families, 25 genera and 82 species; Gasteromyctidae (*Aphylophorales*) has 17 families, 43 genera and 77 species; the class Phragmobasidiomycetes (*Septate basidium*) has one family, 3 genera and 7 species; the class Ascomycetes has 6 families, 10 genera and 23 species.

Each species was described with the salient identification characters, measurement, and chemical test where ever necessary followed by habitat, soil or host, locality (placed collection), date of collection and field Nos. Out of 200 species, 115 were discovered for the 1st time from Margalla hills and adjoining areas. As many as 31 species were edible while the others were hard and all these were benefiting the human beings medically directly or indirectly. One edible species of oyster *(Pleurotus ostreatus)* was isolated on P.D.A., E. & P. cellulose and Soya bean agar media. This pure culture was processed for making spawn for onward use in cultivation. The collected samples ere processed on herbarium lines and were indexed in the Mycological Herbarium for record for future research.

Project No. **Biotech/P-NIBGE/Agr (27)**

Project Title: **Isolation, Identification and Molecular Characterization of Economically Important Potato Virus (PLRV) of Pakistan.**

Duration:	3 years
Date of Initiation:	03.05.2000
Date of Completion:	02-05-2003
Location of Scheme:	NIBGE, Faisalabad.
Principal Investigator:	Dr. Yusuf Zafar
Total Expenditure:	Rs.2,76,628/-
Main Objectives:	• Collection and identification of PLRV from Infected potato plants from various regions of the country. • Designing of universal primers for the detection of Pakistani potato virus (PLRV). • Cloning partial sequencing and comparison of Pakistani potato virus (PLVR) sequences to the known PLRV sequences around the world using Gene Bank search. • Development of plant expression vector against PLRV based on single / multiple viral genes. • Establishment of tissue culture and regeneration system for potato. • Establishment of gene transformation system and transformation of potato with newly constructed vectors.

Summary of work done:

Potato is an important food and cash crop throughout the world, is prone to several diseases. Potato leaf roll virus (PLRV) causes the greatest damage among these viruses. In Pakistan exclusive research work has been done specifically on epidemiology and serology of PLRV. The present study is specifically designed to deal with isolation and characterization of the genome of PLRV in Pakistan and its comparison with the PLRV prevailing in other parts of the world. An elaborate survey of potato from northern hilly areas of Pakistan was carried out. The samples have been maintained and propagated under controlled conditions at NIBGE. The sample components were cloned for the PLRV genome. These components were being characterized and sequenced for comparative studies.

One M.Sc. (Hons) and three M. Phil degrees have been awarded based on the research work done under this project.

Project No.	**Biotech/P-NIBGE/ENV(5)**
Project Title:	**Biotechnological Solution of Liquid Effluent from Leather Tanning Industry.**
Duration:	2-years
Date of Initiation:	01.07.1998
Date of Completion:	30-06-2000
Location of Scheme:	NIBGE, Faisalabad.
Principal Investigator:	Dr. Zafar M. Khalid
Total Expenditure:	Rs. 5,16,031/-
Main Objectives:	• Checking of pollution levels in tanneries effluent (Faisalabad , Karachi & Kasur) by analyzing pollutant parameters like BOD,COD, heavy metal contents especially Cr and estimation of toxicity and mutagenicity/carcinogenicity of these effluent samples. • Screening and isolation of microorganisms that are capable of simulating and/or reducing chromium i.e. Cr (VI) to Cr (III) and characterization of isolated strains. • Determination of metal tolerance in these microbes and isolation of putative metal resistance plasmid and study the phenomena of metal resistance in these organisms. • Develop consortia of microorganisms for Cr biosorption/reduction and optimize nutritional and environmental conditions for the growth of these microbes. • Develop a pilot plant process for the treatment of these wastes.

Summary of work done:

Processing of industrial raw materials produce different toxic/hazardous waste materials. The disposal of these wastes depends upon the nature and hazardousness of the compounds present in it. Leather tanning industries are causing cancer problems among the people due to presence of high concentration of chromium in their effluents. This

study was undertaken to check the extant of problem and to find a biotechnological solution for the pollution generated by leather tanning industrial effluents.

Samples from various sections like soaking, liming, deliming pickling, chrome tanning and mixed effluent released out of tanneries of Lyallpur Tanneries, Faisalabad and National Tanneries Mureedke were collected and analysed for different parameters like pH, Ec and Cr, chemical oxygen demand (COD), Biological Oxygen demand (BOD), nutrients (P, N, K) anions and cations. Samples from dying and chrome tanning sections were found toxic and mutagenic while samples from liming section were found toxic at high concentration and vice versa. Enriched culture obtained from chromium tolerance studies and sludge, both from L.T, Faisalabad and N.T. Mureedke were employed for reduction in COD. During incubation, different levels of reduction in COD have been achieved by different sources used for inoculation of bacteria. Effluent from L.T showed up to 60% reduction while N.T showed 76% reduction in COD. Saw dust was found as a good absorbent for removal of Cr. Adsorption data was analyzed by Languor and Freundlich adsorption isotherms.

Both of these isotherms agreed quite well with the adsorption data thus indicating a complex adsorption mechanism. Thus it was concluded that sawdust can be used as an effective adsorbent for Cr VI. Based on the results of this study, two research papers were presented at Third Biennial Conference of Microbiology at Lahore and at Chemistry Conference 2000 at Bara Gali Campus, University of Peshawar, Peshawar. Two Research papers were published in Popular e-digest Energy Environment and Energy.

One M. Phil degree has been awarded to research scholar appointed under this project.

Project No.	**Biotech/S-AKU/Med(12)**
Project Title:	**Determination of *Leishmania Species* using Molecular Biology Techniques.**
Duration:	2 years
Date of Initiation:	01.06.1998
Date of Completion:	31-05-2000
Location of Scheme:	Aga Khan University, Karachi
Principal Investigator:	Dr. M. Khalid Ashfaque
Total Expenditure:	Rs.5,93,568/-
Main Objectives:	• To establish the technique of PCR for diagnosis of Leishmaniasis. • To determine the various strains of Leishmania prevalent in Pakistan. Specially

from Karachi, Baluchistan and Northern Areas.

- To detect the presence of the parasite in patients treated with different anti-leishmania drugs. This will provide evidence on the efficacy of the anti-leishmanial drug and may also help in detecting the emergence of drug resistant strains.

Summary of work done:

Leishmaniasis is caused by parasites of genus *leishmania*. In man these are transmitted by sandflies and cause custaneous and visceral form of diseases. This study was carried out on 117 samples collected from cutanous leishmaniasis patients and 47 samples collected from visceral leishmaniasis patients. Fifty three skin samples and one bone marrow aspirate were collected from Karachi, Sindh. 59 samples from Balochistan, 56 of these were skin aspirates and three were bone marrow samples. Fifty one samples were collected from Northern areas, these included eight skin aspirate, 18 blood samples and 25 bone marrow smears. From Sindh, 38 skin samples and one bone-marrow sample were cultured in RPMI medium

The parasitic DNA isolated from samples received from Karachi, Balochistan and Northern Areas were subjeted to PCR based detection of the parasite. Out of these, forty six skin samples from Sindh were found to be PCR positive and seven skin samples showed no amplification. Eighteen blood samples, three bone marrow aspirate and 26 bone marrow smears from visceral leishmanisis patients were also analysed. Further identification of species was carried out on PCR based assays. 27 samples showed specific bands for L.donovani. When blood samples collected from Northern Areas were subjected to PCR, 12 samples were found positive for *L.donovani* while 6 samples showed no band for any *Leishmania specie*.

On the basis of these observations and results it is concluded that the method of collection of skin or bone marrow samples for culture of Leishmania is critical. The PCR assay results of this study indicate that identification of Leishmania parasite from both cutaneous (skin biopsy aspirates) and visceral (peripheral blood) and bone marrow leishmaniasis patients can become a valuable tool for clinical laboratories. One paper of the study has been published by Pharmaceutical Society of Japan.

Project No. **Biotech/P-AU/Med (24)**

Project Title: **Technologies Development for the Production of Gonadotropins from Animal Sources.**

Duration:	1 year
Date of Initiation.	01-06-2000
Date of Completion:	31-05-2001
Location of Scheme:	University of Agriculture, Faisalabad.
Principal Investigator:	Dr. Nafees Akhtar
Total Expenditure:	Rs.1,48,986/-
Main Objectives:	• To enhance the ability of buffaloes to resume sexual activity as early as possible. • To obtain early conception in order to reduce the length of calving interval. • To obtain pregnancies during low breeding season/summer for increasing milk production during higher demand days. • To increase life time calf production and milk production in lactating buffaloes.

Summary of work done:

Glandular cells of the anterior pituitary gland are responsible for the production of gondadotropins in female buffaloes. In the present study, 60 healthy non-pregnant buffaloes are divided in to 3 group i.e buffaloes heifers (A) buffaloes in lactation (B) and buffaloes in lactation 4th or above (C). The Animals were in estrus, anoestrus and distrust phases. After the confirmation of their reproductive tract status i.e being cyclic, non-cyclic and estrus. Their pituitary glands were collected after the slaughter, and tissue sectioning was performed for microscopy. For histological Staining Azan Masllory Heidenhain's or H & E stain were used. The glands were processed in bouin's and formaldehyde fixatives followed by dehydration in stains of various grades of alcohol.

The mean length, width and thickness of the pituitaries collected from different groups of heifers showed non-significant differences in size, but significant differences in weights. From the stained sections of adenohypophysis, gonadotrops were microscopically identified and counted. Significantly higher mean number of gonadotrops were found for buffaloes in lactation 4th or above during anoestrus. Similarly significantly higher mean number of gonadotrops were counted in buffaloes in lactation then those for heifers and for buffaloes in lactation 4th or above. The higher gonadotropic cell population in the adenohypophysis of estrus buffaloes appears to be indicating the greater activity of the gonadotrops producing more FSH as evidenced by higher number of mature follicles found on the ovaries during this phase. Two papers of the Research Project are ready to be submitted for Publication.

Under this project, one M.Sc (Hons) degree has been produced.

Project No:	**C-PINSTECH/Chem(341)**
Project Title:	**Exploitation of Cheaper Materials for the Removal of Toxic and Harmful Substances from Industrial Effluents.**
Duration:	2-Years
Date of Initiation:	01-11-1999
Date of completion	31.10.2001
Location of Scheme:	PINSTECH, Islamabad.
Principal Investigator:	Dr. Syed Moosa Hasany
Total Expenditure:	Rs. 86,894/-
Main Objectives:	• To explore them for the removal of toxic and harmful substances from industrial effluents. • To collect useful academic information about the sorption behavior of different substances on cheaper materials which are not available in the literature. • To collect data which can be employed to design a pilot plant for the treatment of industrial effluents.

Summary of work done:

The accumulation of harmful metal ions Hg(II), Cd(II), Cr(III), Ag(I) and Zn(II) onto three cheaper materials namely Haro river sand, coconut husk (cocos mucifera) and saw dust (Picea Smithiana) have been investigated in detail using batch and radiotracer techniques. Radiotracers used in this study were 203 Hg, 115Cd, 51Cr, 110m Ag and 65Zn and prepared by irradiating metals or their oxides in PARR-I reactor at a neutron flux of 4 x 10 13n cm-2 s-1. Coconut husk was procured from the local market whereas saw dust was obtained from a sawmill of Matta, Swat, and Haro river sand was collected from the leftbank of Haro river near Lawrencepur, District Attock. All the three materials were treated as described in the experimental section and stored to be used as sorbents.

The sorption of Hg(II), Cd(II) Cr(III) and Ag(I) was studied onto coconut husk,Zn(II) and Cd(II) onto Haro river sand and of Hg(II) ions onto sawdust. The parameters which control the transfer of metal ions at trace levels from liquid to solid phase were optimized stepwise keeping all other factors constant except only one. The parameters, studied were nature and composition of sorptive solution, pH, contact time between sorbent and sorbate, concentration of trace element, amount of sorbent, temperature and the influence of microcomponents such as anions, cations and complexing agents. An optimized procedure was evolved based on experimental observations for every combination of sorbent and sorbate (metal ions).

The sorption data of each element was subjected to different sorption isotherms namely Langmuir, Freundlich and Dubinin-Radushkevich (D-R) isotherms. Kinetics of the sorption of metal ions onto solid surfaces was also studied using various equations such as Morris-Weber, Lagerrgren and Reichenberg.

The kinetic and sorption isotherm equations were examined using linear regression analyses. These equations were tested in their linearized forms and useful entities like sorption capacity, Sorption energy and intensity were computed. The effect of temperature variation on sorption equilibrium was investigated and thermodynamic quantities like H, S and G were evaluated for each metal ions. Finally the influence of common anions and cations was monitored on the sorption of metal ions and compared with their values under optimized conditions. To check the selectivity of each sorbent, the sorption of other ions representing various groups of periodic table and oxidation states were measured.

Keeping all these data, one can evolve different useful separation schemes of metal ions based on their sorption behavbiour on a particular sorbent. All the three cheaper sorbents have been proved to be effective for the accumulation of these harmful metal ions on their surfaces. The sorbents can be expoloited to make columns to remove the traces of metal ions from aqueous solutions.

These sorption investigations have useful applications in Analytical Chemistry, removal or accumulation of metal ions from aqueous solutions, in industrial effluent treatment and pollution abatement studies. The results of these studies have been presented in International and National Conferences and so far one paper has been published in a relevant journal from Switzerland.

Project No.	**S-KU/Chem(342)**
Project Title:	**Influence of Long Chain Branching & High Molecular Weight Components on Elongational & Shear Properties of Polyolefins.**
Duration:	3-Years
Date of Initiation:	1.11.1999
Date of Completion	31.10.2002
Location of Scheme:	University of Karachi, Karachi
Principal Investigator:	Dr. Riaz Ahmad
Total Expenditure:	Rs.3,90,265/-
Main Objectives:	• This project addresses the problem of long chain branching and the presence of high molecular weight components during

extensional flow. The validity of constitutive equations with separable memory kemela remains an unsolved problem. The use of separable kemels in predicting certain processing problems such as die swell, despite various attempts and some progress, remains to be completely justified. At the same time the level of empiricism associated with the use of damping functions of shear flows into extensional flows requires improvement so that the influence of chain branching and spectrum broadening can be applied to a broader range of polymers.

Summary of work done:

The proposed study was designed to identify the influence of long chain branching and the presence of high molecular weight components during extensional and shear flow of polyolefins. Three types of polyolefins including linear and linear-low density polyethylenes were studied.

Shear flow testing of five grades of polyethylene of commercial grade was carried out. Die swell characterization was also carried out and the influence of molecular weight was detected.

In addition, the flow birefringence and capillary pressure drop measurements were set up. The optical cell was connected to the screw extruder, optical bench was constructed and the flow of polarized light through the molten polymer through the slit die was successfully established. Flow birefringence measurements were carried out and photographs of the stress contours were taken. Application of the stress optical rule to the centerline streamline of the slit die revealed remarkable differences between three LPDEs which were selected to encompass both low, medium and high molecular weight polyethylenes with broad molecular weight distributions and varying long chain branching.

Numerical schemes for the prediction of principal stress differences were developed with a power law velocity profile and linear viscoelastic spectrum and damping function obtained from shear flow experiments. A preliminary comparison of the experimental and numerical principal stress differences revealed the applicability of three non-linear and linear viscoelastic constitutive models.

In the third year capillary pressure drop/extrudate swell measurements, rheometric characterization and flow birefringence measurements were carried out on three LDPEs with low to high molecular weight distributions and two m-LLDPEs with controlled long

chain branching. The flow was modeled for shear flow and the combined and separate effect of molecular weight and level of branching was evaluated.

Project No.	**P-AU/Engg(52)**
Project Title:	**Comparison of Modern Irrigation Systems with Primitive Flood Irrigation.**
Duration:	3-years.
Date of Initiation:	01-01-1998
Date of Completion	31-12-2000
Location of Scheme:	University of Agriculture, Faisalabad
Principal Investigator:	Mr M. Asghar Rana
Total Expenditure:	Rs.2,72,788/-
Main Objectives:	• To study water requirements of tomato and maize crops under different irrigation methods. Irrigation scheduling for these crops. • To compare the irrigation efficiencies by different irrigation systems. • To develop new technique of fertilizer application by sprinkler and trickle irrigation systems to minimize wastage of fertilizer and to minimize the ground water pollution. • To cultivate tomato and maize crops under trickle irrigation system. • To encourage and familiarize the farmers of Barani areas to use these modern irrigation system such as sprinkler as well as drop techniques. These systems will be very useful for undulating loose textured and water shortage soils. • To see the effect and response of salts near the roots in all the three irrigation systems. In modern irrigation water will be saved about 30 to 40%.

Summary of work done:

The study was carried out to investigate the effect of irrigation methods on nutrient movement and to investigate the leaching behavior of nitrates under different methods of irrigation. An area of 0.72 hectare was selected. It was divided into four

blocks for the border irrigation (0.21 ha), furrow irrigation (0.21 ha), raingun sprinkler (0.22 ha) and trickle irrigation (0.75 ha).

The quantity of water saving and the crop yields were used as important parameters for making comparison of four methods of irrigation. Two crops sunflower and cotton were grown for two different years. The summary of the results are as under:

1) The application efficiencies in case of trickle and raingun irrigation is much higher than furrow and border strip irrigation methods.
2) Water saving and crop yield was higher in trickle and raingun methods as compared to border and furrow irrigation.
3) Water use efficiency in case of trickle and raingun sprinkler irrigation as compared to surface method of irrigation was also higher.

Trickle irrigation system is more suitable in water scarcity areas having undulated topography, shallow and sandy soils, and wide spaced and high value crops. But this method is very costly for agricultural row crops and is suitable for fruit gardens and tree plantation.

Among the climatic factors which affect the efficiency of application are relative humidity and temperature. Sprinkler operating pressure and air movement also affect application efficiencies, and have a more pronounced effect on the distribution pattern. It is recommended to use raingun sprinkler for first two irrigations because deep perculation losses are heavy which can be minimized by the sprinkler system. During report period, one research paper was published in National Journal.

Project No.	**S-KU/Envr (51)**
Project Title:	**Population Dynamics and Dispersal Pattern of Fiddler Crabs in the Mangroves Areas of Karachi Coast.**
Duration:	2-years
Date of Initiation:	01.07.2000
Date of Completion	30.06.2002
Location of Scheme:	Karachi University
Principal Investigator:	Dr. Naureen Aziz Qureshi
Total Expenditure:	Rs.3,15,163/-
Main Objectives:	• To study the relative abundance and temporal variation in the distribution of species of fiddler crabs inhabiting mangroves area along Karachi coast.

- To study the sex ratios, growth, reproductive potential, fecundity and dispersal pattern of the species of fiddler crabs inhibiting the mangrove area.

- To study the relationship between the various environmental parameters and the abundance and distribution of fiddler crabs.

Summary of work done:

Mangroves create habitat for diverse community of organisms including decapods, crustanceans of which the brachyuran crabs form the significant feature of the mangrove community. The present study was designed to investigate the distribution and abundance of fiddler crabs and other fauna along Karachi coast from the two transects in the mangrove areas at two stations i-e sand spit (backwater mangroves), and one station at Korangi creek. Regular monthly sample from March 2001-Februrary 2002 were collected including number of crabs, burrows mangrove roots, molluscan shells and other residing flora, fauna in quadrate along with the data on environmental parameters like PH, salinity and temperature. It was observed that number of burrows are greater than the number of crabs. Small sized crabs were collected close to low water marks. The seasonal variability in the burrow abundance and size was observed which is related to the reproductive cycle of the species. It was also observed that male crabs are more abundant than the female crabs except during breeding period. Four research papers have been published on the basis of the project results. One research associate is enrolled for Ph.D. studies.

Project No.	**C-QU/Envr (58)**
Project Title:	**Studies on the Degradation of Chlorinated Phenolic Compounds by *Pseudomonas Species***
Duration:	2-year
Date of Initiation:	01.07.2000
Date of Completion	30.06.2002
Location of Scheme:	Quaid-i- Azam University, Islamabad.
Principal Investigator:	Dr. Safia Ahmed
Total Expenditure:	Rs.3,12,772/-
Main Objectives:	• Isolation and selection of microorganism utilizing chlorinated phenolic compound as sole source of carbon and energy. This will help in exploring the

potential of indigenous microbial strains for biodegradation of chlorinated phenolic compounds.

- Degradation of phenolic compounds in the liquid media with different concentrations to be completely mineralized and partially degraded. This will also give the time for different concentrations to be mineralized.

- Strains grown at different temperatures have been selected. In this study, chlorophenolic compound degradation in cold and at high temperature using selected strains and their mixed cultures will be tested. Calibration of retention time, dissolved oxygen concentration in biofermentor for the design of any treatment system at the site. Immobilization of selected chlorophenol degradation strains.

- Soil decontamination study for simple and easy system for removing pollutants from the adjacent environment.

Summary of work done:

Chlorinated aromatic compound used as herbicides, pesticides, preservatives, solvents and lubricants constitute a major class of environmental pollutants. The degradation of these compounds has been found to be facilitated by bacteria. The present study was designed to explore the new strains of bacteria and fungi for biodegradation of chlorinated phenols. Initially, bacterial isolates *Pseudomonas* were selected on the basis of their best growth. These strains were checked for their growth and tolerance limits for different concentrations of chlorinated phenols on nutrient agar and mineral salt media with and without glucose. The best growth of bacterial strains on nutrient agar plates containing 2-CP at 400ppn, PNR-G agar plates at 550ppn and PNR agar plates at 100ppn for 4-CP best growth was seen at 300,100, and 50ppn on nutrient agar, PNR-G and PNR agar plates were observed. All the three isomers of dichlorophenols showed nearly the same pattern of growth and tolerance.

While PCP dish growth was observed up to 300ppn, 200ppn and 100ppn on nutrient, PNR-G and PNR agar plates. Five fungal strains (FCPI-FCP) were also isolated from the soil & identified as *Aspergillus niger, Penicillium islandius, Bjeckandera adusta, Aspergillus terreus and Cephalosporium curtipes.* Three of the five fungal isolates; PCP1, PCP2 and PCP3 showed best growth for all isomers of phenoles on the agar plates media. Three research papers have been published in National & International Journal while one paper has been submitted for publication. Two M.Phil dissertations

have been completed on the basis of project study while two are in progress. Still another student has compiled his M.Sc research report on the basis of project data.

Project No.	**C-QU/Phys (108)**
Project Title:	**Studies of X-Rays/Neutrons/Ion-Beam Emitted from Matter Type Plasma Focus.**
Duration:	3-years
Date of Initiation:	01.05.2000
Date of Completion	30.04.2003
Location of Scheme:	Quaid-i- Azam University, Islamabad.
Principal Investigator:	Prof. Dr. M. Zakaullah
Total Expenditure:	Rs.1,12,485/-
Main Objectives:	• Enhancement of x-ray and neutron emission without increasing the discharge energy for possible applications of plasma focus on radiation sources. • Special uniformity of x-ray emission from pinch filament for possible use of plasma focus in x-ray microscopy and lithography. • Enhanced stabilization of the focused plasma by attempting different modifications in the electrodes assemblys.

Summary of work done:

In the present study the X-ray emission from a low energy plasma focus with argon filling is investigated. Attention is specifically paid to determine the machine efficiency for argon K-series lines. The maximum line radiation is detected at a filling pressure of 1.5 numbers and the radiation emission in 4π geometry is found to be 30 mJ which equals the system efficiency of 0.0015%. The plasma focus is operated in an enhanced Cu-K_a emission mode. In the side-on direction 0.4 J\sr. line radiation is recorded. In 4π geometry 40 J of energy is found to be emitted as X-rays out of which 8 J is in the form of Cu-K_a. To estimate the plasma electron temperature by continuous X-rays, the characteristics of cobalt as a filter are investigated.

The Cobalt filter is found to be an appropriate choice for pinch type devices like plasma focus, since it successfully discriminates the line radiation from the back ground impurities like carbon, nitrogen and oxygen, or the radiation from plasma focus electrodes, which are commonly made of copper. It made possible to determine the plasma temperature in single shot by using cost-effective experimental arrangement of

PIN-diodes. The combination of Co and Ni filters helps to determine the contribution of Cu-K_a line radiation from the device, since one filter allows the transmission of k_a line radiation, while the other blocks them. It is found that at different filling pressures, 90-95% of X-rays is Cu-K_a line radiation. Soft X-rays in the 1.0-1.5keV energy range emitted from a low energy (1.15kJ) Mater-type plasma focus operated with nitrogen as the filling gas are studied by employing time-resolved and time integrated detectors. A simple and cost effective technique for the measurement of X-ray fluence anisotropy is presented. As a result of this study, ten research papers have been published in National & International Journals. In addition to this, 13 M.Phil dissertations and two Ph.D thesis based on the project results have been completed.

Project No.	**C-QU/Phys (111)**
Project Title:	**Numerical Study of Pinch Dynamics/Stability and Study of Nonlinear wave Propagation in Magnetized Plasma**
Duration:	3-years
Date of Initiation:	01.11.1999
Date of Completion	30.10.2002
Location of Scheme:	Quaid-i-Azam University, Islamabad.
Principal Investigator:	Dr. Arshad M. Mirza
Total Expenditure:	Rs.252,486/-

Main Objectives:

- To study linear and nonlinear drift waves in the presence of magnetic shear and non-maxwellian electron distribution in the presence of ion dynamics
- To study the showing down of two dust projectiles passing through a non uniform, resistive magneto plasma.
- To study numerical/theoretical ballooning instability with Hall effect in presence of diffusion and temperature gradients.
- To develop shooting code, in order to compute the growth rate of the said modes.
- To study the dynamics as well as fusion parameters of DT-fiber plasma for a single and double gas-puff systems using O-D and I-D MHD codes.
- To train manpower in fusion related problems.

Summary of work done:

This project was designed to investigate numerical study of pinch dynamics/stability and study of nonlinear wave propagation in magnetized plasma. In the first study, the dynamics of finite thickness imploding spinning gas puff is studied for a staged pinch device. The numerical results demonstrate that although large spin velocities help to suppress R-T instability, but they adversely affect the fusion parameters. However, with a naturalized puff thickness of LP=0.01 and spin velosities between omega =(1.0-2.0) $x10^{-3}ns^{-1}$, One may achieve a stable pinch plasma close to thermonuclear fusion conditions. The effect of opacity on the temperature of the fiber at the final stage was also studied.

The second problem investigated was related to chaotic behavior of ion temperature gradient driven drift dissipative modes. A new set of nonlinear mode coupled equations for finite amplitude, low frequency electro magnetic waves has been derived for non-uniform resistive, magnetized electron ion plasma with sheared flows. The temporal behavior of the non linear mode coupling equations is found to be governed by eight coupled equations, which are the generalization of the Lorenz and Stenflo equations, admitting chaotic trajectories equations. The result of this study would be helpful in understanding wave phenomena in space and tokamab plasma.

In third part of study, a nonlinear equation for low frequency toroidal ion-temperature gradient modes in non-uniform magneto plasma with sheared plasma flow is presented. For some specific profiles of the equilibrium density, the ion temperature and sheared plasma flow, the nonlinear equation admits a tripolar vortex. The numerical results show a magnetic potential vortex core between the lobs of a dipole like structure, which has a positive value of the potential. As a result of this study, eight research papers have been published in National & International Journals. In addition to this, one Ph.D thesis and five M.Phil dissertations have been completed on the basis of the project results.

iii) Scientific Publications Produced through PSF Supported Projects

An important achievement of the Foundation is the research publications resulting from the research conducted under PSF funded projects. Through the projects completed during report period, 33 research papers were published or presented in National and/or International Conferences/Symposia. A list of these papers is placed at Annexure-V.

iv) Higher Degrees Earned through PSF Supported Projects

One of the major goals of the Foundation is the training of scientific manpower in the country. This in turn would result in strengthening of R&D infrastructure of various scientific organizations. In order to achieve this goal, the PSF has been developing scientific manpower, through its research projects. For this purpose, Research Associates are provided in the projects, they are required to register for Ph.D or M.Phil degrees.

During the report period, 7 Ph.D, 35 M.Phil and 8 M.Sc (Hons) degrees were awarded to research workers under PSF funded projects in the fields of Agriculture, Biology, Chemistry, Physics and Mathematics. List of the scholars who obtained the degrees, are given below.

S.No	Project No.	Name of Researcher	Degree awarded
1.	Biotech/P-NIBGE/Agr(27)	Abu Nasar	M. Phil
		Muhammad Imtiaz Shafiq	M. Phil
		Umbreen Azhar	M. Phil
2.	F-GU/Agr (158)	Mr. Sajjad Ahmad	M. Sc (Hons)
		Mr. Bashir Ahmad	M. Sc (Hons)
		Mr. Shah Jahan	M. Sc (Hons)
		Mr. Syed Dilawar Shah	M. Sc (Hons)
		Mr. Muhammad Arif	M. Sc (Hons)
		Mr. Noor Zada	M. Sc (Hons)
		Mr. Muhammad Sadiq	Ph.D
3.	S-KU/Bio (277)	Ms. Samina Dawood	M.Phil
		Ms. Azra Bano	M.Phil
4.	P-PU/Bio (304)	Mr. Khawja Asif Majeed	Ph. D
5.	S-KU/Bio (319)	Ms. Samina Bano	M.phil
		Ms. Zakia Khatoon	Ph.D
6.	C-NARC/Bio (321)	Ms. Mansoorah Naurin	M. Phil
		Ms. Sajida Bano	M. Phil
		Mr. M. Hashim Raza	M. Sc
7.	Biotech/P-NIBGE/Envr (5)	Syed Anjum Tahira	M.Phil
8.	C-QU/Env(58)	Sofia Bashir	M.Phil
		Hina Hashmi	M.Phil
		Sajida Iqbal	M.Phil
		Kalsoom Azam	M.Phil
		Noor-us-Saher	Ph.D
9.	Biotech/P-AU/Med(24)	Name (Nil) One Scholar	M.Sc. (Hons)
10.	C-QU/Phys(108)	Mr.Ather Rasool	M.Phil
		Mrs. Kanwal Naz	M.Phil
		Mr.Sartaj	M.Phil
		Mr.Sarfraz Ahmed	M.Phil
		Mr.Mohammad Hassan	M.Phil
		Mr.Abdul Qayyum	M.Phil

		Ghulam Murtaza	M.Phil
		Miss Shaista Zeb	M.Phil
		Mr.M.Zubair Khan	M.Phil
		Muhammad Afzal Khan	M.Phil
		Shujaat Ali	M.Phil
		Muhammad Ikram	M.Phil
		Hamdullah	M.Phil
		Khalid Alamgir	Ph.D
		Muhammad Shafiq	Ph.D
11.	C-QU/Phys(111)	Mr.M.Shafiq	M.Phil
		Mr.M.Ajmal Khan M.Phil	M.Phil
		Mr.M.A.Mahmood	M.Phil
		Mr.Irfan Azeem	M.Phil
		Mr.Adnan Sarwar	M.Phil
		Mr.Hassan Nawaz	M.Phil
		Mr.Faisal Yaqoob	M.Phil
		Mr.M.Javaid Iqbal	M.Phil
		Miss.Nusart Rafiq	M.Phil
		Mr.M.H.Nasim	Ph.D

3. SUPPORT TO SCIENTIFIC SOCIETIES/LEARNED BODIES

The promotion of Scientific Societies/Associations, Learned Bodies 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, is an important activity of the Foundation. The Foundation makes annual grants to the established learned bodies and scientific societies, as partial financial assistance for the achievement of their approved objectives and publication of their respective scientific journals. Annual grants amounting to Rs. 0.185 million were released to the following Scientific Journals and Societies during the year 2002-2003.

S.No.	PUBLICATION/JOURNALS	Amount of Grant
1.	Mehran University Journal of Engineering & Technology	Rs. 20,000/-
2.	Pakistan Veterinary Journal	Rs. 15,000/-
3.	Pakistan Oral & Dental Journal	Rs. 15,000/-
4.	Pakistan Journal of Pharmaceutical Sciences	Rs. 15,000/-
5.	Journal of Natural Science & Mathematics	Rs. 15,000/-
6.	Pakistan Journal of Agricultural & Engineering and Veterinary Sciences.	Rs. 15,000/-
7.	Pakistan Journal of Arid Agriculture	Rs. 25,000/-

8.	Pakistan Journal Geographic	Rs. 15,000/-
9.	Farming out look	Rs. 15,000/-
10.	Research Journal of Baluchistan	Rs. 20,000/-
	Total:-	**Rs.170,000/-**

SOCIETIES/ASSOCIATIONS

1.	Institution of Engineers, Pakistan	Rs. 15,000/-
	Grant Total:	**Rs.185,000/-**

4. FUNDING FOR CONFERENCES/ SEMINARS/ SYMPOSIA/ WORKSHOPS

To enable scientists to share their knowledge and research experience with each other, the Foundation provides partial financial assistance to Scientific Societies/Universities and R&D Organizations for organizing Science Conferences, Seminars, Symposia and Workshops etc. This is a continuing activity of the Foundation. During the report year, grants amounting to Rs. 0.670 million were released to various Organizations for holding National/International Conferences, Seminars, Symposia and/or Workshop etc. (Annexure-VI).

5. TRAVEL GRANTS

One of the functions of the Foundation is to provide travel grants from its annual budget to Pakistani scientists for their participation in international conferences, seminars, symposia etc. for presentation of their research findings at international forums. However, this activity of the Foundation has remained suspended during the last several years due to ban imposed by the Govt. on utilization of GoP funds for travel abroad for participation in meetings, conferences, seminars etc.

6. AWARDS/FELLOWSHIPS

During the Report period, an amount of Rs.120,000/- was released as fellowship to two scholars for completion of their M.Phil/Ph.D studies at University of Sindh, Jamshoro & Quaid-I-Azam University, Islamabad

II. SCIENCE POPULARIZATION

Popularization of Science is one of the statutory functions of Pakistan Science Foundation. The Foundation is engaged in various science popularization activities at national level with the aim of increasing awareness of science education in the society. In order to achieve this objective the Foundation has initiated a number of programs including science exhibitions, fairs, science film shows, popular science lectures and science quiz competitions, science essay & poster contests, establishing of Science Centers/Corners, strengthening of laboratories of High schools etc.

1. SCIENCE CARAVANS (Mobile Science Exhibition)

Science Caravan 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. Through Mobile Science Exhibition, the people living in rural/backward areas of the country are exposed to some of the most fascinating scientific and technical developments of the modern world. All narrations are in national language, and are accompanied by simple illustrations. At present five Science Caravan Units are operating one each in Balochistan, Sindh, NWFP, Punjab and Federal Areas. These Caravan units continued their activities during the report period & organized science exhibitions in schools within their jurisdiction.

Federal Unit

13 schools visited the Science Exhibition and Film/Planetarium shows at Tehsil Kahuta.	16.9.02 to 24.10.02
19 schools visited the Science Exhibition and Film/Planetarium shows at Kallar Syadan Tehsil Kahuta Distt. Rawalpindi.	1.11.02 to 23.11.02
11 schools visited the Science Exhibition and Film/Planetarium shows at Bakhral Tehsil Kahuta Distt. Rawalpindi.	1.1.03 to 8.2.03
4 schools visited the Science Exhibition and Film/Planetarium shows at Sultana Foundation, Tehsil & Distt. Islamabad	12.4.03 to 19.4.03

Sindh Unit

17 schools visited the Science Exhibition and Film/Planetarium shows at Singhoro District Sanghar	17.9.02 to 6.10.02
22 schools visited the Science Exhibition and Film/Planetarium shows at Taluka Singhoro and Shahdadpur	14.10.02 to 8.11.02
16 schools visited the Science Exhibition and Film/Planetarium shows at Taluka Singhoro & Distt. Shikarpur	13.11.02 to 8.1.03
16 schools visited the Science Exhibition and Film/Planetarium shows at Taluka Tando Adam	22.1.03 to 11.2.03
18 schools visited the Science Exhibition and Film/Planetarium shows at Taluka Digri and Kot Ghulam Muhammad, Distt. Mirpur Khas	3.4.03 to27.4.03
21 schools visited the Science Exhibition and Film/Planetarium shows at Taluka and Distt. Mirpur Khas	7.5.03 to 31.5.03

Balochistan Unit

4 schools visited the Science Exhibition and Film/Planetarium shows at Quetta and its surroundings	16.9.02 to 28.9.02
6 schools visited the Science Exhibition and Film/Planetarium shows at Quetta.	16.11.02 to 28.11.02
11 schools visited the Science Exhibition and Film/Planetarium shows at Quetta and its surroundings.	26.5.03 to 7.6.03 & 16.6.03 to 30.6.03

NWFP Unit	Duration
6 schools visited the Science Exhibition and Film/Planetarium shows at Drosh Distt. Chitral	15.8.02 to 1.9.02
7 schools visited the Science Exhibition and Film/Planetarium shows at Distt. Swat	25.9.02 to 6.10.02
9 schools visited the Science Exhibition and Film/Planetarium shows at Distt. Mardan	30.10.02 to 8.11.02
15 schools visited the Science Exhibition and Film/Planetarium shows at Distt. Swabi	2.1.03 to 12.1.03
22 schools visited the Science Exhibition and Film/Planetarium shows at Distt. Kohat (F.R)	17.2.03 to 1.3.03
6 schools visited the Exhibition and Film/Planetarium Shows at Nizampur Distt. Nowshera.	10.4.03 to 23.4.03
13 schools visited the Science Exhibition and Film/Planetarium shows at GHS- Oghi Distt. Mansehra	20.5.03 to 21.6.03
7 schools visited the Science Exhibition and Film/Planetarium shows at GHSS –Khanuspur, (Ayubia) Abbottabad	16.6.03 to 28.6.03

Punjab Unit	Duration
18 schools visited the Science Exhibition and Film/Planetarium shows at Distt. Muzaffargarh	14.10.02 to 26.10.02
24 schools visited the Science Exhibition and Film/Planetarium shows at Distt. Jhang	11.11.02 to 30.11.02

. 20 schools visited the Exhibition at Distt. Jhang	9.12.02 to 21.12.02
30 schools visited the Science Exhibition and Film/Planetarium shows at Distt. Bahawalpur	15.4.03 to 10.5.03
18 schools visited the Science Exhibition and Film/Planetarium shows at Shorkot Distt. Jhang	21.5.03 to 31.5.03

2. RENOVATION OF SCIENCE CARAVANS

As the Caravan Exhibitions i.e. Panels, Models & Fabrication of the Caravans are too old and shabby, therefore their renovation work was started during the report period. Initially a new panel exhibition alongwith newly fabricated Caravan Truck was prepared and handed over to the Science Caravan NWFP unit. The renovation work of old Science Caravan Panels & Truck is under process. The renovation of Science Caravan Sindh unit will be done in the next fiscal year.

3. DONATION OF LABORATORY EQUIPMENT TO SCHOOLS

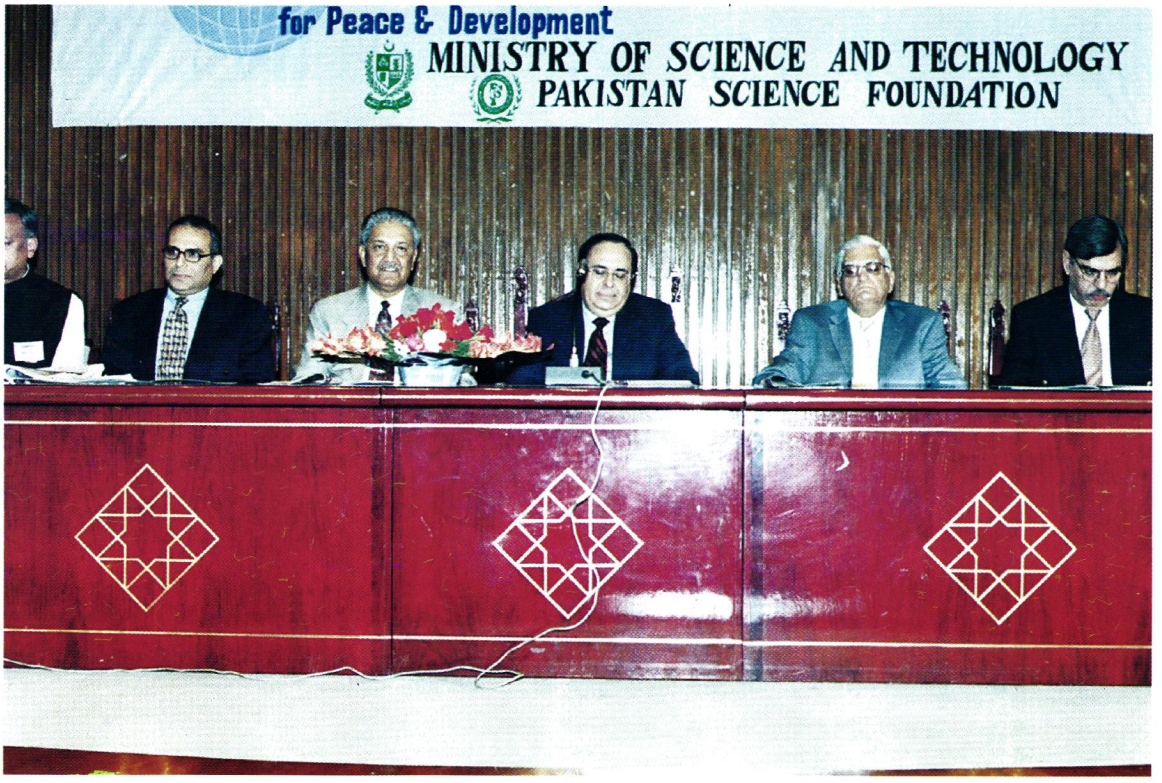
Two sets of Laboratory Equipment were acquired from National Educational Equipment Centre, Lahore (NEEC) for donation to five High schools of NWFP & Punjab Provinces nominated by relevant District Education Officers

4. BOOKS DONATED TO UNIVERSITIES/R&D ORGANIZATIONS

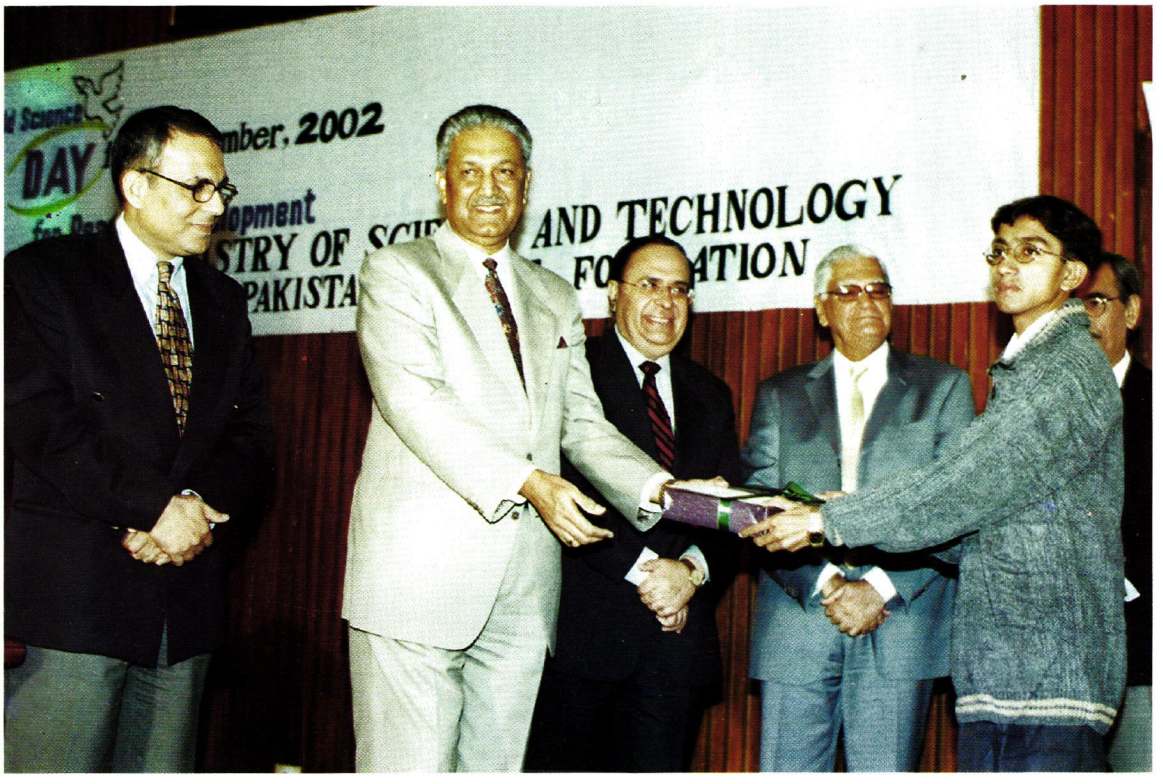
Fifty (50) copies of the book entitled "Water and New Technologies" edited by the well known Scientist Dr. Ishfaq Ahmed, Special advisor to Prime Minister and published by Global Change Impact Studies Centre (GCISC) were purchased for the distribution to various universities and R&D organizations of the country.

5. SCIENTIFIC LITERATURE TO HIGH SCHOOLS

12000 Copies of Monthly "Global Science" were donated to 1000 High schools during the report period. Moreover, hundreds of Brochures & Posters were provided to various High schools/other organizations of the country.



Dr. A.Q. Khan, Chief Guest at the Occasion of Nov., 10 as "World Science Day for Peace and Development" with Prof. Dr. Atta-ur-Rahman, Dr. Ishfaq Ahmad, Mr. Shahzad Hassan Pervez and Dr. Farid A. Malik



Distribution of Prizes to the Winner of Inter Board Essay Competition by Dr. A.Q. Khan at the above Mentioned Occasion

Judges Evaluating the Posters for Inter Board Poster Contest at PSF Auditorium

Display of Posters during 12th Inter Board Poster Competition

6. 12th INTRA & INTER BOARD SCIENCE ESSAY & POSTER COMPETITIONS

12th Intra & Inter Board Science Essay & Poster Competitions were organized during the report period and an amount of Rs.116,000/- was released to winner students as prize money through their respective Boards. The themes for the Poster and Essay Competition were "Electronics in the Service of Mankind" and "Advances in Communications in the 21st Century" respectively.

7. 13TH ALL PAKISTAN SOFTWARE COMPETITION

A grant of Rs.35000/- was provided to Dr. A.Q. Khan Research Labs. Kahuta for organizing 13th All Pakistan Software Competition.

8. NATIONAL CHILDREN MOUNTAIN CONSERVATION

A sum of Rs.30,000/- was sanctioned & released to the Adventure Foundation Pakistan, Garden Avenue, Islamabad to partially meet the expenditure of "National Children Mountain Conservation Meet 2002".

9. PUBLICATION OF BOOK "SEED INDUSTRY OF PAKISTAN"

An amount of Rs.30,000/- was provided to Federal Seed Certification & Registration Department, Islamabad for publication of their book '***Seed Industry of Pakistan***'.

10. WORLD SCIENCE DAY FOR PEACE & DEVELOPMENT

In collaboration with S&T R Division, MoST, the Foundation has organized the "World Science Day for Peace & Development" (WSDPD) on 10th November 2002 at National Library Auditorium, Islamabad.

Cash prizes alongwith Encyclopedias were given to the winners of Inter Board Science Essay and Poster Competitions. A Seminar was also organized as part of the celebrations.

11. COLLABORATION WITH UNESCO

During the report period, under the directions of MoST, the Foundation collaborated with UNESCO in their on going Project ***"Breaking the Poverty Cycle of Women: Empowering the Adolescent Girls to become the Agents of Social Transformation"***. Mrs. Farhat Rajpar, Principal Scientific Officer, Science Promotion Section, on behalf of the Foundation attended the first meeting of the subject project held in Dhaka, Bangladesh from July 27-29, 2002. The Foundation has also been providing its expertise for Popularization of Science for the Subject project in Pakistan. The 2nd meeting of regional partners scheduled to be held in November/December, 2003 is also expected to be jointly organized by UNESCO & the Foundation

III. INDUSTRY LIAISON GROUP

Pakistan Science Foundation is playing an important role in the application of research and commercialization of technology. In order to meet this objective, Industrial Liaison Group (ILG) was established in February, 2003 in Pakistan Science Foundation. This group works under the direct supervision of the Chairman, PSF. ILG is focused on projects of applied nature with clearly identified end-users. This group is responsible for establishing sustainable linkages between R&D organization and the industrial community. The scope of the Industrial Liaison Group covers a wide range of activities like.

- Identification and processing of Applied Research Projects.
- Coordination and management of Applied Research Projects.
- Transfer of research findings to the specific end-user in particular and industrial community in general.
- Preparation of Technology Transfer Mechanism and developing Technology Transfer Packages.
- To introduce mechanisms of wealth generation through Research and Technology based Development.

With clear vision, ILG identified following seventeen projects of applied nature in the fields of engineering, chemical sciences, metals and minerals, agriculture, food and environment in the year 2002-2003.

1. Pilot scale Development of Ethane Diol from Ethylene Gas
2. Disbondment of Epoxy Coating and Integrity of Gas Transmission Pipelines
3. Gasification studies of Coke Dust and Pakistani Lignite
4. Recycling of used Lubricating Oil
5. Development of DDVP
6. Development of Fenofibrate
7. Development and Manufacturing of Pour Point Depressant(PPD)
8. Development and Manufacturing of Methyl Ethyl Ketone (MEK)
9. Development and Manufacturing of Bio-Diesel
10. Preventive Hygiene in Hospital Management and Agricultural sector
11. Development of Techniques to reduce Post Harvest Losses in selected Medicinal Herbs in Pakistan
12. Pilot scale study for the Development of Ferro-Chrome
13. Enhancement in the Shelf-Life of Bread and Allied Products
14. Surveillance of Lead in different Food Commodities with special reference to Public Health
15. Proposal for Potash-Bed Studies
16. Focus Baluchistan
17. Non-Chemical Control of Wild Boar population in the area of Islamabad

Productive working relationship has been established with different chambers of commerce and industry. Different research proposals of national and economic importance were received during this year which are currently under process.

Since its active operations in February, 2003, Industrial Liaison Group has given practical shape of introducing perfection, objectivity and precision practices in the identification and preparation of research proposals for successful funding/ implementation.

It is hoped that these activities will result in much needed socio-economic development of the country.

IV. PLANNING AND DEVELOPMENT WORK

During the report period, the work on following five on-going development projects continued.

S.No	Name of Project	Total Cost (Million Rs.)
1.	Financial Support to Scientific Societies in Pakistan.	39.00
2.	Participation of Scientists and Technologists in International Conferences, Seminars and Workshops.	17.00
3.	Funding of Scientific and Technological Research in Universities and other R&D Organizations.	39.00
4.	Career Development of Young Scientists.	28.00
5.	Popularization of Science in Rural areas	22.212
	Total	**145.212**

Brief summary of the progress made under each development project during the report period is as under:

1. Financial Support to Scientific Societies in Pakistan

The Pakistan Science Foundation provides grant-in-aid to some of the scientific societies and learned bodies from its non-development budget for their activities and for the publication of few scientific journals but the amount allocated for the purpose is negligibly small. In order to strengthen the role of scientific societies/learned bodies and to enable them to develop linkages with their counter part societies in the advanced countries, the above development project was approved at a total cost of Rs. 39.00 million for a period of five years. Under this project financial assistance is provided to scientific societies for;

- Holding of National and International conference, seminar workshop etc. on important scientific topics.
- Publication of scientific journals and

- Development of linkages with their counterpart societies in advanced countries to remain updated in the contemporary Science and Technology and to draw the benefit of R&D to Pakistan industry by adopting the ways and means as done by those countries.

During the year under report an amount of Rs. 3.06 million was paid to 10 Scientific Societies as per details given below:

S. No.	Name of the Society.	Amount Released (Rs).
1.	Pakistan Thalassaemia Welfare Society.	3,73,000/-
2.	Pakistan Society of Nematologists.	3,15,000/-
3.	Pakistan Society for Semiconductor Science & Technology.	1,28,880/-
4.	The Chemical Society of Pakistan.	4,96,790/-
5.	Biological Society of Pakistan.	3,10,000/-
6.	Pakistan Vacuum Society.	5,83,348/-
7.	Pakistan Association for the Advancement of Science.	2,04,862/-
8.	Pakistan Academy of Sciences.	3,00,000/-
9.	National Geological Society of Pakistan	2,50,000/-
10.	Weed Science Society of Pakistan.	1,00,000/-
	Total:	**30,61,880/-**

.2. Participation of Scientists and Technologists in International Conferences, Seminars and Workshops

One of the functions assigned to Pakistan Science Foundation under its charter is to provide financial support to scientists for presentation of their research papers in

international conferences. The above project was approved at a total cost of Rs.17.00 million for a period of five years. The main objective of the project is to provide financial assistance to Pakistani scientists, technologists, doctors and engineers for their participation and presentation of research findings in international conferences, seminars & workshops.

During the report period, as many as 106 travel grant requests were received, out of which 79 requests were approved by the Foundation at a total cost of Rs.5.73 million, However, only 40 scientists could avail the grants. The remaining could not attend their conferences due to visa restrictions/non-availability of flights. Funds amounting to Rs. 3.289 million were released in this regard.

The list of scientists who succeeded in availing the PSF grants is at Annexure-VII.

3. Funding of Scientific and Technological Research in Universities and other R&D Organizations.

The above development project was sanctioned at a total cost of Rs.39.00 million over a period of three years. The main objective of the project is to strengthen the scientific and technological research activities in the Universities and other R&D Organizations by providing them more funds for:

i. Undertaking basic and applied research on problems having direct relevance to the socio-economic needs of the country. Projects are funded in the subject areas pertaining to Information Technology, Biotechnology, Chemistry (Medical Chemistry, Biochemistry, Industrial Chemistry) Engineering Sciences, Agriculture Sciences, Electronics, Physics, Mathematics.

ii. Procurement of specialized research equipment, chemicals and/or literature which are required by the research workers in different organizations for carrying out their research activities and which they are unable to purchase due to paucity of funds.

iii. Training of manpower for undertaking scientific research on advanced laboratory techniques

During the period under report, 40 new research projects were approved for funding by the Foundation at an estimated cost of Rs. 24.38 million. The remaining projects are being processed through experts and technical committees. List of new projects approved during the year 2002-2003 under this development project is at Annex-VIII.

An amount of Rs. 4.50 million was released on account of 1st installments of some newly sanctioned projects and due installments of on-going projects.

4. Career Development of Young Scientists and Technologists

Pakistan Science Foundation initiated a development project entitled "Career Development of Young Scientists and Technologists". The objectives of the project are (i) to utilize expertise of highly qualified S&T manpower for the development of science and technology in the country, (ii) to provide career opportunities to young scientists and technologists and to encourage them to settle within Pakistan and (iii) to arrest brain drain of highly qualified scientists and technologists from the country.

During the report period, a total of 19 projects were under process. Out of these, 9 research projects in the field of Biological Sciences were approved for funding by the Foundation at a total cost of Rs. 1.668 million. In this way, 9 employed young scientists were provided grants for initiation of research work.

List of the newly approved projects under the above development project is at Annexure-IX.

5. Popularization of Science in Rural Areas

The above development project, was initiated proposing the construction of four more Science Caravans, one for each province at a total cost of Rs. 22.212 million, to be completed in two years.

The main objectives of the project are:

i) To stimulate interest of students in science through the display of attractive scientific models, charts and exhibits;

ii) To disseminate information on the achievement and accomplishments of science and portray the blessings and facilities provided by of science and technology which are being enjoyed by us in our every day life;

iii) To stimulate the interests of students in the natural science phenomena by arranging scientific film shows on topics of interest to common man;

iv) To arrange planetarium shows to explain the astronomical concepts;

v) To arouse interest of students for science and technology and to create in them a thirst for acquiring more knowledge;

vi) To inculcate in the minds of students the idea of solving every day problems by application of science and technology, such as use of mechanized agriculture practices, pest management and control, problems related to hygiene and sanitation, scientific management of human and animal diseases etc.

During the year 2002-2003, an amount of Rs.3.500 million was utilized for the procurement of following items & equipment for the subject project

- Mazda trucks for Science Caravans (2)
- Fabrication of Bodies of Science Caravans ***(under construction)*** (2)
- Slide Projectors (4)
- Screens for projectors (4)
- Computers P-IV (5)
- Printers HP-1300 (2)
- TVs Sony 21" (8)
- Multimedia Projectors (4)

PAKISTAN MUSEUM OF NATURAL HISTORY (PMNH)

Pakistan Museum of Natural History (PMNH) is an important scientific organization carrying out environmental and biodiversity research in the country as well as promoting informal education and public awareness about our natural wealth. It is a subsidiary organization of Pakistan Science Foundation and was established in 1979 to serve 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.

Pakistan Museum of Natural History remained engaged in the collection, curation and preservation of natural history specimens and research on flora, fauna and geology of Pakistan. The scientists of the three Divisions of PMNH viz., Botanical, Earth Sciences and Zoological Sciences Divisions carried out a number of field tours to various localities of Sindh, Punjab, NWFP, Northern Areas and AJK. About 6000 natural history specimens, comprising of plants, animals, rocks, minerals and fossils were collected. The collected material was curated and preserved in the reference collection of PMNH. Besides samples, numerous photographs showing details of the area of study were also taken. Research was conducted on various aspects of the natural history of the country, which resulted in the production of many research articles. During this period research articles were published in national and international journals.

PMNH continued international collaboration on research with various Universities/ Research organizations of USA, France, Japan, Canada and Switzerland. Expert help was provided to agencies like IUCN, WWF, UNESCO, etc. Several University students were guided in their research work.

A division-wise account of activities during the year 2002-03 is given below.

1. BOTANICAL SCIENCES DIVISION:

a) Reference Collection:

The scientists of the Division carried out field tours to various localities of Murree & Galiat, Northern Pakistan, Azad Jammu & Kashmir, North West Frontier Province, Punjab and Islamabad to collect Higher and Lower Plant specimens along with ecological and ethnobotanical data. A total of 3000 plant specimens comprising of flowering plants, algae and fungi were collected and added to the reference material of the PMNH.

b) Laboratory work:

Identified 750 higher plants and 250 lower plants; poisoned and mounted 4000 higher plants and 260 lower plants. Physico-chemical properties of water samples collected from various localities during field-work were found out. Received 110 rare plant specimens from the Herbaria of Royal Botanic Garden, Edinburgh, and Natural History Museum, Paris. Prepared many data sheets and write-ups for Biodiversity and Global Networking (BGN) project. Provided details of courses, lists of literature, chemicals, glassware, etc. for PINS. Delivered in house seminars on Botanical research topics. Prepared quarterly and annual progress reports of PMNH, and material for Yearbook 2002.

c) Design/Display:

Provided numerous data sheets, write-ups and digital images of hundreds of higher and lower plants for Virtual Orientation Gallery. Also provided write-ups and images for display.

d) Technical Reports/ Development Schemes:

Technical Reports Submitted to Pakistan Science Foundation:

- "Studies on taxonomy and traditional uses of economically important plants of Chitral".
- "Mushrooms and Toadstools of Margalla hills and adjacent areas".
- "Ecological studies of Algal Flora of Punjab and Islamabad".

New Projects Initiated:

- "Ethnobotanical studies, taxonomy and pictorial encyclopedia of economically important plants from mountainous regions of Northern Pakistan"
- "Documentation of Indigenous Knowledge about Medicinal Plants of Pakistan"

Project Proposals Submitted:

- Development of Techniques to reduce post harvest losses in selected Medicinal Plants of Pakistan" (PC-1).
- Inventory of the Flora of Margalla Hills National Park, Islamabad."

Development scheme revised:

- Revised and presented the PC-1, Phase III of Pakistan Museum of Natural History to the Ministry of Science & Technology.

e) Extension work and service to other organizations:

- Many student groups from various institutions were provided guided tours to the Laboratories and Reference Halls of the Division.
- Guided several M. Phil. students from Quaid-i-Azam University, Islamabad.
- Guided several M. Sc. students of University of Arid Agriculture in their research assignment and also provided literature reprints to them.
- Worked as External Examiners for 2 M. Phil. students of Quaid-i-Azam University, Islamabad.
- Provided data on the number of local and foreign visitors to PMNH to Ministry of Minorities, Culture, Sports, Tourism and Youth Affairs.

f) Publications:

Bhatti, G.R., R. Qureshi, M. Shah (2001). "Ethnobotany of Qadan Wari of Nara Desert". Pak. Journ. Bot. **33**(special issue): 801-812.

Awan, M. R., M. Shah, G. Akbar & S. Ahmad. (2001). " Traditional uses of economically important plants of Chitral district, Malakand division, NWFP, Pakistan." Pak. J. Bot. **33** (special issue): 587-598.

Sultan, A., K. Nazir & N. Ayub. (2001). "Some common specie of fleshy Macromycetes (Discomycetes, Gasteromycetes and Agaricales) from Margalla hills National Park and adjacent areas". Pak. J. Bot. **33** (special issue): 709-921.

Farooq, M., N. Ayub and K. Nazir. (2001). "A comparative study of aeromycoflora of thickly populated and less populated areas of Rawalpindi". Pak. J. Bot. **33** (special issue): 733-736.

Leghari, M.K., S.B. Waheed & M. Y. Leghari. (2001). "Ecological study of Algal Flora of Kunhar river of Pakistan". Pak. J. Bot. **33** (special issue): 629-636.

Leghari, M. K., M. Shah and M. Y. Leghari. (2002). "Ecological study of Phytoplankton at Kohala of Jhelum river, Azad Jammu & Kashmir". Proc. Pak. Zool. Congr. **22:** 1-11.

Leghari, M. K., M. Y. Leghari and M. Shah. (2003). "Physico-chemical and Biological Study of Korang Nallah of Rawal dam, Islamabad". Journ. Sci. Tech. Dev. **22(1):** 5-8.

Published several Abstracts in national and international journals.

Accepted for Publication:

- "Comparative ecological study of Cyanophyceae part I of Phoosna and Bakar Lakes of Pakistan".
- "Pollen variation in various genera of the family Amaranthaceae from Pakistan."
- "Medicinal and Economic Uses of Roses with reference to Ancient Civilizations".
- "Bibliography of the genus Rosa".
- "Need for Technology Development to reduce Post harvest Losses in Medicinal Plants".

2. EARTH SCIENCES DIVISION (ESD):

a) Reference Collection:

The Geologists of PMNH carried out over a dozen field work in various localities of Salt Range, Noorpur, Ganda Kas, Barthi, Sulaiman Range, Kalam, Dir, Mohmand Agency, Kohistan, Sargoda, Lehri, Dina, Margalla, etc. A large number of geological samples such as rocks, minerals and fossils were collected. Geological field data was also obtained. The collected material was added to the reference collection of PMNH.

b) Laboratory Work:

Studied x-ray diffractograms of clay minerals from Cambrian rocks and unknown refractory material from an archeological site; examined quantity and quality of well water at PSF. Washed thousands of kilograms of rock sediments and recovered many pieces of fossil bones. Studied chert-carbonate and granite samples for economic value, studied data on topaz mineralization. Prepared more than 100 thin sections of rocks and carried out their petrographic studies,. microphotographs of these sections were also

Minister for Science and Technology, Chairman PSF, and Director General, PMNH on the occasion of Inauguration Ceremony of PMNH

taken. Catalogued 80 vertebrate fossils in computer, labeled 556 geological samples and 1700 fossils. Delivered in house seminar on Geological research topics.

c) Design/Display:

Provided data and write-ups on Geological and Palaentological information for Virtual Orientation Gallery project. Obtained through purchase or donation gemstone, marble slabs, granite tiles and slates for geological exhibits. Provided technical assistance, write-ups, etc. for the preparation of Dioramas like Salt Range, Ocean, Palaentology, Dimension Stone, etc.

d) Technical Reports/ Development Schemes:

Submitted the following project proposals for funding to various national and international agencies:

- "Establishment of PC-1 of Pakistan Institute of Natural Sciences (PINS) at PMNH".
- "Geological studies and value added industrial applications of celestite deposits of Thano-Bula Khan and adjoining areas of Karachi and Hyderabad, Sindh".
- "Evaluation and beneficiation of talc deposits associated with the Indus suture zone in Swat, Malakand and Dir districts".

c) Extension work and service to other organizations:

- A large number of student groups from various Schools and Colleges were guided through the labs and reference material of the Division.
- Explained paleo-environment of oil-producing reservoir rocks in Pakistan to engineers from OGDC.
- Conducted practical examinations of 3 B. Sc. students of Applied Geology of University of Azad Jammu & Kashmir.
- Identified many rock, mineral and fossil samples brought by various visitors, including students, researchers, professionals, etc.
- Collaborated with University of Wisconsin, Northeastern Ohio University, College of Medicine, Rootstown, USA; University of Montpellier, CNRS Montpellier, France; Swiss Institute of Technology, ETH, Switzerland, etc. on geological research.

d) Publications:

Cheema, I. U., L.J. Flynn, A. R. Rajpar. (2003). "Late Pliocene Murid rodents from Lehri, Jhelum District, Northern Pakistan". Advanc. Vert. Paleont. Bucharest, Romania, 85-92.

Roohi, G., F. R. Khan, S. R. Baqri, A. N. Fatmi & N. Iqbal. (2002). The discovery of an Eocene nautiloid from the Salt Range, Punjab, Pakistan'. Pesh. Univ. Teach. Asoc. Journ. **9:** 51-56

Raza, S.M., I.U. Cheema, W.R. Downs, A.R. Rajpar and S.C. Ward (2002). "Miocene stratigraphy and mammal fauna from the Sulaiman Range, Southwestern Himalayas, Pakistan". Paleofeography, Paleoclimatology and Paleoecology. Amsterdam, Holland, **186:** 185-197.

Published 5 research abstracts in Petroleum Symposium-II, Univers. Pesh & Pak. Assoc. Petrol. Geosc.

Published 6 abstracts in International Symposium on Mountains of Pakistan: Potential, Protection and Prospects in Islamabad, and 18th Himalaya-Karakorum-Tibet Workshop, Kolkata, India, 2002.

3. ZOOLOGICAL SCIENCES DIVISION (ZSD):

a) Reference Collection:

During this period the zoologists of the PMNH undertook 10 field trips of a total duration of about 125 days in different localities of the Galiat, Azad Jammu & Kashmir, Mansehra, Cholistan and Northern Areas, besides one-day trips to Margalla and Islamabad areas. A total of 1560 invertebrates and 670 vertebrates, including a large number of insects, fish, reptiles, amphibians and rodents were collected. These specimens were preserved and added to the PMNH Zoological reference collection.

b) Laboratory Work:

Catalogued 1350 invertebrates and 1611 vertebrates, preserved and mounted some 3000 butterflies. Identified 2500 butterflies and 10 snakes, labeled 5000 fish samples. Stuffed 11 birds and 7 mammals, repaired 2 mammal and 4 bird specimens; prepared skins of 28 birds and 3 mammals. Carried out chromosome study of many fish samples. Prepared numerous computer data sheets for the BGN project. Delivered in house seminars on Zoological research topics.

c) Display Activities:

Prepared write-ups of more than 300 species of different animal groups for the project "Virtual Orientation Gallery". Also prepared write-ups of more than 200 animals for various Display Dioramas of PMNH Display Halls.

d) Technical Report/Research Proposals:

Annual Report prepared:

- "Ecological studies of the reptilian fauna of Cholistan Desert"

- Submitted the following Reports pertaining to Entrepreneurship:
  - Environment for Entrepreneurship.
  - Role of Pakistan Science Foundation for Entrepreneurship.
  - Campaign for Entrepreneurship.

New project initiated:

- "Ecology and Zoogeography of butterfly fauna of Moist Temperate montane of Pakistan".

The following Project proposals were prepared for funding to submit to various donor agencies:

- "Inventory of faunistic diversity in Margalla Hills National Park".

- "Bio-ecology and population management of the House Crow (*Corvus splendens)* in Islamabad area".

- "Butterfly Garden".

- "Establishment of network of self sustainable family fish ponds for exploitation of untapped fisheries resources in Northern areas". (PC-1)

- "Isolation and characterization of the coagulants from the venom of vipers of Pakistan".

- "Bioinsecticides".

- "Venoms and Toxins".

- Proposal to designate PMNH as a National Focal Point of BioNet International-SACNET Loop and setting up of a 'Pakistan Bionet Group' of leading Taxonomists of the country.

e) Extension work and service to other organizations:

- Provided information pertaining to PMNH for Pakistan Medical Research Council Directory of Healtl search in Pakistan.

- Prepared detailed report on 'Identification of biosphere reserves in Pakistan for future nominations' under UNESCO MAB Programme.

- Prepared and submitted proposals for Scientific and Technological cooperation in the fields of Biodiversity Research and Conservation between Pakistan and Bangladesh, Pakistan and Malaysia, and Pakistan and Thailand.

- Provided material for Budget Speech.

- Interviews were given to various news agencies on Environment and Biodiversity of Pakistan.

- Prepared a list of animals served as Geographical Indicators for Ministry of Science & Technology.

- Guided several M. Sc. and M. Phil. students of University of Arid Agriculture, Rawalpindi, and Quaid-i-Azam University, Islamabad, in their research assignments.

- Guided 2 Ph. D. students in their thesis research.

- Evaluated M. Phil dissertation and conducted viva-voce of a student of Quaid-i-Azam University, Islamabad.

- Guided tours to the Division were provided to various student/teacher groups of various Colleges and Universities.

f) Publications:

Hasan, S.A. and Rafique, M. (2003). "Development of different temperature regimes in rivers Jhelum, Neelum and Kunhar and their effect on fish dispersal". Pakistan Journ. Zoology. **35(1)**: 39-44.

Hasan, S.A. (2003). "Natural History Museum: A vital source of Biodiversity information". Proc. Workshop Inform. Handl. Bio. Res.

Baig, K.J. (2002). "Rediscovery of Murree Hill frog *Paa vicina* after 130 years from Ayubia" Proc. Pak. Acad. Sci. **39(2)**: 261-262.

Rafique, M., Akhtar, S. and Niazi, M.H.K. (2003). "Fish fauna of Jinnah Barrage and adjoining areas". Pak. J. Zool. **35(2)**: 95-98.

4. PUBLIC SERVICES DIVISION (PSD):

a) Design and Display:

Worked for the preparation of the inaugural ceremony of PMNH Display Centre. Final touches were given to the skeleton displays of large mammals like whale, giraffe and elephant. Preparation of a large display on Salt Range is underway. Also worked on the Palaentology and Ocean Dioramas. Work on an exhibit on Dimension Stone has been initiated. All the write-ups in various Dioramas and exhibits are being documented through the computer for record and future reference.

b) Educational Activities:

- Numerous students from various Schools and Colleges were provided guided tour of the Museum.
- Several student groups were shown films on Natural History in the audio-visual hall of the PMNH.
- Delivered in house seminar on "Drawing an Object"

c) Museum Maintenance and Photography:

Necessary renovation, maintenance and repair work including carpentry, painting, illumination, lighting, etc. of the Display Halls, Galleries, various Dioramas, the Audio-visual Hall, scientific labs, administration section, museum building, etc. were carried out. Video coverage of the Inaugural Ceremony of the Display Centre was prepared. Took numerous photographs of animals, plants, rocks, etc. for display and research purposes.

d) Extension work and services rendered to other organizations:

- Provided the main gate, 49 showcases complete with electric illumination to Science Corner at Children Library Complex, Lahore. Also provided 23 Science & Technology Exhibits as per plan, 25 background paintings, 25 thee-dimensional foregrounds and 48 write-ups in English and Urdu.
- Provided consultancy for Science Exhibition at Pakistan Academy of Sciences.
- Prepared a model of a Float for Ministry of Science & Technology for Pakistan Day Parade of 23 rd March, 2003 (The ceremony was cancelled)
- Prepared a three-dimensional model of Aero Sculpture in connection with Pakistan Air Force Expo 2003.

5. Other Activities

1. Inauguration of the Display Centre of Pakistan Museum of Natural History:

The Display Centre of Pakistan Museum of Natural History, Islamabad, was formally inaugurated by the then Federal Minister of Science & Technology Dr. Atta-ur-Rehman on 30th October, 2002. The Secretary MoST also participated in the ceremony conducted by Dr. Farid A. Malik, Chairman, Pakistan Science Foundation. The Minister visited the Display Centre and appreciated the work done. A film show on the Natural History of Pakistan was also arranged on this occasion.

2. Biodiversity of Pakistan: Data bases and Global Networking:

To play an active role as Associate Participant in Global Biodiversity Initiative Forum, PMNH is involved in the preparation of Biodiversity Database of Pakistan. In this regard a project on "Biodiversity of Pakistan: Data bases and Global Networking (BGN)" funded by the Ministry of Science & Technology is being implemented. The project is in its final stages. It is likely to facilitate storing, quick access and retrieval of biodiversity data and make available the information on the Internet. The necessary infrastructure has already been developed, and software has been developed. The scientists and staff of PMNH have been imparted computer training for this purpose. Specialized personnel have also been recruited. A large amount of data on the biodiversity of Pakistan has been compiled by the scientists of all the three scientific Divisions of PMNH. The data will soon be entered in the Local Area Network of PMNH for online access. Afterwards the selected data will be made available in the Internet via a website of the project to be launched soon.

3. Virtual Orientation Gallery (VOG):

A project entitled 'Establishment of Virtual Orientation Gallery of Pakistan Museum of Natural History (VOG)' funded by the Ministry of Science & Technology is being completed. The main objective of the project is to make the Display Centre of Pakistan Museum of Natural History fully functional so that it can provide necessary education and awareness about the natural resources of Pakistan to the public in general and to the students of schools and colleges in particular. A large amount of information on the plants, animals, rocks, minerals and fossils of Pakistan has been entered in the computer server that is linked to several stations for use by the visitors. The construction of the building for this gallery has been initiated. In this gallery facility of computerized introduction and information retrieval about various exhibits will be provided. This information will be made accessible to the students and general visitors through touch - screen computer terminals which will guide the user through the galleries using 3-D images and guiding links.

4. Participation in Meeting on Public-Private Partnership:

Director, Zoological Sciences Division visited Bangkok in connection with Consultative Meeting on Public-Private Partnership (PPP) Units for Delivery of Basic Services. This meeting was organized by United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) as follow-up to the 'World Summit on Sustainable Development'. The main objective was to establish and strengthen Public-Private Partnership (PPP) Units to address pro-poor issues and to conceptualize demonstration projects focusing on access to water, energy, health-services and conserving biodiversity.

5. Biodiversity Day, 2003

Pakistan Museum of Natural History participated in the International Biodiversity Day on May 22, 2003. In this connection, different educational programmes were arranged in PMNH, including film-show and lecture to create awareness among the public about the Biodiversity of Pakistan and its conservation. Interviews of scientists of PMNH were recorded for Radio and Television. Coverage of the activities of the day was published in dailies The Nation, Dawn, and Frontier Post.

6. Participation in Training Activities:

The officers of Pakistan Museum of Natural History participated in Training activities like Management Training Lectures by Dr. Farid A. Malik, Chairman, Pakistan Science Foundation, Islamabad. Through these lectures, the PMNH officers learned the principles and practices of modern age management. They also received standard and advanced computer trainings from COMSATS and PASTIC so that they may carry out data and word processing more efficiently.

PAKISTAN SCIENTIFIC AND TECHNOLOGICAL INFORMATION CENTRE (PASTIC)

Pakistan Scientific and Technological Information Centre, PASTIC is the premier organization in the field of information dissemination serving thousands of researchers. It is a unit of Pakistan Science Foundation, an autonomous organization under the Ministry of Science & Technology.

PASTIC has evolved from the erstwhile Pakistan National Scientific and Technological Documentation Centre, PANSDOC, which was established in 1957 at Karachi with the assistance of UNESCO, under the Pakistan Council of Scientific and Industrial Research. In 1974 PANSDOC was transferred to Pakistan Science Foundation (PSF) and was renamed as Pakistan Scientific and Technological Information Centre, PASTIC. After transfer to PSF its scope and facilities were expanded.

The National Centre is housed in its own building situated in the Quaid-i-Azam University Campus, Islamabad. It has five Sub-Centers at Karachi, Lahore, Peshawar, Faisalabad and Quetta. It employs about 100 persons which include Technical and Administrative Staff.

AIMS & OBJECTIVES

1. To procure, process and disseminate scientific and technological information to the researchers.
2. To interact with regional and international information agencies/networks.
3. To develop inter-library cooperation, resource sharing at national level.
4. To train information personnel in contemporary techniques and methods of information handling.
5. To develop and strengthen the National Science Reference Library.
6. To provide bibliographic and translation service.
7. To compile Directory of S&T Periodicals of Pakistan, Union Catalogue of Scientific periodicals in the libraries of Pakistan and Technological Information Bulletin.
8. To publish an abstracting and indexing journal entitled "Pakistan Science Abstracts".

TECHNICAL SERVICES AND ACTIVITIES

The activities undertaken during the period of July 2002 - June 2003 are briefly described below:

1. DOCUMENT PROCUREMENT AND SUPPLY SERVICE

Under the Document Procurement and Supply Service queries were received from different R&D organizations for supply of reprints of research articles, conference papers and reports etc. which were procured either from local sources or from abroad. A total number of 883 S&T documents were procured and supplied against 1384 requests received from scientists, researchers and other R&D workers.

2. BIBLIOGRAPIC INFORMATION SERVICE

References from International databases on CD ROM were supplied to users according to their research topics on request. Against 965 orders 19447 references on S&T topics were supplied to 972 researchers.

Besides, in order to strengthen the bibliographic information service and resources of PASTIC Sub-Centres, bibliographic information databases on CD-ROM were supplied to PASTIC Sub-Centres, Lahore, Peshawar, Faisalabad, Quetta and Karachi. Also training in this regard was provided to the officers/staff of sub-centres for operating these databases and undertaking bibliographic information searches from these electronic databases. A full text electronic database on CD-ROM entitled "Proquest Medical Library" was also used for dissemination of reference and referral service and 13 full text articles were supplied to the researchers from this database.

3. ABSTRACTING AND INDEXING SERVICE

PASTIC provides abstracting and indexing service by publishing an abstracting journal entitled "Pakistan Science Abstracts" which serves as a secondary information source to give support to research and development activities in the country. The scientific information generated in Pakistan or abroad and published in Pakistani journals is documented in this secondary journal. The abstracts of research articles along with detailed author index and keyword index were published in Pakistan Science Abstracts.

Under this activity research articles were abstracted, classified, indexed, compiled, edited and Pakistan Science Abstracts, 2000 Vol. 40, No. 1-4 was published. Besides, 32 Pakistani Scientific Journals were scanned for abstracting these in Pakistan Science Abstracts and 398 research articles from these journals were abstracted indexed and classified for next volume of Pakistan Science Abstracts.

Directory of Scientific and Technological Periodicals of Pakistan: PASTIC brings out Directory of Scientific and Technological Periodicals of Pakistan with a view to identify the scientific periodicals being published in Pakistan. This publication serves as an important reference information tool for research scholars, scientists, R&D workers, information workers, documentalists and other connected with the field of scientific and technological endeavour.

In this regard a questionnaire was prepared for gathering reference information pertaining to scientific periodicals being published from Pakistan for bringing out a

revised and updated edition of this directory and reference information of 250 scientific periodicals being published from Pakistan was gathered in the form of this questionnaire for compiling and publishing this reference information tool. A web based database was developed for computerizing this data of scientific periodicals of Pakistan and reference information data of these 250 scientific journals was entered in this database.

4. UNION CATALOGUE

PASTIC undertakes screening and survey of the libraries of scientific institutions and universities of the country to gather information about the serial holdings collection of these libraries. The information collected from these libraries is thus standardized, computerized and published in the form of "Union Catalogue". In this regard a Union Catalogue of major libraries of Pakistan is under preparation. A web based database for preparation of Union Catalogue on CD-ROM and in print form was developed. Serial holdings record of 200 libraries was entered in this database. After computerization of all the data of serial holdings of these libraries, it was merged, indexed, edited and loaded on PASTIC website for providing on line accessibility of the data to the users.

5. PASTIC NATIONAL SCIENCE REFERENCE LIBRARY

PASTIC National Science Reference Library is aimed at providing reference and referral service to the users and strengthening of all the services of PASTIC especially document supply service, bibliographic information service, abstracting and indexing service, technical information service etc. Therefore in view of this objective following important CD-ROM databases were subscribed.

i) Life Sciences
ii) POLTOX
iii) Applied Science and Technology
iv) Medline
v) Science Citation Index (2002 to date with Abstracts)
vi) DERWENT Biotechnology Abstracts (2001 to date with Abstracts)
vii) COMPENDEX SITE ENHANCED (1995 to date with Abstract)

Besides, 411 issues of various S&T periodicals, 47 documents and 32 books were received in PASTIC National Science Reference Library. Regarding reference service of library a total number of 2542 references were supplied to the users during the period under review.

6. REPROGRAPHIC SERVICES

The Reprographic Section of PASTIC has facilities ranging from photocopying to offset printing. During the period July 2002 to June 2003 about 12,62,465 impressions, 3610 pages and 87,167 copies were printed and produced by the Reprography Unit against 99 jobs received from 11 organizations.

7. NATIONAL SCIENCE AND TECHNOLOGY DATABASE / INFORMATION NETWORK AT PASTIC:

A development project entitled "Establishment of National Science and Technology Database/Information Network" at PASTIC is under execution. Networking will be established with all the PASTIC Sub-centres and other designated network members. Under this project following activities were carried out during the period under review:

- Obtained PASTIC's own domain named www.pastic.gov.pk, installed and uploaded PASTIC website to its own domain.
- Serial holdings record of 200 libraries loaded on PASTIC website at URL:http://www.pastic.gov.pk/catalogue.htm
- A database of expatriate Pakistani Scientists and Engineers was developed and loaded on PASTIC website at URL:http://www.pastic.gov.pk/pastic/index.asp
- Designed, conducted and scrutinized the typing tests for 140 applicants for MoST for the post of technical assistance and Data Entry Operators.
- Designed and finalized the Database of Pakistani Scientist for PSF.
- Installed winproxy software on server for fast internet service.
- Obtained 3MB Microsoft SQL database support and converted the database of union catalogue to Ms SQL database format and uploaded on PASTIC website.
- Technical assistance to PMNH for BGN project to PSF for Local Area Networking was provided.
- Designed and implemented software for computerization of PASTIC store.
- PASTIC network was converted from work group to centralized server based environment for better services and data backups.
- Technical review of the "Visual Orientation Gallery" project at PMNH was finalized and report was submitted.
- Purchased 10 computers, 5 Fax machines, 1 digital camera, 10 printers, 3 scanners, verified equipments specification and computers installed.
- Provided technical support to PMNH for VOG software and to PSF for Management Information System.
- Finalized site survey for both wireless and DSL technologies at PASTIC for Internet connectivity.
- Worked with Country Manager of Infocad Solutions for the Development of Reverse Engineering Lab at PASTIC.
- Prepared detailed inventory report of the purchased hardware for audit review.
- Prepared software for printing and designed CD based Union Catalogue for distribution.
- Tendering process was completed for purchase of equipments under the project for LAN and WAN facilities at PASTIC.

8. INTERNATIONAL LIAISON

PASTIC is the National Focal Point of International/Regional Information Centres and Networks like SAARC Documentation Centre, WHO/CEHANET and UNEP/INFOTERRA. PASTIC is also the Coordinating / Collaborating Centre for UNDP/TIPS, UNESCO/ASTINFO and AIT/ ENSICNET. The following collaborating activities were undertaken under international liaison activities.

INFOTERRA

INFOTERRA is the United Nation Environment Programme's Global Information Network based at Nairobi, Kenya comprising of National Focal Points in about 200 Member States. INFOTERRA provides information on environmental issues by using the database on Environmental Information Sources which it has developed with the assistance of the NFPs. All information services such as article service, bibliographic service, reference and referral service are supplied free of charge through INFOTERRA. During the period under review following activities were undertaken.

The INFOTERRA activities have been reorganized and being updated according to the new restructuring of INFOTERRA.

CEHANET

The World Health Organization's Centre for Environmental Health Activities Information Network gathers information about published material on environmental health issues with the help of NFPs of CEHANET which are 22 in number. Information is then disseminated through this bibliographic database of environmental health documents which can be obtained from the Member States. During the report period the following activities were undertaken.

- CEHANET brochures received from WHO/CEHA were distributed to the relevant organizations for publicizing the services & activities of CEHANET.
- Information was identified and collected on Air Quality, Atmospheric Pollution and Noise Pollution in Pakistan for environmental health documents database of CEHANET.

ASTINFO/UNESCO

It is a UNESCO supported Network for the Exchange of Experience and Information in Science and Technology in Asia and the Pacific. Its aim is to build and strengthen the information infrastructure in the Member States. Under this network PASTIC is responsible for distribution of UNESCO developed software/packages such as CDS/ISIS and IDAMS and for provision of training on CDS/ISIS package. In view of these objective following activities were undertaken during the period under report.

- Supplied WINISIS Package (English Version) to 9 organizations, which are Lok Virsa, Ministry of Culture, Islamabad; Sustainable Development Policy Institute

(SDPI), Islamabad; Sindh University, Jamshoroo; SAARC Human Resource Development Centre, Islamabad; International Islamic University, Islamabad; Baqai Medical University, Karachi; Islamabad Policy Research Institute, Islamabad; The AIMS Education Systems, Islamabad and UET Lahore.

- Supplied WINISIS Package (Arabic Version) to The AIMS Education System, Islamabad.
- WINISIS package distribution list to other organizations in Pakistan from 2001-2002 was prepared and forwarded to UNESCO Office, France.
- ASTINFO Newsletter Vol. 17 No. 1 was distributed to S&T organizations in Pakistan.
- Brief prepared for coordination Frameworks for the Information for All Programme (IFAP) UNESCO.

9. BILATERAL COOPERATION

Project proposals for S&T cooperation agreement, between Pakistan & Greece, Pakistan & The European Union, Pakistan & Bangladesh and Pakistan & Tunisia were prepared under bilateral cooperation programme.

SAARC DOCUMENTATION CENTRE

SAARC Documentation Centre (SDC) is a regional centre of SAARC. It was established in 1994 to act as an effective information system of Member States that enables exchange of information in various fields. Another objective of the SDC is to develop human resources in the Member States in the area of information science, technology, management systems and services. In this regard following activities were undertaken during the period under report.

- Nominations from Pakistan were processed for short term and long term training courses on information technology for information management.
- Director General PASTIC attended the 8th Governing Board Meeting of SAARC at New Delhi, India from 18-19 November, 2002.
- Traditional Knowledge Experts from Pakistan in the field of Naturopathy, Unani, Folklore & Tribal Communities, Rural Traditional Knowledge, Farmers & Artisans and Traditional Foods were identified and communicated to SDC, India.
- Visit report of Member, Governing Board of SDC from Pakistan regarding his visit to SDC, India for attending 8th Governing Board Meeting of SAARC Documentation Centre was prepared.
- Nominations from Pakistan regarding "SAARC Workshop on Library Automation" were also processed.

ECO

Economic Cooperation Organization for the exchange of information among Member States. Its major activity includes the provision of Scientific and Technological Information to the member states on demand.
Information on ECO scenario in Trade and Technology opportunities was provided.

10. TECHNOLOGICAL INFORMATION PROMOTION SYSTEM (TIPS)

Technological Information Promotion System based at PASTIC has been regularly publishing weekly and fortnightly bulletins in Pakistan which provides up-to-the-minute detailed information on technology and trade opportunities in the developing countries. It covers fourteen different sectors and has the largest database in the world on trade/technology information from the developing countries. These sectors are (i) Agro-Industries (ii) Energy (iii) Electronics (iv) Pharmaceuticals (v) Business Opportunities (vi) Food Processing (vii) Machinery (viii) Bio-Technology (ix) Textiles (x) Fisheries (xi) Building Materials (xii) Chemicals (xiii) Mining (xiv) Packaging.

Under TIPS service information on 515 technological offers from 42 countries was provided to its subscribers in Pakistan. Similarly, information from 34 Pakistani companies about their products and services was disseminated to 50 TIPS member countries.

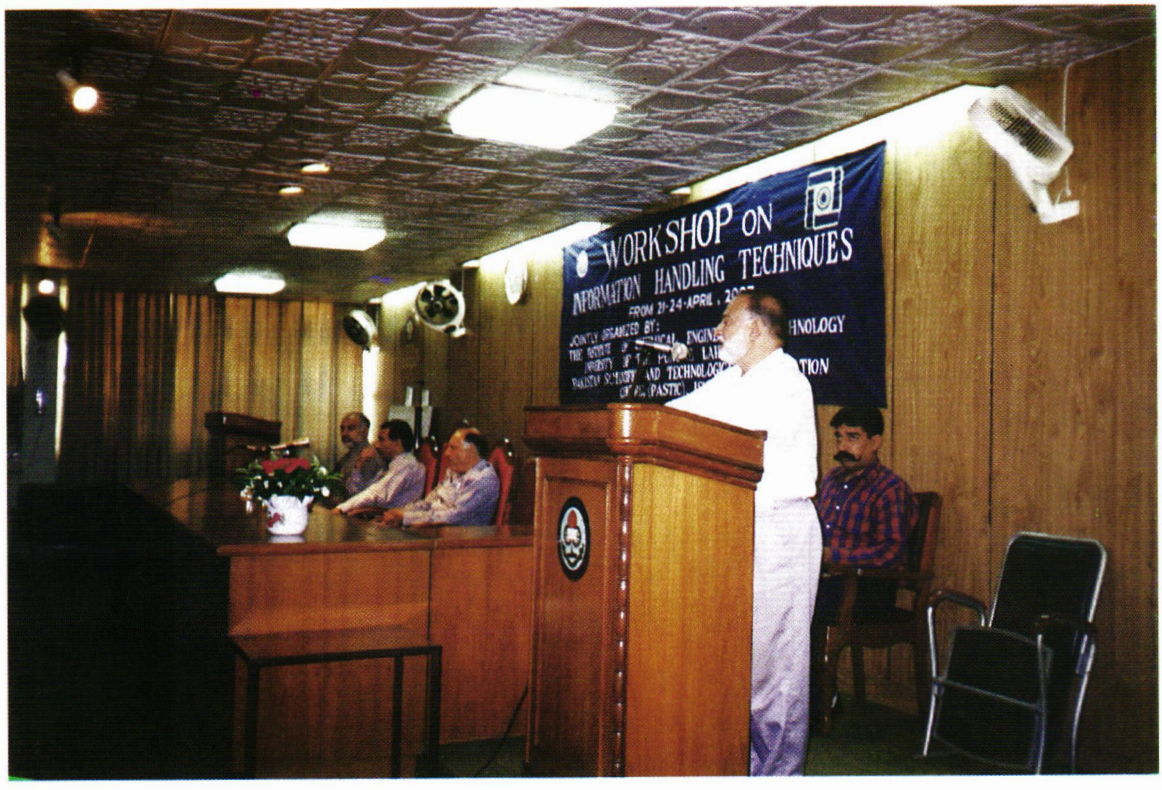
- TIPS organized a computer, office equipments & IT exhibition from 21-22 July, 2002 at Islamabad under the title "Digital Dimension: Avenues of Information Technology".
- White Meat Journal, Vol. 6, Issue No. 1, June 2002 was published and distributed to 204 organizations related to White Meat Industry.

11. ISO 9000 CERTIFICATION

An initiative has been undertaken for implementation of ISO 9000 in PASTIC. A separate section has been established for this purpose and also a development project in this regard was prepared which is under process of approval. Initial documentation in this regard was completed and four quality documents were prepared.

At present one section i.e. Public Service Section of PASTIC is under ISO Certification. Internal quality audit of this section was conducted and external quality audit of this section is underway. This section of PASTIC will hopefully be ISO 9000 certified during 2003.

Workshop on Library Automation & Information Handling was organized at University of Sindh, Jamshoro, from 23-26 October, 2002



Workshop on "Information Handling Techniques" From 21-24 April 2003 at Lahore

Workshop on "Information Handling Techniques" From 23-25 June 2003 at Peshawar

Workshop on "Information Handling Techniques" From 16-19 June 2003 at Quetta

12. ESTABLISHMENT OF INTELLECTUAL PROPERTY SERVICES AND ENTREPRENEURSHIP DEVELOPMENT CENTRE

PASTIC is underway to establish Intellectual Property Service and Entrepreneurship Development Centre at National Centre and all its Sub-Centres. This initiative is being undertaken for dissemination of Intellectual Property Information Service and provision of information guidance that entrepreneurs need to grow their businesses.

A development project in this regard has been prepared and is in the process of approval. The aforementioned services will be started after the approval and implementation of the project prepared and submitted in this regard.

MISCELLANEOUS

- An orientation programme was initiated for orientation of newly inducted officer/officials at PSF/PMNH/PASTIC. Under this programme orientation of all the officers/officials appointed in the Foundation during the period under review was carried out.
- PASTIC is making efforts to foster research-industry linkage by promoting the IPRs Systems amongst the researchers. A checklist has been prepared for the items and documents required with the Patent Application for simplification of the patent system.
- A draft speech of the president for the proposed convention of scientists on November 10, 2002, in connection with world Science Day for Peace and Development was prepared.
- A report on implementation status of the MoST project for establishment of six National Libraries in six disciplines i.e. Chemical Sciences, Physical sciences, Biological Sciences, Agricultural Sciences and Earth Sciences was prepared.
- Development Projects of NIBGE, PINSTECH, NARC, PCSIR and National Centre of Excellence in Geology, University of Peshawar regarding establishment of National Libraries in different disciplines were reviewed.
- Five Quality Circles of PASTIC were constituted, launched and were made functional.
- PC-1 entitled "Establishment of Intellectual Property Services and Entrepreneur Development Centre at PASTIC" has been submitted to PSF.
- Grievances Committee of PASTIC was constituted and made functional for addressing the issues of grievances of PASTIC employees.

13. TRAININGS/WORKSHOPS

Training/Workshop organized for Information Professionals

One of the important activities of PASTIC is to impart training on computer applications for Office & Library automation using MICRO CDS/ISIS and other

packages. PASTIC is the authorized distributor of micro CDS/ISIS and IDAMS packages developed by UNESCO in Pakistan.

- A PSF Training Programme was initiated. Under this programme weekly Seminars/Lectures were arranged on Management related topics for officers of PSF, PASTIC and PMNH.
- Training was provided on WIN/ISIS to Librarians from International Islamic University, Islamabad, Beacon House School Systems, Wah and Lok Virsa, Islamabad, from 2-4 July, 2002.
- A workshop on Library Automation & Information Handling was organized at University of Sindh, Jamshoro, from 23-26 October, 2002.
- Training was provided on WIN/ISIS to a Librarian from The AIMS Model School System, Islamabad, from 20-23 November, 2002.
- A computer training course on MS-WORD, MS-EXCEL & MS-POWER POINT was organized and conducted for officers of PSF/PMNH/PASTIC from 26-28 December, 2002.
- A computer training course at Beginner and Advance level on MS-WORD, MS-EXCEL & MS-POWER POINT, INTERNET, MS ACCESS and MIS for PASTIC, PSF and PMNH officials from 1-8 and 13-15 January, 2003 at PASTIC National Centre was organized.
- Organized a Workshop on "Statistical Methods in Research with Special Reference to Applied Biology" from 27-29 January, 2003 at University of Karachi, Karachi.
- Organized a Workshop on "Information Handling in Higher Education Research" from 10-12 April, 2003 at Azad Jammu and Kashmir University, Muzaffarabad.
- Organized four Workshops on "Information Handling Techniques" From 21-24 April 2003 at Lahore.
- Training was provided on WIN/ISIS package to a librarian from Islamabad Policy Research Institute, Islamabad from 2-5 June, 2003.
- Organized a Workshop on "Entrepreneurship Challenges and Opportunities in 21st Century" on 25th June at Kashmir Information Resource Centre, Muzaffarabad.

Training/Workshop Received/Attended by PASTIC Officers

- System Manager attended training on "Web based software of Union Database of Journals in Agricultural Libraries of Pakistan" from 3-7 March, 2003 at NARC, Islamabad.
- PASTIC Officers attended a one-day Seminar on Virginia Tech. Library Systems (VTLS) for library automation on 21st March, 2003 at Islamabad.

CHAPTER-2

ORGANIZATION AND ADMINISTRATION

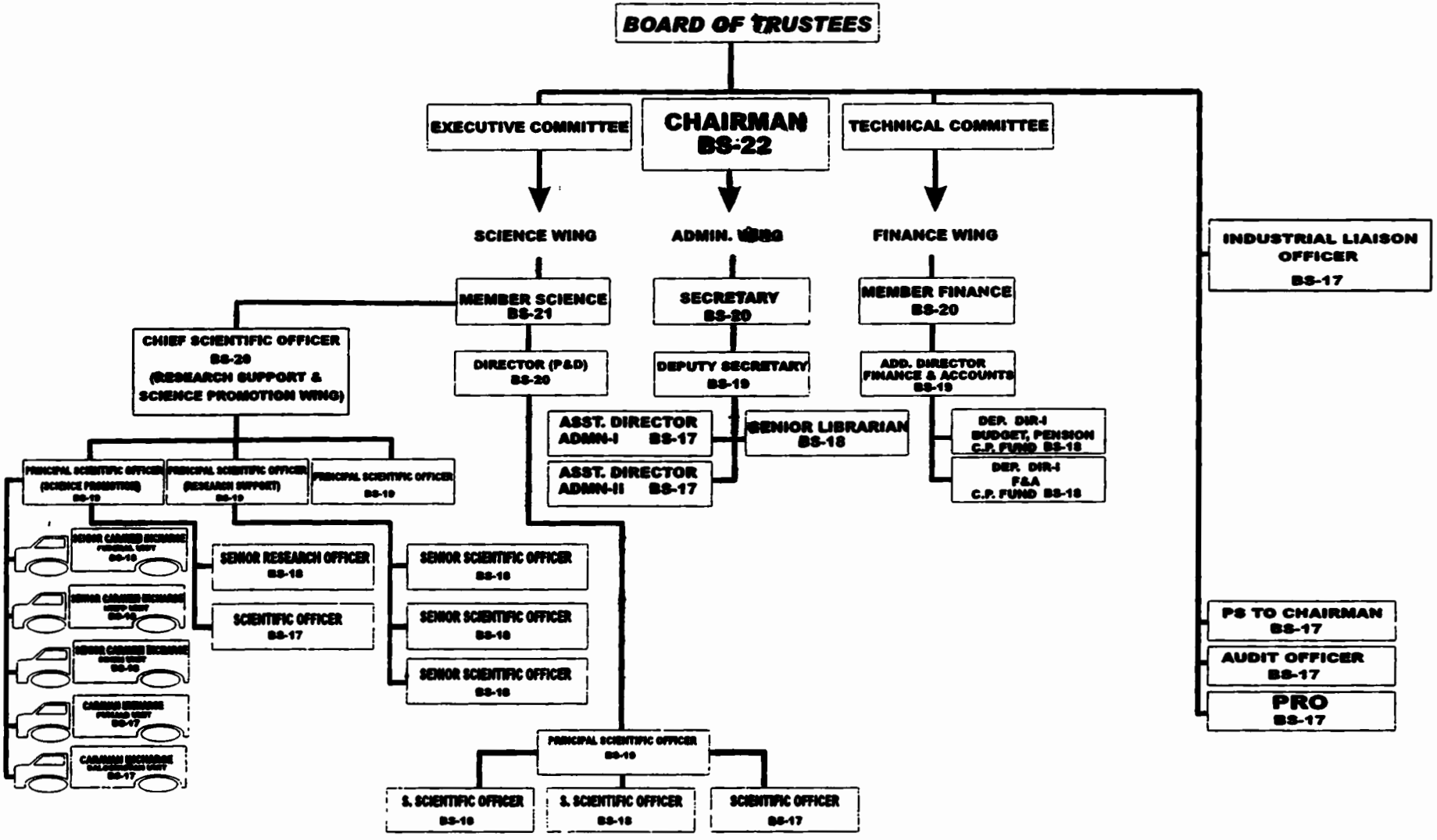
The organizational structure of the Pakistan Science Foundation, Pakistan Museum of Natural History & Pakistan Scientific & Technological Information are given on the forthcoming pages. The staff position in the Foundation, PMNH and PASTIC during the report period is as under:

PAKISTAN SCIENCE FOUNDATION (PSF)

S.No	Designation	Number
1.	Chairman	1
2.	Member (Science)	1
3.	Member (Finance)	1
4.	Secretary	1
5.	Chief Scientific Officer	1
6.	Director (P&D)	1
7.	Additional Director (F&A)	1
8.	Deputy Secretary	1
9.	Principal Scientific Officer	4
10.	Sr. Scientific Officer	6
11.	Sr. Research Officer	2
12.	Sr. Librarian	1
13.	Dy. Director (F&A)	2
14.	Sr. Caravan Incharge	3
15.	Scientific Officer	2
16.	Public Relations Officer	1
17.	Assistant Director (Admn)	2
18.	Internal Audit Officer	1
19.	PS to Chairman/Member(s)	2
20.	Caravan Incharge	2
21.	Sr. Graphic Artist/ Graphic Artist	2
22.	Mechanic for Instruments	1
23.	PA to Chairman	1
24.	Accountant	4
25.	Asstt. Research Officer	1
26.	Superintendents	3
	Supporting staff	123
	Total	174

PAKISTAN SCIENCE FOUNDATION

ORGANIZATIONAL CHART



Pakistan Museum of Natural History
Islamabad

Sanctioned Strength of PMNH 2002-2003

Sr. No.	Designation	BS	No of Post
1.	Director General, PMNH	21	01
2.	Director	20/21	03
3.	Curator	19	08
4.	Curator	19	01
5.	Associate Curator	18	11
6.	Exhibit Designer	18	01
7.	Assistant Director (Admin-I)	17	01
8.	Assistant Director (Admin-II)	17	01
9.	Assistant Director (Accounts-III)	17	01
10.	Research Associate	17	14
11.	Graphic Designer	17	01
12.	Sr. Taxidermist	17	01
13.	System Analyst	17	01
14.	Assistant Research Associate	17	02
15.	P.A. to the D.G.	16	01
16.	Associate Artist	16	01
17.	Teacher Guide	16	01
18.	Children Education Programmer	16	01
19.	Sr. Photographer	16	01
20.	Accountant	16	01
21.	Assistant Librarian	16	01
22.	Taxidermist	16	01
		Total	55
1.	Supporting Staff	15 & below	81
		Total	**136**

PAKISTAN MUSEUM OF NATURAL HISTORY

ORGANIZATIONAL CHART

CHAIRMAN PSF
BPS-22
Dr. Farid A. Malik

DIRECTOR GENERAL
BPS-20
Dr. Syed Muqarrab shah

EARTH SCIENCES DIVISION

- Director BPS-21
  Dr. S.R.H. Baqi
- Curator BPS-19
  Mr. I.U. Choema
- Curator BPS-19
  Syed Shahid Hussain
- Curator BPS-19
  Dr. Nayyer Iqbal
- Associate Curator BPS-18
  Mr. Abdul Rahim Rajpar
  Mr. Hamid Dawood
  Mrs. Ghazala Roohi

BOTANICAL SCIENCES DIVISION

- Curator BPS-19
  Dr. Mrs. Kishwar Nazir
- Curator BPS-19
  Dr. M. Khan Leghari
- Associate Curator BPS-18
  Mr. Saleem Ahmed
  Mr. Muhammad Idris
- Research Associate BPS-17
  Mr. M. Ibrar Shinwari

ZOOLOGICAL SCIENCES DIVISION

- Director BPS-20
  Dr. S. Azhar Hasan
- Curator BPS-19
  Dr. Khalid Javed Baig
- Associate Curator BPS-18
  Mr. Muhammad Rafique
- Senior Taxidermist BPS-17
  Mr. Nasim A. Khan
- Research Associate BPS-17
  Mr. Mirza Habib Ali
  Mr. Ahsan Feroze
- Taxidermist BPS-16
  Mr. Fiaz Ahmed

PUBLIC SERVICES DIVISION

- Director BPS-19
  Mr. M. Rashid Awan
- Operational Manager BPS-19
  Muhammad Akhter Javed
- Exhibit Designer BPS-18
  Ms. Samiya Haroon
- Graphic Designer BPS-17
  Mr. Rahat Saeed
- Associate Artist BPS-16
  Mr. M.A.H. Muzaffar Faizi
- Children Education Programmer BPS-16
  Ch. Javed Iqbal

ADMINISTRATIVE SERVICES DIVISION

- Deputy Director BPS-18
  Malik Khalid Mehmood
- Assistant Director BPS-17
  Mr. Ayub Ali
- Assistant Director BPS-17 (Accounts)
  Mr. Maqbool A. Qureshi
- Assistant Librarian BPS-16
  Mr. Jaffar Hussain Haqvi
- Accountant BPS-16
  Mr. Muhammad Ayub
- P.A. to the D.G. BPS-16
  Mr. Abid Hussain

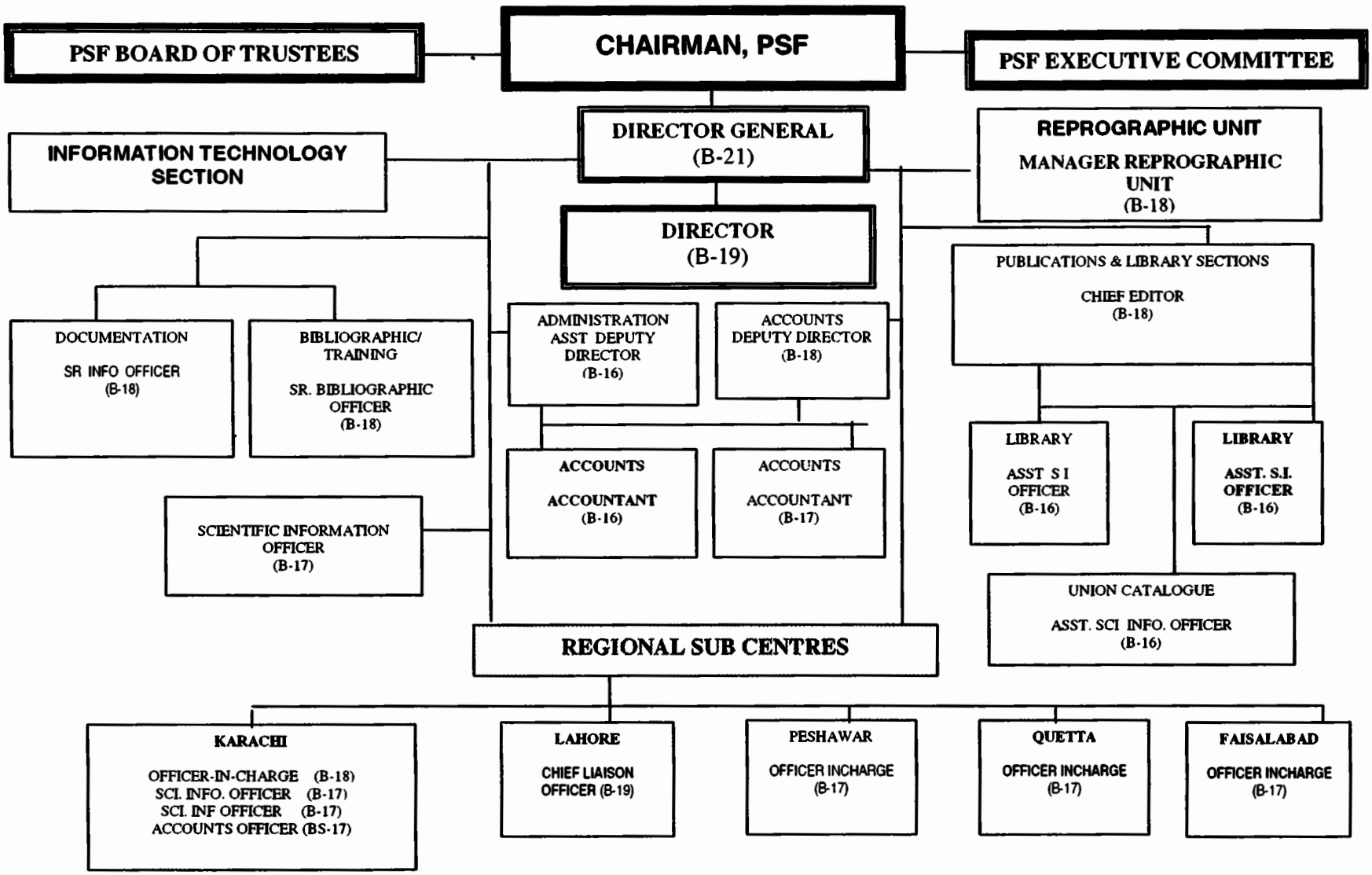
INFORMATION TECHNOLOGY DIVISION

- Manager BGN Database/Web
  Ms Ghazala Roohi, ESD
- System Analyst BPS-17
  Mr. Obaidullah Azeem

PAKISTAN SCIENTIFIC AND TECHNOLOGICAL INFORMATION CENTRE (PASTIC)

S. No	Designation	Number
1)	Director General	1
2)	Director	1
3)	Dy. Director	1
4)	Additional Director (F&A)	1
5)	Chief Liaison Officer	2
6)	Sr. Translating Officer	1
7)	Manager Reprographic Unit	1
8)	Sr. System Analyst	1
9)	Sr. Documentation Officer	1
10)	Chief Editor	1
11)	Sr. Information Officer	1
12)	Sr. Bibliographic Officer	1
13)	Sr. Librarian	1
14)	Deputy Director (Admn)	1
15)	Scientific Information Officer	5
16)	Bibliographic Officer	1
17)	Patent officer	1
18)	System Analyst	2
19)	Manager Technology Information	1
20)	Photographic Officer	1
21)	Printing Officer	1
22)	Graphic Artist	1
23)	Assistant Director(Admn)	2
24)	Liaison Officer/Officer Incharge	1
25)	Accountant	1
26)	Asstt: Accounts Officer	1
27)	P.A to Director General	1
28)	Superintendent (R.U)	1
29)	Asstt: Scientific Information Officer	3
30)	Asstt: Doc. Officer	2
31)	Asstt: Programmer	3
32)	Asstt: Manager (R. U)	1
33)	Asstt: Printing Officer	3
34)	Accountant- Cum Cashier	1
35)	Superintendent-Cum- Asstt:	1
		49
	Supporting Staff	**106**
	Total	**155**

PAKISTAN SCIENTIFIC AND TECHNOLOGICAL INFORMATION CENTRE



CHAPTER-3

PAKISTAN SCIENCE FOUNDATION
FINANCIAL STATEMENTS
JUNE 30, 2003.

AUDITORS' REPORT TO THE BOARD OF TRUSTEES

We have audited the annexed balance sheet of the **PAKISTAN SCIENCE FOUNDATION** as at June 30, 2003 and the related receipts and expenditure account together with the notes forming part thereof for the year then ended.

These financial statements are the responsibility of the Management. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with generally accepted auditing standards. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting policies used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audit provides a reasonable basis for our opinion and, after due verification, we report that: -

The Foundation is not maintaining its books of accounts on the double entry book keeping as such the completeness of the receipts recorded and expenditure incurred cannot be ensured.

In our opinion: -

a) The expenditure incurred during the year was for the purpose of the approved objects of the organization,

b) Where funds were received for a specific stated purpose, these have been spent for that purpose only; and

c) The financial statements give a true and fair view of the Foundation's affairs as at June 30, 2003 and of the results of its operations for the year then ended.

S.M.MASOOD & CO.,
Chartered Accountants

Date: Dec. 04, 2003
Place: ISLAMABAD

PAKISTAN SCIENCE FOUNDATION
BALANCE SHEET
AS AT JUNE 30, 2003

	Note	2003 Rupees	2002 Rupees
GRANT AND LIABILITIES			
GENERAL FUND	3	23,269,703	22,987,855
RESEARCH SUPPORT GRANT	4	60,435,715	51,376,350
DEVELOPMENT FUND GRANTS	5	5,114,864	8,093,218
CURRENT LIABILITIES			
Accrued and other liabilities	6	159,696	1,014,505
		88,979,978	83,471,928

	Note	2003 Rupees	2002 Rupees
PROPERTY AND ASSETS			
FIXED ASSETS			
- at cost less accummulated depreciation	7	20,233,268	21,155,346
DEVELOPMENT PROJECTS			
- at cost less accummulated depreciation	8	3,682,897	441,831
RESEARCH PROJECT IN PROGRESS		60,435,715	51,376,350
LONG TERM DEPOSITS	9	1,637,195	1,617,195
CURRENT ASSETS			
Advances and prepayments	10	1,117,408	1,223,679
Cash and bank	11	1,873,495	7,657,527
		2,990,903	8,881,206
		88,979,978	83,471,928

These accounts should be read in conjunction with the annexed notes which form an integral part thereof.

TRUSTEE

Javid Malik
CHAIRMAN

PAKISTAN SCIENCE FOUNDATION
RECEIPTS AND EXPENDITURE ACCOUNT
FOR THE YEAR ENDED JUNE 30, 2003

	Note	2003 Rupees	2002 Rupees
RECEIPTS			
Grant from Federal Government		40,150,000	33,800,000
Other income		778,585	31,326
		40,928,585	33,831,326
EXPENDITURE			
Scientific functions	12	18,224,301	14,038,878
Administrative expenses	13	22,422,436	21,100,619
		40,646,737	35,139,497
EXCESS/ (SHORTAGE) OF RECEIPTS OVER EXPENDITURE	3	281,848	(1,308,171)

These accounts should be read in conjunction with the annexed notes which form an integral part thereof.

TRUSTEE

CHAIRMAN

PAKISTAN SCIENCE FOUNDATION
CASH FLOW STATEMENT
FOR THE YEAR ENDED JUNE 30, 2003

	2003 Rupees	2002 Rupees
CASH FLOWS FROM OPERATING ACTIVITIES		
Defecit for the year	281,848	(1,308,171)
Adjustment for:		
Depreciation - fixed assets	1,104,162	1,184,694
Depreciation - development projects	961,648	217,619
Surplus before working capital changes	2,347,658	94,142
Changes in working capital:		
(Increase) in long term deposits	(20,000)	-
(Increase) in advances and prepayments	(686,125)	(612,058)
Increase/(decrease) in accrued and other liabilities	(874,514)	326,501
	(1,580,639)	(285,557)
Net cash used in operating activities	767,019	(191,415)
CASH FLOWS FROM INVESTING ACTIVITIES		
Purchases of fixed assets	(3,572,697)	(755,661)
Net cash used in investing activities	(3,572,697)	(755,661)
CASH FLOWS FROM FINANCING ACTIVITIES		
Development Fund Grants - Net	(2,978,354)	6,933,077
Net cash generated from financing activities	(2,978,354)	6,933,077
Net (decrease) /increase in cash and cash equivalents for the year	(5,784,032)	5,986,001
Cash and cash equivalents at the beginning of the year	7,657,527	1,671,526
Cash and cash equivalents at the end of the year	1,873,495	7,657,527

These accounts should be read in conjunction with the annexed notes which form an integral part thereof.

TRUSTEE

Farid Malik
CHAIRMAN

PAKISTAN SCIENCE FOUNDATION
NOTES TO THE ACCOUNTS
FOR THE YEAR ENDED JUNE 30, 2003

1 BACKGROUND AND OBJECTIVES

Pakistan Science Foundation is a statutory organization established under Pakistan Science Foundation Act, 1973 on February 02, 1973. The main objects of the its establishment are to promote and finance scientific activities having a bearing on the socio-economic needs of the country.

2 ACCOUNTING POLICIES

2.1 Grants received

Grants from the Government of Pakistan have been accounted for on receipt basis.

2.2 Research support grant

Research support grant has been accounted for on payment basis.

2.3 Fixed assets

Fixed assets have been valued at cost less accumulated depreciation except leasehold land which is stated at cost. Depreciation on fixed assets is charged on reducing balance method. Full year's depreciation is charged on the assets acquired during the year and no depreciation is charged on the disposals. Gains and losses are taken into accounts currently. Maintenance and normal repairs are charged to receipt and expenditure account as and when incurred while major renewals and improvements are capitalised.

		2003 Rupees	2002 Rupees
3 GENERAL FUND			
Balance as on July 01,		22,987,855	24,296,026
Surplus / (deficit) transferred from Receipts and Expenditure account		281,848	(1,308,171)
		23,269,703	22,987,855
4 RESEARCH SUPPORT GRANT			
Balance as at July 01		51,376,350	45,124,982
Add: Disbursements during the year	4.1	12,215,837	10,629,634
		63,592,187	55,754,616
Less: Projects completed during the year	4.2	(3,156,472)	(4,378,266)
		60,435,715	51,376,350

		2003 Rupees	2002 Rupees
4.1 DISBURSEMENTS DURING THE YEAR			
Bio tech Sciences		180,235	333,461
Mathematics and Computer Sciences		400	24,416
Physical Sciences		2,128,472	753,340
Chemical Sciences		2,031,731	1,808,486
Biological Sciences		3,429,353	1,837,381
Earth Sciences		638,651	932,431
Environmental Sciences		294,823	838,038
Engineering Sciences		720,799	434,855
Agricultural Sciences		2,723,891	2,207,669
Medical Sciences		67,482	683,241
Institutional support		-	656,669
Board/Committee meetings		-	119,647
		12,215,837	10,629,634
4.2 PROJECTS COMPLETED DURING THE YEAR			
Physical Sciences		1,088,569	516,890
Environmental Sciences		453,641	471,221
Engineering Sciences		-	958,360
Chemical Sciences		792,769	668,965
Biological sciences		344,638	293,546
Agricultural Sciences		476,855	1,367,085
Medical Sciences		-	102,199
		3,156,472	4,378,266
5 DEVELOPMENT FUND GRANTS			
Opening balance		8,093,218	1,160,141
Add: Development Project Grants	5.1	12,219,200	17,657,000
Computer equipment capitalized		-	320,950
		12,219,200	17,977,950
Less: Development Project Functions	5.2	(15,197,554)	(11,044,873)
Closing balance		5,114,864	8,093,218

Note: The difference with cash at bank relates to non-cash expenditure relating to depreciation and capital expenditure.

	2003 Rupees	2002 Rupees
5.1 DEVELOPMENT PROJECT GRANTS		
Financial Support to Scientific Societies	-	5,000,000
Popularization of sciences in Rural Areas	3,500,000	1,000,000
Participation of Scientists and Technologists in Conferences	3,285,000	2,160,000
Career Development of Young Scientists and Technologists	-	2,520,000
Funding of Scientific Research in Universities and Other Organizations	4,500,000	4,500,000
NCST	-	2,477,000
TDPC	175,000	-
Core Group on Life Sciences	420,000	-
Peer Review Work NCST Projects	198,000	-
Peer Review Work PTCL Projects	141,200	-
	12,219,200	17,657,000

		2003 Rupees	2002 Rupees
5.2 DEVELOPMENT PROJECT FUNCTIONS			
TA/DA & evaluation fee		1,346,938	623,679
Financial support to societies		3,061,880	2,998,757
Grants for research		5,263,952	4,246,663
Participation in conferences		3,135,402	1,379,264
Career development grants		-	1,117,901
Postage		15,640	347
Stationary		239,392	69,262
Advertisement		40,578	217,135
Repair of office equipment		-	7,500
Internet charges		8,200	3,000
Consultancy		-	47,000
Telephone		61,663	24,806
Depreciation	8	961,648	217,619
Salary/Honorarium		51,232	16,325
Entertainment		8,418	206
Vehicle running and maintenance		210,944	18,016
Bank charges		1,160	57,393
Miscellaneous		33,650	
Amount surrendered to FTO		756,857	-
		15,197,554	11,044,873
6 ACCRUED AND OTHER LIABILITIES			
Accrued expenses		105,590	215,969
Security deposits		26,025	112,733
Payable to supplier (Development Fund Grants)		19,705	-
Endowment fund		-	685,803
Other liabilities		8,376	-
		159,696	1,014,505

7 FIXED ASSETS

PARTICULARS	COST			DEPRECIATION				BOOK VALUE
	AS AT JULY 01,2002	ADDITIONS	AS AT JUNE 30,2003	RATE %	AS AT JULY 01,2002	CHARGE FOR THE PERIOD	AS AT JUNE 30,2003	AS AT JUNE 30,2003
Lease hold land	3,713,418	-	3,713,418	-	-	-	-	3,713,418
Building	19,484,540	-	19,484,540	5%	5,877,759	680,339	6,558,098	12,926,442
Motor vehicles	3,706,809	-	3,706,809	20%	3,316,571	78,048	3,394,619	312,190
Office equipment	3,225,061	97,780	3,322,841	15%	2,340,463	147,357	2,487,820	835,021
Science equipment	2,004,275	-	2,004,275	15%	1,460,191	81,613	1,541,804	462,471
Furniture and fixture	1,960,416	58,133	2,018,549	6%	951,222	64,040	1,015,262	1,003,287
Air conditioners	194,974	-	194,974	20%	187,632	1,468	189,100	5,874
Library books and films	1,461,515	26,171	1,487,686	5%	461,829	51,293	513,122	974,564
Bicycle	680	-	680	20%	675	4	679	1
2003	35,751,688	182,084	35,933,772		14,596,342	1,104,162	15,700,504	20,233,268
2002	35,655,477	96,211	35,751,688		13,411,648	1,184,694	14,596,342	21,155,346

8 DEVELOPMENT PROJECTS

PARTICULARS	COST			DEPRECIATION				BOOK VALUE
	AS AT JULY 01,2002	ADDITIONS	AS AT JUNE 30,2003	RATE %	AS AT JULY 01,2002	CHARGE FOR THE PERIOD	AS AT JUNE 30,2003	AS AT JUNE 30,2003
Motor vehicles	-	2,752,027	2,752,027	20%	-	550,405	550,405	2,201,622
Office equipment	-	1,127,555	1,127,555	15%	-	169,133	169,133	958,422
Computer equipment	659,450	284,880	944,330	33%	217,619	239,815	457,434	486,896
Furniture and fixture	-	38,252	38,252	6%	-	2,295	2.295	35,957
2003	659,450	4.202,714	4,862,164		217,619	961,648	1,179,267	3,682,897
2002	-	659,450	659,450		-	217,619	217,619	441,831

		2003 Rupees	2002 Rupees
9 LONG TERM DEPOSITS			
Electricity (WAPDA)		1,472,195	1,472,195
Gas (SNGPL)		145,000	145,000
Security (Mobile Phone)		20,000	-
		1,637,195	1,617,195
10 ADVANCES AND PREPAYMENTS			
Advances to staff:			
- for vehicle / motorcycle		31,112	86,407
- for house rent		734,296	330,533
- for Furniture (Development Fund Grants)		40,000	-
		805,408	416,940
Advance for motor vehicles (Development Fund Grants)		-	792,396
Advance for Fabrication (Development Fund Grants)		312,000	-
Other receivable		-	14,343
		1,117,408	1,223,679
11 CASH AND BANK			
Cash at bank - saving accounts		692,960	685,803
Cash at bank - current account		66,520	112,733
PSF Development Fund bank - current accounts		1,099,672	6,858,991
UNESCO Coupons		14,343	-
		1,873,495	7,657,527
12 SCIENTIFIC FUNCTIONS			
Research support grant	4.1	12,215,837	10,629,634
Research support functions		543,659	-
Scientific societies and professional bodies		185,000	293,000
Scientific conferences, meetings and seminars		795,084	222,920
Operation of science caravan		3,595,922	1,487,396
International liaison		-	289,613
Science promotion activities		888,799	1,116,315
Science centre, herbria clubs etc.		-	-
		18,224,301	14,038,878

	2003 Rupees	2002 Rupees
13 ADMINISTRATIVE EXPENSES		
Salaries and other benefits	14,357,457	13,699,650
Travelling	289,253	74,534
House rent facility	2,908,628	2,564,434
Ground rent to CDA	17,944	17,944
Electricity, gas and water	822,031	633,960
Postage, telephone and telegram	918,303	1,002,094
Printing and stationery	219,887	243,357
Vehicle running and maintenance	933,934	1,094,664
Newspaper and advertisement	379,669	177,303
Liveries and uniforms	37,070	16,100
Entertainment	33,407	69,715
Repair and maintenance of office equipment	59,631	143,908
Audit fee	20,000	20,000
Legal expenses	-	20,000
Depreciation	1,104,162	1,184,694
Maintenance of office building	183,575	64,826
Staff welfare fund	60,000	30,000
Miscellaneous	77,485	43,436
	22,422,436	21,100,619

14 FIGURES

- have been rounded off to the nearest Rupee.

TRUSTEE

CHAIRMAN

PAKISTAN SCIENCE FOUNDATION DEVELOPMENT FUNDS	NCST	PSTIC	CDYST	FOSTRUAOO	PSRA	FSSS	TDPC	CGLS	PRNCST	PRWR&D	TOTAL
OPENING BALANCE	1,840,140	688,611	1,204,453	-	41,604	3,080,078	4,105	-	-		6,858,991
FUNDS RECEIVED DURING THE YEAR		3,285,000		4,500,000	3,500,000	-	175,000	420,000	198,000	141,200	12,219,200
INTER PROJECTS TRANSFER				44,354			(44,354)				-
	1,840,140	3,973,611	1,204,453	4,544,354	3,541,604	3,080,078	134,751	420,000	198,000	141,200	19,078,191
EXPENDITURE											
TA/DA & Evaluation Fee	850,913	-	46,296	143,462	-	-	-	213,467	-	92,800	1,346,938
Vehicles	-	-	-	-	1,959,631	-	-	-	-	-	1,959,631
Office Eqipment	-	-	-	134,000	973,850	-	-	-	-	-	1,107,850
Computer Equipment	-	-	62,500	-	166,800	-	-	10,880	-	44,700	284,880
Furniture and Fixture	-	-	-	-	38,252	-	-	-	-	-	38,252
Financial Support to Socities	-	-	-	-	-	3,061,880	-	-	-	-	3,061,880
Grant for research	-	-	1,063,612	4,200,340	-	-	-	-	-	-	5,263,952
Participation in conferences	-	3,135,402	-	-	-	-	-	-	-	-	3,135,402
Travelling Grant	-	-	-	-	-	-	-	-	-	-	-
Postage	5,300	-	720	9,620	-	-	-	-	-	-	15,640
Printing and Stationary	20,046	56,585	21,125	10,825	27,544	4,000	4,110	90,000	5,157	-	239,392
Advertisement	-	-	-	30,343	10,235	-	-	-	-	-	40,578
Repair of Office Equipment	-	-	-	-	-	-	-	-	-	-	-
Internet	5,000	1,000	-	1,500	700	-	-	-	-	-	8,200
Consultancy	-	-	-	-	-	-	-	-	-	-	-
Telephone	52,361	-	-	-	9,302	-	-	-	-	-	61,663
Salary/Honorarium	-	-	-	-	21,232	-	-	30,000	-	-	51,232
Entertainment	200	-	-	-	-	4,198	120	3,900	-	-	8,418
POL/Repair of Vehicles	53.268	10,407	-	-	16,748	-	130,521	-	-	-	210,944
Bank Charges	400	160	200	-	-	-	-	200	200	-	1,160
Advance for Furniture	-	10,000	10,000	10,000	-	10,000	-	-	-	-	40,000
Advance for Fabrication	-	-	-	-	312,000	-	-	-	-	-	312,000
Miscellaneous	2,226	3,200	-	4,264	5,310	-	-	15,000	-	3,650	33,650
Surrendered to FTO	-	756,857	-	-	-	-	-	-	-	-	756,857
Total	989,714	3,973,611	1,204,453	4,544,354	3,541,604	3,080,078	134,751	363,447	5,357	141,150	17,978,519
Balance	850,426	-	-	-	-	-	-	56,553	192,643	50	1,099,672

Annexure-I

PAKISTAN SCIENCE FOUNDATION ACT 1973
National Assembly of Pakistan Islamabad, the 2nd February 1974

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

Act No. III of 1973

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

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

It is hereby enacted as follows:-

1. Short title, extent and commencement. (1) This Act may be called the Pakistan Science Foundation Act, 1973.

   2) It extends to the whole of Pakistan

   3) It shall come into force at once.

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 provision of this Act, to acquire, hold and dispose of property, both movable and immovable, and shall be the said name sue and be sued. (3) The Head Office of the Foundation shall be at Islamabad.

4. Functions of the Foundation: (1) The Foundation shall function as a financing agency

   for

   i) The establishment of comprehensive scientific and technological information and dissemination centers;

   ii) The promotion of basic and fundamental research in the universities and other institutions on scientific problems relevant to the socio-economic development of the country;

   iii) The utilization of the results of scientific and technological research including pilot plant studies to prove the technical and economic feasibility of processes found to be promising on a laboratory scale;

   iv) The establishment of science centers, clubs, museums, herbaria and planetaria,

   v) The promotion of scientific societies, associations and academies engaged in spreading the cause of scientific knowledge in general or in the pursuit of a specific scientific discipline or technology in particular;

   vi) The organization of periodical science conferences, symposia and seminars;

   vii) The exchange of visits of scientists and technologists with other countries;

viii) The grant of awards, prizes and fellowships to individuals engaged in developing processes, products and inventions of consequence to the economy of the country; and

ix) Special scientific surveys not undertaken by any other organization and collection of scientific statistics related to the scientific effort of the country.

(2) The Foundation shall also;

i) Review the progress of scientific research sponsored by it and evaluate the results of such research;

ii) Maintain a National Register of highly qualified and talented scientists of Pakistan including engineers and doctors, in or outside the country and to assist them, in collaboration with the concerned agencies in finding appropriate employment; and

iii) Establish liaison with similar bodies in other countries.

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

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

Whole-time members

i) the Chairman;

ii) one eminent scientist;

iii) the Director of Finance; to be appointed by the President;

Part-time members

iv) the Chairman of the National Science Council;

v) four scientists to be nominated by the National Science Council; and

vi) eleven eminent scientists to be nominated by the President

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

6. Chairman of the Board. The Chairman of the Board shall be the Chairman of the Foundation and shall be appointed for a term of three years from amongst the eminent scientists of the country having experience of research and scientific administration.

7. Term of Members of the Board. The members of the Board, other than the ex-officio member, shall hold office for a term of three years and shall be eligible for re-appointment or re-nomination, as the case may be.

8. Meetings of the Board. (1) The meeting of the Board shall be held at least twice a year and shall be presided over by the Chairman or, in his absence, by its whole-time scientist member. (2) All decisions at a meeting of the Board shall be taken by a majority of the votes of the members present and voting.

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

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

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

12. Adhoc Committees. The Foundation may set up adhoc committees consisting of university professors and other leading scientists and experts to scrutinize applications for financial assistance for

carrying out scientific research submitted to the Foundation by the universities or other institutions or by individual scientific workers or groups of scientific workers and to review and evaluate the results of research sponsored by the Foundation.

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

a) Grants made by the Federal Government and the Provincial Governments;

b) Donation and endowments; and

c) Income from other sources

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 with in the meaning of the Chartered Accountants Ordinance., 1961 (X of 1961) and are appointed by the Foundation in consultation with the Auditor-General of Pakistan.

16. Appointment of Officers and Servants. (1) The Foundation may appoint such officers and servants and engage such consultants or experts, as it may consider necessary for the efficient performance of its functions, on such terms and conditions as it may deem fit. (2) In fixing the terms and conditions of service of its officers and servants, the Foundation shall, as nearly as may be, conform to the scales of pay, allowances and conditions of service applicable to the corresponding class of employees of the Federal Government.

17. Annual Reports. (1) The annual report of the Foundation, which shall among other things, clearly bring out the benefits accruing to the nation as a result of the activities sponsored by the Foundation, shall be prepared by the Chairman and submitted through the Board to the Federal Government 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 NEW PROJECTS APPROVED BY THE PAKISTAN SCIENCE FOUNDATION DURING THE YEAR 2002-2003

(Non Development Budget)

(a) Agriculture Sciences

S.No	Title and Number of Project	Name of P.I. and the Organization Supported	Project Cost (Rs)
1.	Integrated weed management in wheat (*Triticam aestivum* L on thell) in NWFP. F-AU/Agr(295)	Dr. Khan Bahadar Marwat, NWFP Agricultural University, Peshawar.	Rs.960,901/-
2.	Integrated management of noxious weeds in chickpea (*Cicer arietinum*) in southern districts of NWFP. F-AU/Agr(296).	Dr. Gul Hassan, Department of Weed Science, NWFP Agricultural University, Peshawar.	Rs.272,748/-
3.	To assess the causes of ratoon crop failure in sugarcane in NWFP Province. F-AU/Agr(299).	Mr. Farid Gul, Sugar Crop Research Institute, NWFP, Mardan.	Rs.786,277/-
4.	Effect of steepness and green manuring on run-off, erosion, soil properties and soil fertility in eroded lands of Northern NWFP. F-AU/Agr(300)	Dr. Farmn ullah khan, Department of Soil & Environmental Sciences, NWFP Agricultural University, Peshawar.	Rs.707,696/-

(b) Biological Sciences

5.	Germination capacity of stored pollen of some economically important plants and their maintenance. S-KU/Bio (345)	Dr. Anjum Parveen, University of Karachi, Karachi.	Rs.1,081,210/
6.	Assessment of Omega-3 polyunsaturated fatty acids in tropical fish and shell fish for health benefits. S-PCSIR/Bio (339)	Mrs. Kherun Nisa, Food & Marine Resources Research Centre, PCSIR Labs., Karachi.	Rs.911,207/-
7.	Seed dormancy mechanisms in coastal halophytes of Karachi, Pakistan. S-KU/Bio(344)	Prof. Dr. M. Ajmal Khan, Department of Botany, University of Karachi, Karachi.	Rs.1,061,881/

8.	Development and molecular characterization of gametocyte vaccine (local isolate) against avian coccidiosis. P-AU/Bio (347)	Dr. Masood Akhtar, University of Agriculture, Faisalabad.	Rs.832,330/-
9.	Distribution, population status and conservation of cheer pheasant (*Catreus wallichi*) AJK-UCR/Bio (333)	Mr. Muhammad Siddique Awan, University of Azad Jammu and Kashmir, Muzaffarabad	Rs.351,635/-
10.	Taxonomy and biology of *Hieroglyphus Spp.*(hemiacridinae acrididae:*orthoptera*) S-SU/Bio (338)	Dr. Muhammad Saeed Wagan, University of Sindh, Jamshoro.	Rs.545,761/-

(c) Biotechnological and Genetic Engineering

11.	Mutation breeding of *Lactobaccilus delbrukii* for production of biodegradable biopolymers. Biotech/P-NIBGE/Ind (32)	Dr. Shoukat Pervez, Principal Scientific Officer, NIBGE, Faisalabad.	Rs.607,284/-
12.	Multiplication of virus free banana plants and detection of somaclonal variations. Biotech/C-NARC/Agr (36)	Mr. Aish Muhammad, Scientific Officer, NARC, Islamabad.	Rs.813,419/-
13.	Development of multiplex PCR for diagnosis of *Salmonella typhi* and detection of its drug resistance. Biotech/P-NIBGE/Med (39)	Mr. Abdul Haque, Senior. Scientific Officer, NIBGE, Faisalabad.	Rs.10,66,415/-
14.	Production of enzyme phytase for improving the nutritional value of defatted oilseed cake in poultry feed. Biotech/P-LCW/Ind (41)	Prof. Dr. Mrs. Bushra Mateen, Lahore College for Women, University, Lahore.	Rs.465,130/-
15.	Antipsychotic drugs blood dyscrasias and hematological safety. Biotech/S-KU/Med(42)	Prof. Dr. Nikhat Siddiqui, Department of Biochemistry, University of Karachi, Karachi.	Rs.424,361/-

(d) Chemical Sciences

16.	Synthesis and biological evaluation of	Dr. Javid H. Zaidi,	Rs.1,022,800/-

	hexapeptide analog of neurotensin NT (8-13) No. C-QU/Chem(376)	Associate Professor, Department of Chemistry, Quaid-i-Azam University, Islamabad.	
17.	Capillary gas chromatographic determination of biologically active amines and amino-acids by pre-column derivatization. S-SU/Chem(381)	Prof. Dr. Muhammad Yar Khuhawar, Institute of Chemistry, University of Sindh, Jamshoro.	907,840/-

(e) Earth Sciences

18.	Geology and economic resources of Jurassic to early cretaceous rocks of upper Indus Basin, Pakistan. No. C-PMNH/Earth (74)	Dr. Nayyer Iqbal, Associate Curator, Earth Sciences Division, PMNH, Islamabad.	Rs. 9,93,592/-

(f) Engineering Sciences

19.	Study of bonding between zircaloy and stainless steel. C-PINSTECH/Engg(39)	Dr. M. Afzal Sheikh, Chief Scientist/Head, Nuclear Physics Division, PINSTECH, Nilore, Islamabad.	Rs.290,108/-
20.	Stochastic flood risk mapping (zoning) P-CEWRE/Engg(77)	Dr. S.M. Saeed Shah, Head of Hydrology Division Centre of Excellence in Water Resources Engineering, University of Engineering and Technology, Lahore.	Rs.372,960/-
21.	Assessment of water resources and development of strategic water utilization plan in Potohar region for its sustainable management. PCRWR/Engg(78)	Dr. Ashfaq Ahmed Sheikh, Deputy Director (Hydrology) Pakistan Council for Research in Water Resources.	Rs.1,117,012/-

(g) Physics

22.	The study of super conducting properties of C_{u1}-xTi_x B_{a2} C_{a2} Cu30 10 – Y thin films to be used for microelectronics devices. C-QU/Phys(122)	Dr. Nawazish Ali Khan, Department of Physics, Quaid-i-Azam University, Islamabad.	Rs.746,681/-

23.	Laser induced breakdown spectroscopy. C-QU/Phys(127)	Dr. Raheel Ali, Department of Physics, Quaid-i-Azam University, Islamabad.	Rs.704,830/-
24.	Investigation about iron related defects in silicon C-QU/Phys(128)	Prof. Dr. Akbar Ali, Department of Physics, Quaid-i-Azam University, Islamabad.	Rs.1,073,856/-
25.	Preparation and characterization of CD te-based solar cells and related thin film materials C-QU/Phys.(121)	Prof. Dr. Asghari Maqsood, Department of Physics, Quaid-i-Azam University, Islamabad.	Rs.908,677/-
26.	Study of solution formation, ITG modes and energy deposition by cluster-ion-beams in a dust-contaminated plasma C-QU/Phys(130)	Prof. Dr. Arshad M. Mirza, Department of Physics, Quaid-i-Azam University, Islamabad.	Rs.443,904/-
27.	Magnetic & structural studies of nanoparticles. US-NSF/Res/Phys(18)	Dr. S.K. Hasnain, Department of Physics, Quaid-i-Azam University, Islamabad.	Rs.610,820/-
		Total:-	**Rs.20,081,335/-**

Annexure-III

DETAILS OF MONITORING AND EVALUATION OF ON-GOING PSF PROJECTS DURING 2002-2003
(Non Development Budget)

a) Semi-Annual Reports

S.No	Project No.	Project Title	Reports
1.	Biotech/P-NIBGE/Agr(33)	Engineering Phage type Chimeric promoters to over express bifunctional proteins in Rice proplastids to develop biosafe transgenic plants.	1st Semi Annual
2.	P-UAAR/Agr (49)	Residual nitrate status of cultivated land and water pollution in Barani areas.	1st Semi-Annual
3.	P-AU/Agr (242)	Utilization of the genetic potential existing in sorghum bicolor (L) Moench for the development of genotype tolerance to salinity.	1st Semi-Annual
4.	S-KU/Agr (285)	Studies on the field efficacy of the entomopathogenic nematodes as biopesticides.	1st Semi-Annual
5.	P-NIAB/Agr (288)	Effect of soil salinity and nitrogen availability on photosynthate partitioning and growth of wheat.	1st Semi-Annual
6.	F-AU/Agr (291)	Development of sustainable rice-wheat cropping system through management of legumes.	1st Semi-Annual
7.	C-QU/Agr (292)	Ethnobotanical studies of economically important plants of Northern Areas of Pakistan and their taxonomy.	1st Semi-Annual
8.	Biotech/P-NIAB/Agr(38)	Characterization of virulent races of blight and with pathogens using biological and DNA molecular marker techniques and evaluation of chickpea germplasm for resistance against these diseases.	1st Semi Annual
8.	Biotech/P-NIAB/Agr(38)	Characterization of virulent races of blight and with pathogens using biological and DNA molecular marker techniques and evaluation of chickpea germplasm for resistance against these diseases.	2nd Semi Annual
9.	C-NARC/Agr (266)	Identification, characterization and distribution of phytoplasmal disease of potato in Pakistan.	2nd Semi-annual
10.	Biotech/P-NIBGE/Agr (33)	Engineering phage-type chimeric promoters to over express bifunctional proteins in rice proplastids to develop biosafe transgenic plants.	2nd Semi-Annual

11.	S-PARC/Agr (277)	Investigations of plants parasitic nematodes and pseudomonas associated with date palm in Balochistan and their management by organic amendments.	2nd Semi-Annual
12.	S-KU/Agr (269)	Use of rhizobia in the biological control of root knot diseases of crop plant.	2nd Semi-Annual
13.	F-AU/Agr (282)	Evaluation and assessment of germination, stand establishment and yield of soybean and mungbean before and after seed storage using osmoconditioning techniques.	2nd Semi-Annual
14.	F-AU/Agr (268)	Evaluation of morphological and physiological plant traits adopting and forage under stress.	2nd Semi-Annual
16.	P-AU/Agr (248)	Fungi as Bio-control agents against weeds I: Bio-control of weeds of rice crop.	3rd Semi-annual
17.	C-NARC/Agr (270)	Characterization and monitoring of banana bunchy top virus (BBTV).	3rd Semi-annual
18.	S-KU/Bio (281)	Effect of anxiety and tolerance development induced by anxiolyties on reproductive functions in rat.	1st Semi-annual
19.	P-AU/Bio (300)	Studies on coculture system of buffalo embryos.	1st Semi-Annual
20.	C-PMNH/Bio (315)	Ecological studies of the reptilian fauna of Cholistan desert.	1st Semi-annual
21.	C-QU/Bio (323)	Identifications of loci in Pakistani kindreds with ectodermal dysplasia.	1st Semi-Annual
22.	P-NIAB/Bio (324)	Use of isoenzyme markers in chickpea breeding.	1st Semi-Annual
23.	Biotech/P-GC/Bio (37)	Optimization of cultural conditions on the biosynthesis of xylanase by locally isolated *Aspergillus niger.*	2nd Semi Annual
24.	S-KU/Chem(363)	Purification Characterization and applied studies of Protein antibiotics from Indigenous staphylococci.	2nd-Semi Annual
25.	C-QU/Chem(370)	Synthesis and Characterization of some liquid crystalline Molecules.	2nd-Semi Annual
26.	S-KU/Chem(348)	Extrapyramidical and Monoaminergic effects of Neuroleptics: Modulation by l-Tryptophan and l-valine.	3rd-Semi Annual
27.	Biotech/P-AU/Env (31)	Hyper expression of lysine and transfer of cellulose genes in *Bravibactrium flavaum* for recycling of agro industrial wastes.	1st Semi-Annual

28.	C-NARC/Env (59)	Diet composition of some passerine birds in cotton based agro-ecosystem of Punjab: A preliminary study to investigate the risk of pesticides.	1st Semi-Annual
29.	P-AU/Env (62)	Studies on growth and bio-energetic of fish under heavy metal toxicity.	1st Semi-Annual
30.	S-SU/Earth(65)	Detection of saline Intrusions in the Right Bank Coastal Sediments.	1st Semi Annual
31.	PINSTECH/Earth(67)	Geological studies of carbonatite complexes of northern pakistan and their economic evaluation in terms of rare metals, rare earth elements, phosphate and uranium.	1st Semi Annual
32.	C-PINSTECH/Earth (69)	Geochronological, Tectonic Uplift and cooling history studies of the alkaline complex from the Peshawar Plain Alkaline Igneous province (PAIP) NW Pakistan with the help of perographic and Fission – Track Dating Techniques.	1st Semi Annual
33.	AJK/Earth (70)	Biostratigraphic and Tectonic analysis of Paleogene rocks of Neotethys ocean in Azad Kashmir and Hazara areas of the Himalayas of Pakistan.	1st Semi Annual
34.	S-AKU/Med(185)	Role of vitamins B6, B12 and folate, glutathione and cytokines in the development of coronary artery disease in Pakistan population.	2nd Semi Annual
35.	P-GC/Phys(119)	Generation and Characterization of Hydrogen Methane and Oxygen-Argon Cold Plasma.	1st semi Annual
36.	C-QU/Phys(120)	Laser Optogalvinic spectra of Atoms.	2nd-Semi Annual
37.	C-QU/Phys(108)	Study of X-rays/Neutrons Ion Beam emitted from Mother type plasma focus.	3rd-Semi Annual

1st Semi Annual Reports (Development Projects)

S.No	Project No.	Project Title	Reports.
1.	R&D/C-CCRI/Agr (4)	Balanced Nutrient Management Studies for Cotton Wheat –Cropping System in Sindh.	1st Semi Annual
2.	R&D/C-NARC/Agr (7)	Sustainable Crop Production through Management of Legume N2 Fixation.	1st Semi Annual
3	R&D/C-NARC/Agr (13)	Studies on the population genetic of Phytophthora infestans the cause of late blight of potato	1st Semi Annual

4.	R&D/C-NARC/Agr (14)	Integrated management of Powdery scab of Potato in Pakistan	1st Semi Annual
5.	R&D/F-AU/Agr (36)	Evaluation of Phytobiocides for control of Powdery Mildew in Pea	1st Semi Annual
6.	R&D/P-UAAR/Agr (85)	Potential of Mungbean and Mashbean to Fix Nitrogen and Benefit the Subsequent Wheat Crop in Potowar.	1st Semi Annual
7.	R&D/F-AU/Agr (107)	Validation of Milk-Urea as an On-Farm Diagnostic Test for Evaluating Protein Status of Milking Cows and Buffaloes	1st Semi Annual
8.	R&D/C-NARC/Agr (115)	Management of Soil Born Diseases in Vegetable Nurseries using Solarization and Amendments	1st Semi Annual

Biological Sciences:

9.	R&D/C-NARC/Bio (1)	Assessment of toxinogenic fungi and mycotoxin contamination in stored food grain.	1st Semi Annual
10.	R&D/C-NARC/Bio (18)	Collection, conservation and characterization of vegetable crop biodiversity.	1st Semi Annual
11.	R&D/P-AU/Bio (41)	Screening of nematode population of beetal goats for development of resistance against commonly used anthelmintics at livestock farms of Punjab	1st Semi Annual
12.	R&D/P-AU/Bio (42)	Studies on the prevalence, biology, control and economic significance of hypoderma species in some semi-hilly districts of Punjab	1st Semi Annual
13.	R&D/P-AU/Bio (46)	Enhancing the nutritional worth of low quality crop residue by escalating nitrogen fixation through chemical and biological treatments and its influence on palatability, voluntary feed intake, digestion kinetics and productive performance of buffaloes.	1st Semi Annual
14.	R&D/P-AU/Bio (49)	Exploitation of maximum productive potential of spent layers through induced moults by varying nutritional regimes.	1st Semi Annual
15.	R&D/S-AKU/Bio (81)	Does leptin play a role in sex and age related release of gonadotropin from the pituitary gland?	1st Semi Annual
16.	R&D/S-AKU/Bio (82)	Immunohistochemical & molecular characterization of T-non-Hodgkin's lymphoma and its association with Epstein- Barr virus	
17.	R&D/C-QU/Bio (164)	Association of rhizobium and plant growth promoting bacteria in rice growth, nitrogen fixation and yield	1st Semi Annual
18.	R&D/C-QU/Bio (165)	Molecular and biochemical analysis for characterization of genetic diversity in barley	1st Semi Annual

		land races from west Asia and north African region	
19.	R&D/C-PMNH/Bio (166)	Ecology and zoogeography of butterfly fauna of moist temperate montane of Pakistan	1st Semi Annual
20.	R&D/S-AKU/Bio (178)	Studies on calcium channel blocking activities of indigenous medicinal plants	1st Semi Annual

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21	CDYST/P-PRI/Bio (1)	Influence of different copper and aluminum levels on feather renewal and production characteristics of layers in second production cycle	1st Semi Annual
22	CDYST/S-KU/Bio (3)	Marine nematodes as pollutant indicator	1st Semi Annual
23	CDYST/C-NARC/Bio (4)	Identification of drought-tolerant chickpea genotypes using physiological and agronomic traits.	1st Semi Annual
24	CDYSTP-LPRI/Bio (6)	Preparation and evaluation of tick vaccine.	1st Semi Annual
25	CDYST/C-NARC/Bio (11)	Gene transfer technology for the induction of disease resistance in rice.	1st Semi Annual
26	CDYST/C-NARC/Bio (12)	Developing disease resistance in tomato through genetic engineering.	1st Semi Annual
27	CDYST/S-KU/Bio (14)	Bio-control of nematodes by vesicular arbuscular mycorrhizal (VAM) fungi	1st Semi Annual
28	CDYST/C-PCRWR/Agr (15)	Impact evaluation of water resource development in command area of small dams.	1st Semi Annual
29	CDYST/F-NIFA/Bio (17)	Radiation decontamination of poultry feed.	1st Semi Annual
30	CDYST/B-AZRI/Bio (18)	Ecological Studies on *Artemisia herba alba* in highland Baluchistan.	1st Semi Annual

b) *First Annual Reports (Non Development Budget)*

1.	S-PARC/Agr (277)	Investigations of plants parasitic nematodes and pseudomonas associated with date palm in Balochistan and their management by organic amendments.

2.	F-AU/Agr (282)	Evaluation and assessment of germination, stand establishment and yield of soybean and mungbean before and after seed storage using osmoconditioning techniques.
3.	P-PU/Agr (248)	Fungi as biocontrol agents against weeds. I. Biocontrol of weeds of rice crop.
4.	C-NARC/Agr (270)	Characterization and monitoring of banana bunchy top virus (BBTV).
5.	P-AU/Agr (244)	Screening of germplasm for genetic improvement of wheat in relation to salinity stress.
6.	Biotech/P-NIAB/Agr (38)	Characterization of virulent races of blight and with pathogens using biological and DNA molecular marker techniques and evaluation of chickpea germplasm for resistance against these diseases.
7.	F-AU/Agr (268)	Evaluation of morphological and physiological plant traits adopting and forage under stress.
8.	AJK-UCR/Agr (275)	Studies on the establishment & improvement of clovers *Trifolicum* spp. for nitrogen availability and soil management under agro -climatic conditions of Azad Kashmir, A.K.
9.	B-ARIQ/Agr (247)	Determinations of pesticides resistance in codling moth and two spotted spider mites, the severe pests of apple in Balochistan.
10.	Biotech/P-GC/Bio (37)	Optimization of cultural conditions of the biosynthesis of xylanase by locally isolated *Aspergillus niger*.
11.	P-NIBGE/Bio (317)	Introduction of salinity tolerance in plants through the use of halotolerance conferring genes from bacteria and fungi: A transgenic approach.
12.	C-PMNH/Bio (315)	Ecological studies of the reptilian fauna of Cholistan desert.
13.	P-NIAB/Bio (324)	Use of isoenzyme markers in chickpea breeding.
14.	Biotech/P-GC/Bio(37)	Optimization of cultural conditions on the biosynthesis of xylanase by locally isolated Aspergillus niger.
15.	Biotech/P-AU/Envr (31)	Hyper Expression of lysine and transfer of cellulase genes in Brevibacterium fleavum for recycling of agroindustrial wastes.
16.	Biotech/P-NIBGE/Agr (33)	Engineering Phage type Chimeric promoters to over express bifunctional proteins in Rice plastides to Develop biosafe transgenic plants.
17.	Biotech/P-NIBGE/Agr (38)	Characterization of virulent races of blight and with pathogens using biological and DNA molecular marker techniques and evaluation of chickpea germplasm for resistance against these disease.
18.	B-BU/Earth (57)	Facies Distribution, paleoenvronmental analysis and petroleum prospects of the Foreland Basin Sediments in the Kirther Fold-Belt, Balochistan.

19.	C-PMNH/Earth(59)	Petrology and Economic geology of Pegmaties of Granitic complexes of Swat, Malakand and Hazara.
20.	PINSTECH/Earth(67)	Geological studies of Corbonatite complexes of Northern Pakistan and their Economic Evaluation in terms of Rare Metals, Rare Earth Elements, phosphate and uranium.
21.	C-PINSTECH/Earth (69)	Geochronological, Tectonic Uplift and cooling histories of the Alkaline complex from the Peshawar Plain Alkaline Igneous province (PAIP) Pakistan with the help of petrographic and Fission – Track Dating Technique.
22.	S-KU/Chem(346)	Leishmania and Leishmaniasis in Pakistan
23.	S-KU/Chem(367)	Direct and Indirect Electrochemical attack on Cancer Cells.
24.	C-QU/Chem(370)	Synthenis & characterization of liquid crystalline Molecules.
25.	S-KU/Chem(372)	Synthesis of Biologically active chiral Iridoides via Pauson Khand Reaction
26.	C-QU/Chem(373)	Enantioselective synthesis of carbohydrate Building blocks and Bioactive Natural Products.
27.	P-GC/Phys(119)	Generation and Characterization of Hydrogen-Methane and Oxygen-Argon cold plasma.
28.	C-QU/Chem(120)	Laser optogalvinic spectra of atoms.

b) Second Annual Reports

1.	S-PARC/Agr (277)	Investigations of plants parasitic nematodes and pseudomonas associated with date palm in Balochistan and their management by organic amendments.
2.	S-KU/Agr (269)	Use of rhizobia in the biological control of root knot diseases of crop plant.
3.	B-ARIQ/Agr (247)	Determinations of pesticides resistance in codling moth and two spotted spider mites, the severe pests of apple in Balochistan.
4.	P-AU/Agr (244)	Screening of germplasm for genetic improvement of wheat in relation to salinity stress.
5.	Biotech/P-NIBGE/Agr (27)	Isolation, identification and molecular characterization of economically important potato viruses (PLRV) of Pakistan and development of transgenic potato.
6.	Biotech/P-NIAB/Agr (38)	Characterization of virulent races of blight and with pathogens using biological and DNA molecular marker techniques and evaluation of chickpea germplasm for resistance against these diseases.
7.	Biotech/P-CEMB/Ind (21)	Process development for the manufacture of *Bacillus thuringiensis* bio-insecticide.

8.	C-QU/Bio (323)	Identifications of loci in Pakistani kindreds with ectodermal dysplasia.
9.	S-KU/Chem(348)	Extrapyramidal and Monoaminergio effects of Neuroleptics: Modulation by l-tryptophan and L-valine.
10.	P-AU/Chem(353)	Pilot Production of Barium and Strontium pigments from Indigenous Barite and Celestite Minerals.
11	S-KU/Chem(363)	Purification, characterization and applied studies of protein antibiotics from Indigenous staphylococci.
12	S-KU/Chem(372)	Synthesis of Biologically active chiral iridoides via Pauson Khand reaction.
13	P-PU/Phys(114)	Pomeron (odderon) in soft and hard processes

1st Annual Reports (Development Budget)

S.No.	Project No.	Project Title
1.	R&D/C-CCRI/Agr (4)	Balanced Nutrient Management Studies for Cotton Wheat –Cropping System in Sindh.

Annexure-IV

LIST OF COMPLETED PROJECTS DURING THE YEAR 2002-2003.

S.No.	Project No.	Project title
1.	P-AU/Agr (155)	Breeding for seedless kinnow. A biotechnology approach.
2.	F-GU/Agr (158)	Evaluation of the economics of various rice-based cropping systems under D.I. Khan conditions.
3.	P-AU/Agr (192)	Development of maize population for fodder purposes.
4.	F-AU/Agr (223)	Development of commercial diet for rearing of lacewing, *Chrysoperla carnea:* A biological control agent.
5.	F-AU/Agr (232)	Assessment of soil losses, runoff estimates and changes in some physico-chemical properties of soil under different cropping systems.
6.	F-AU/Agr (258)	Identification and field evaluation of bio-control agents of the family braconidae (*Hymenoptera*) against important crop pests of Pakistan.
7.	S-KU/Bio (277)	Assessment of biological activity in the marine cynobacterial species from coastal and near-shore environments.
8.	P-PU/Bio (304)	Micropropagation of jojoba, *Simmondsia chinensis* an oil yielding plant of high commercial value.
9	S-KU/Bio (319)	Distribution and abundance of juvenile fish stock in Korangi Creek.
10.	C-NARC/Bio (321)	Pathobiology, molecular characterization and control of avian influenza viruses.

11.	C-PMNH/Bio (327)	Mushrooms and toadstools of Margalla hills and adjacent areas, Islamabad.
12.	Biotech/P-NIBGE/Agr (27)	Isolation, identification and molecular characterization of economically important Potato Virus (PLVR) of Pakistan.
13.	Biotech/P-NIBGE/Envr (5)	Biotechnological solution of liquid effluents from Leather Tanning Industry.
14.	Biotech/S-AKU/Med (12)	Determination of *Leishmania Species* using Molecular Biology Techniques.
15.	Biotech/P-AU/Med (24)	Technologies development for the Production of gonadotraphins from animal sources.
16.	C-PINSTECH/Chem.(341)	Exploitation of cheaper materials for the removal of toxic and harmful substances from industrial effluents.
17.	S-KU/Chem(342)	Influence of long chain branching and high molecular weight components on elongational and shear properties of polyolefins.
18.	P-AU/Engg(52)	Comparison of modern irrigation system with primitive flooding irrigation.
19.	S-KU/Envr (51)	Population dynamics and dispersal pattern of fiddler crabs in the mangroves areas of Karachi Coast.
20.	C-QU/Env (58)	Studies on the degradation of chlorinated phenolic compounds by pseudomonas species
21.	C-QU/Phys(108)	Study of X-rays/neutrons/Ion beam emitted from matter type plasma focus.
22.	C-QU/Phys(111)	Numerical study of Pinch dynamics/stability and study of nonlinear wave propagation in magnetized plasmas.

Annexure-V

LIST OF PUBLICATIONS PRODUCED THROUGH PSF SUPPORTED PROJECTS COMPLETED DURING 2002-2003

Hasany, S.M. and M.H. Chaudhary, (2001).Evaluation of sorption affinity of cadmium (II) on Haro river sand from aqueous solutions, J. Radioanal. Nucl. Chem. 247, 335

Inayatullah, M. (2002). The genera of the subfamily Euphorinae collected in the NWFP. Pak. Sarhad J. Agricul. 18 (2): 225-230.

Siddiqui, P.J.A. and A. Bano, (2001). Distribution of cyanobacteria as epiphyte on macroalgae. Pak. J. Mar. Biol. 7(1&2): 251-259.

Zaib-un-Nisa, S.N, Mansoor, and P.J.A. Siddiqui, (2000). Species diversity of cyanobacteria growing on pneumatophores and in the adjacent surface sediment in mangrove swamp at sandspit backwaters, Karachi. Pak. J. Mar. Biol. 6 (1): 59-68.

Jaskani, M.J., I.A. Khan, and M. S Yaqub. (1996). Regeneration of triploids from citrus endosperm. Proc. Intl. Soc. Citriculture 1:128-129.

Jaskani, M.J., I.A. Khan, and M.S. Yaqub (1996). Regeneration of triploids from citrus colchiploids. Proc. Int. Soc. Citriculture. 1:30-132.

Khan, I.A. and M.J. Jaskani (1996). Interploid hybridization for the improvement of Kinnow mandarin. Proc. Int. Soc Citriculture 1:137-140.

Jaskani, M.J. and I. A. Khan (1992) Fruit set behaviour in Kinnow mandarin. Proc. First Int. Soc. Citriculture. pp. 512-519.

Jaskani, M.J. and I.A. Khan (1992). Breeding for seedless Kinnow: A progress report. Proc. First Int. Soc. Citriculture. pp.103-105.

Jaskani, M.J. and I.A. Khan (1993). Interploid hybridization and embryo rescue in Kinnow mandarin. Proc. 3rd. National Meeting on Plant Tissue culture pp. 150-153.

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Annexure-VI

GRANTS SANCTIONED FOR CONFERENCES, SEMINARS AND SYMPOSIA DURING 2002-2003

No.	EVENT.	ORGANIZATION	AMOUNT
1.	1st Convocation of Pakistan Academy of Pharmaceutical Sciences.	Institute of Pharmacology & Herbal Sciencs, Hamdard University, Madinat-ul-Hikmah, Karachi.	Rs. 20,000/-
2.	Seminar on Atmospheric and Ionospheric Physics	Pakistan Space and Upper Atmosphere Research Commission (SUPARCO), Karachi.	Rs. 25,000/-
3.	Workshop on Natural Earth quakes & Mass movement	National Centre of Excellence in Geology, University of Peshawar, Peshawar.	Rs. 25,000/-
4.	Conference on Materials (i) The Driving Force of Technology and (ii) Culture of Science.	Pakistan Academy of Sciences, Islamabad.	Rs.2,00,000/-
5.	National Conference on Research and Higher Education in Pakistan.	University of Baluchistan, Quetta.	Rs. 25,000/-
6.	Workshop on the Development of Curriculum for Biotechnology Organization.	Planning & Development Department, University of Peshawar, Peshawar.	Rs. 25,000/-
7.	Pak. China Binational Workshop on Chemical Sciences.	H.E.J Research Institute of Chemistry, University of Karachi, Karachi.	Rs. 30,000/-
8.	Mathematics Conference.	Allama Iqbal Open University, Islamabad.	Rs. 15,000/-
9.	20th Training Course on use of Nuclear and other Advanced Techniques in Food and Agricultural Research	Nuclear Institute for Food and Agriculture (NIFA), Peshawar.	Rs. 15,000/-

10.	International Symposium on Mountains of Pakistan Protection, Potential and Prospects.	Global Change Impact Studies Centres (GCISC), Islamabad.	Rs.2,00,000/-
11.	3rd International Science Conference.	University of Arid Agriculture, Faculty of Sciences, Rawalpindi.	Rs. 30,000/-
12.	23rd Pakistan Congress of Zoology (International)	University of Arid Agriculture, Faculty of Sciences, Rawalpindi.	Rs. 40,000/-
13.	National Seminar on Frontiers of Chemistry.	Department of Chemistry, Quaid-I-Azam University, Islamabad.	Rs. 20,000/-
		Total:-	**Rs.6,70,000/-**

Annexure-VII

List of Scientists/Technologists who Succeeded in availing PSF Travel Grant

S.No	Name and Address of Applicant	Conference Attended	Amount Utilized
1.	Dr. Syed Abdul Rehman, Programme Director, National Allergy and Asthma Centre, Gulshen-e-Iqbal, Karachi. T.G (118)	58th Annual International Conference of American Academy of Allergy, Asthma and Immunology, held at New York, USA, from 1st to 3rd March 2002.	Rs.73000/-
2.	Mr. Muhammad Shakaib, Laboratory Engineer, NED University of Engineering & Technology, Karachi. T.G.(144)	Ninth Asian Fluid Mechanics Congress, 27th- 31 May, 2002 Isfahan (Iran)	Rs.60,330/-
3.	Prof. Dr. Amir Khan, Department of Geography, University of Peshawar, Peshawar. TG(156)	Geographical Renaissance at the Millennium. From 4-7 August, 2002 at Durban, South Africa.	Rs.85,000/-
4.	Prof. Dr. Qaiser Mushtaq, Chairman, Department of Mathematics, Quaid-i-Azam University, Islamabad. T.G (157)	International Congress of Mathematicians Satellite Conference in Algebra and Related Topics, at Chinese University of Hong Kong, from 14-17 August 2002.	Rs.53,525/-
5.	Prof. Dr. Bakhshal Lashari, Institute of Irrigation and Drainage Engg., Mehran University of Engg. & Technology, Jamshoro. T.G.(162)	Energy Climate Environment and Water – Issues and Opportunities for IRRI and Drainage from 10-13 July, 2002 at Dener Colorado, USA.	Rs.1,08,700/-
6.	Dr. Shahina Fayyaz, Scientific Officer, National Nematological Research Centre, University of Karachi, Karachi. TG(165)	3rd Bio NET – INTERNATIONAL Global Workshop from 8-12 July, 2002 at Pretoria, South Africa.	Rs.77,200/-

7.	Dr. M. Mohsin Iqbal, C.S.O/Director, Nuclear Institute for Agriculture and Biology, (NIAB), Faisalabad. TG(175)	17th World Congress of Soil Science from 14-21August, 2002 at Bangkok, Thailand.	Rs.1,03,400/-
8.	Dr. Farhat Fatima Jamil CSO, Nuclear Institute of Agriculture & Biology(NIAB), Faisalabad. TG(176)	The 3rd Asia Pasific International Mycological Congress on Biodiversity ands Biotechnology 4-8, Nov. 2002. at Kunming China	Rs.53,465/-
9.	Dr. N.M. Butt, Scientist Emeritus, PAEC, PINSTECH, P.O. Nilore, Islamabad. TG(180)	II International Conference on Radiation Education, at Debrecan, Hungary from 20-25 August, 2002	Rs.67,870/-
10.	Prof. Dr. Saeed Ahmed, Chairman, Civil Engineering Department, UET, Taxila. T.G (182)	27th Conference on Our World Concrete and Structures from 29-30 August 2002 at Singapore.	Rs.78,840/-
11.	Prof. Dr. M. Naseer Khan, Pro-Rector (Academic), GIK Institute of Engineering Sciences and Technology, Topi. TG(184)	Applied Super Conductivity Conference, at Texas, USA, 4-9 August 2002.	Rs.40,000/-
12.	Mr. Riaz Hussain, Veterinary Officer, Livestock Production Research Institute, Bahadurnagar, Okara. T.G (187)	53rd Annual Meeting of European Association for Animal Production, from 1-4 September, 2002 at Cairo, Egypt.	Rs.78,649/-
13.	Dr. Shahid Abbas, Assistant Chief, C&TDRD & Incharge, Department of Allergy, NIH, Islamabad. T.G (189)	13th Annual Scientific Meeting of Australian Society of Chemical Immunology of Allergy, from 27-30 Sept. 2002 at Adelaide Australia.	Rs.84,955/-

14.	Dr. Mohsin Raza, Assistant Professor, HEJ Research Institute of Chemistry, University of Karachi. T.G (190)	50th Annual Congress of the Society for Medicinal Plant Research, from 24-29 Sept. 2002 at Barcelona, Spain.	Rs.60,200/-
15.	Prof. Dr. Haroon Rashid Choudhry, Head, Department of Psychiatry, Fatima Jinnah Medical College/Sir Ganga Ram Hospital, Lahore. T.G (191)	XII World Congress of Psychiatry, from 24-29 August, 2002 at Yokohama, Japan.	Rs.1,00,000/-
16.	Prof. Dr. M.I. Bhangar, Director, Centre of Excellence in Analytical Chemistry, University of Sindh, Jamshoro. T.G (197)	41st Annual Meeting of Japan Oil Chemists Society, from 19-21 Sept. 2002 at Tokyo, Japan.	Rs.58,970/-
17.	Dr. Sabiha Bakhtyar, P.S.O, Nuclear Engg. Division, PINSTECH, Nilore, Islamabad. T.G (198)	4th International Conference (YUNSC-2002) of the Yugoslav Nuclear Society YUNS, from 30 Sept. to 3rd October, 2002 at Belgrad, Yugoslavia.	Rs.100000/-
18.	Prof. Dr. Mrs. Asghari Maqsood, Chairperson, Department of Physics, Quaid-i-Azam University, Islamabad. T.G (201)	16th European Conference on Thermo physical Properties, from 1-4 Sept. 2002 at Imperial College, London.	Rs.44,800/-
19.	Mirza Muhammad Ashraf, Chief Scientific Officer, RIAD, PINSTECH, P.O. Nilore, Islamabad. T.G (202)	World Conference on Neutron Radiography, from 15-20 Sept. 2002 at Rome, Italy.	Rs.60675/-
20.	Dr. Zahid Ata Cheema, Professor, Department of Agronomy,	Third World Congress on Allelopathy; Challenge for the New Millennium, at Tsukuba, Japan, 26-30 August, 2002.	Rs.66800/-

	University of Agriculture, Faisalabad. T.G (204).		
21.	Dr. Abdul Rehman Tahir, Associate Professor, University of Agriculture, Faisalabad. T.G (212)	3rd International Symposium on Sustainable Agro-Environment System: New Technology & Application, from 26-29 October, 2002 at Cairo, Egypt.	Rs.34600/-
22.	Dr. Zia-ur-Rehman, Associate Professor, Department of Physiology, University of Agriculture, Faisalabad. T.G (213)	6th International Congress of Biometerology, from 28th October to 1st November, 2002 at Mkansas City, Missouri, USA.	Rs.1,00,000/-
23.	Dr. Naazar Ali, Chief Scientific Officer, Oil seed Research Programme, NARC, Islamabad. T.G (215)	3rd International Symposium on Sustainable Agro-Environmental Systems: New Technologies & Applications, from 26-29 October, 2002 at Cairo, Egypt.	Rs.42,100/-
24.	Engr. Tariq Masood, Assistant Manager (Mech.), National Development Complex, 612 – Park Towers, F-10/3, Islamabad. T.G (222)	2002 IEEE International Conference on Industrial Technology (IEEC ICIT-02), from 11-14 December, 2002 at Bangkok, Thailand.	Rs.69,170/-
25.	Mr. Muhammad Asim Noor, Research Associate, Computer Science Department, Lahore University of Management Sciences (LUMS), Lahore T.G (223)	International Conference on Systems, Development and Self Organization-2002 (ICSDS-2002), from Nov. 30 to Dec. 1, 2002 at Beijing, China.	Rs.40,500/-
26.	Mr. Atif Alvi, Research Associate, Computer Science Department, Lahore University of Management Sciences (LUMS), Lahore. T.G (224)	International Conference on Systems, Development and Self Organization-2002 (ICSDS-2002) FROM Nov. 30 to Dec. 1-2002 at Beijing, China	Rs.40,500/-

27.	Prof. Dr. Muhammad Tahir Shah, NCE in Geology, University of Peshawar. T.G (217)	International Conference on the Role of Natural Resources & Environment in Sustainable Development in South and South East Asia (NESDA) on 17th January, 2003 at Dhaka.	Rs.35,400/-
28.	Mrs. Rashida Qari, Lecturer, Centre of Excellence in Marine Biology, University of Karachi. T.G (230)	International Conference on the Role of Natural Resources and Environment in Sustainable Development in South East Asia (NESDA), from 17 to 20 Jan. 2003 at Dhaka, Bangladesh.	Rs.35,000/-
29.	Dr. F.M. Zafar Kaifi, Senior Scientific Officer, PCSIR Laboratories, Jamrud Road Peshawar. T.G (234)	International Conference on the Role of Natural Resources and Environment in Sustainable Development in South East Asia (NESDA), from 17 to 20 Jan. 2003 at Dhaka, Bangladesh.	Rs.35,000/-
30.	Rubina Bilqees, Senior Scientific Officer, PCSIR Laboratories, Peshawar. T.G (235)	International Conference on the Role of Natural Resources and Environment in Sustainable Development in South East Asia (NESDA), from 17 to 20 Jan. 2003 at Dhaka, Bangladesh.	Rs.35,000/-
31.	Dr. Shahina Tariq, Assistant Professor, Institute of Earth & Environmental Sciences, Bahria University, Shahgrila Road, E-8, Islamabad. T.G (237)	International Conference on the Role of Natural Resources and Environment in Sustainable Development in South East Asia (NESDA), from 17 to 20 Jan. 2003 at Dhaka Bangladesh.	Rs.35,000/-
32.	Dr. Khalid Aftab, Associate Professor, Department of Pharmacology, Islamabad Medical & Dental College, Murree Road, Bharakahu, Islamabad. T.G (240)	SAAB/IDR 2003 Conference International Conference of South Africa, from 7th to 11th Jan. 2003 in South Africa.	Rs.52,120/-
33.	Prof. Dr. Khan Bahadur Marwat, Chairman, Department of Weed Science, NWFP Agriculture University,Peshawar. T.G (241)	19th Asian Pacific Weed Science Society Conference (APWSS), from 17-21 March 2003 at Manila, Philippines.	Rs.100,000/-

34.	Miss Rehana Anjum Rajput, Scientific Officer, Central Cotton, Research Institute Sakrand, Sindh. 113T.G (243)	World Cotton Research Conference-3, from March 9-13, 2003 at Cape Town, South Africa.	Rs.100,000/-
35.	Mr. Abdul Razzaque Soomro, Senior Scientific Officer, Control Research Cotton Institute, Sakrand, Sindh. T.G (245)	World Cotton Research Conference-3, from March 9-13, 2003 at Cape Town, South Africa.	Rs.100,000/-
36.	Prof. Dr. M. Qasim Jan, Vice Chancellor and Professor of Geology, University of Peshawar. T.G (246)	Role of Natural Resources and Environment in Sustainable Development in South & South East Asia, from 17-21 Jan. 2003 at Dhaka, Bangladesh.	Rs.43,895/-
37.	Mr. Mohammad Nabeel Ghayur, Medical Technologist/ researcher. Dept. of Biological sciences, The Agha Khan, University Stadium Road, Karachi. TG(251)	16th Scientific Congress of Physiology & Pharmacology, from 9-13 May, 2003 at Tehran, Iran.	Rs.25,000/-
38.	Dr. Asghar Hussain Asghar, Senior Medical Officer, Institute of Radiotherapy & Nuclear Medicine (IRNUM), University Campus Peshawar. TG(253)	6th International Conference of Nuclear Cardiology(ICNC),from 27-30 April,2003 at Florence, Italy	Rs.69400/-
39.	Prof. Dr. M. Asif Khan National Center of Excellence in Geology, University of Peshawar. TG(254)	18th Himalaya-Karakoram Tibet International Workshop, from 2-4 April 2003 at ASCONA, Switzerland.	Rs.47,415/-
40.	Dr. Iftikhar Ahmad Abbasi, Prof. of Geology, Dept. of Geology, University of Peshawar, NWFP.TG(255)	18th Himalaya-Karakoram Tibet international workshop from 2-4 April 2003 at ASCONA, At Switzerland.	Rs.47,415/-

Annex-VIII

List of Newly Approved Projects Under the Development Funds

S.No	Project Title & No.	Name & Address of P.I.	Duration	Total Sanctioned cost in Rs.
	Agriculture Sciences			
1	Detection of Psychrotophic Bacteria and Lipase activity in milk and milk production and their control measurers. R&D/C-NARC/Agr (8)	Mr. Haider Khan, Dairy Technology Research Lab. Animal Sciences Institute, NARC, Islamabad	2 years	3,08,825/-
2.	Cotton Plant Compensation to Pest Stress as Affected by Plant Nutrients, Growth Regulatory and Cultural Practices" R&D/S-SAU/Agr (29)	Prof. Dr. Ghulam Hussain Abrc Department of Entomology, Sindh Agriculture University, Tandojam	3 years	6,77,545/-
3	Genetic Evaluation of Nili Ravi Buffaloes to Enhance milk Production. R&D/P-LPRI/Agr (31)	Mr. Muhammad Shafiq, Assistant Research Officer, LPRI, Bahadur Nager, Okara.	3 years	2,04,010/-
4.	Impact of Sanitary and phyto-Sanitary Requirements of WTO on Agricultural exports from Pakistan. R&D/P-AU/Agr (44)	Dr. Khalid Mustafa, Deptt. of Agric. Marketing, University of Agriculture, Faisalabad.	1 year	2,67,025/-
5.	Impact of world trade liberalization On the production and export of Kinnow prospects and problems. R&D/P-AU/Agr (52)	Dr. Asghar Ali, Assistant Professor, Deptt. of Agri. Economic, University of Agriculture, Faisalabad.	1 year	1,38,169/-
6.	Evaluation of High Yielding and Drought Resistant Canola Cultivars in Pothwar. P-UAAR/Agr (69).	Dr. Fayyaz-ul-Hasan, Assistant Professor, Department of Agronomy, University of Arid Agriculture, Rawalpindi	3 years	5,10,424/-
7	Integrated Management of stored chickpea Beatle	Dr. Muhammad Aslam, Assistant Professor,	3 years	6,00,780/-

	(Callosobrucus Chinensis Linnaeus) R&D/P-UAAR/Agr (70)	Department of Entomology, University of Arid Agriculture, Rawalpindi.		
8.	Management of Black scruf Potato. R&D/P-UAAR/Agr (71)	Mr. Abdul Rauf, Assistant Professor, Department of Plant Pathology, University of Arid Agriculture, Rawalpindi.	3 years	5,01,780/-
9.	Grain and Nutrient production potential of Maize Bean *(phasealus Vulgaris L).* Inter-cropping in Mountarian Agriculture . R&D/F-AU/Agr (72)	Prof. Dr. Muhammad Siraj Swa Department of Plant Breeding and Genetics, University of Agriculture, Peshawar		5,50,861/-
10.	Developing forecasting models for major crops R&D/P-AU/Agr (74)	Dr. Muhammad Inayat Khan, Department of Mathematics, University of Agriculture, Faisalabad.	3 years	2,92,740/-
11.	An Assessment of the impact of the Farm Advisory services of Agricultural Extension and other allied Agencies in Sanghar, Mirpurkhas Distts of Sindh. R&D/S-SAU/Agr (94).	Dr. Z.D. Mirani, Assistant Professor Dept. of Agricultural Education Sindh Agricultural University Tandojam	2 years	2,56,020/-
12	Incidence of Internal external And blood parasites and Hydated Cyst in Sheep and Goats slaughtered at the Quetta, Kuchlak (Distt, pishin) and Mastung Slaugter Houses. R&D/Q-PARC/Agr (105)	Dr. Shahid Rafique, Senior Scientific Officer, Arid Zone Research Centre, PARC, Browery Road, Quetta.	2 years	4,56,786/-
13.	Restoring productivity of eroded Lands through integrated plant Nutrient management for sustained Production. R&D/F-AU/Agr (128)	Prof. Dr. Amanullah Bhatti, Deptt. of Soil & Envr. Sciences Faculty of Crop production Sciences, NWFP Agriculture University, Peshawar	3 years	8,14,776/-

14	Bread wheat Improvement for Drought Tolerance and High Yield Potential. R&D/F-NIFA/Agr (151)	Mr. Abdul Jabbar Khan, Nuclear Institute for Food and Agriculture, Peshawar.	3 years	5,56,920/-
15.	Development of Oilseed Brassica Genotype for Industrial uses through Induced nutritions, classical Breeding in vitro culture Techniques R&D/F-NIFA/Agr (152)	Syed Amer Shah, Nuclear Institute for Food Agriculture, Peshawar,	3 years	8,88,787/-
16.	Standardization of composing Technology appropriate for compositing of rice-wheat system in normal and salt effected soils R&D/S-SRI/Agr (161)	Dr. Nazir Hussain, Soil Salinity Research Institute, Pindi Bhattian, Distt. Hafizabac	3 years	3,75,615/-
17.	Performance of promising Mungbean (Vienna rediatewilezek) Genotypes /Varieties on farmer's fields in NWFP. R&D/F-NIFA/Agr (181)	Dr. Gul Sanat Shah, NIFA, Peshawar.	2 years	2,12,976/-
18.	Epidemiological Investigation of Lepto-Spirosis in Cattle and Befalloes. R&D/P-LPRI/Agr (229).	Dr. Rashid Ahmad, Livestock Production Research Institute, Bahadurnagar, Okara.	1 year	2,66,148/-
	Biological Sciences			
19.	Some Studies to Improve Meat and Milk Production of Goat/ Sheep in Southern Punjab R&D/P-BZU/Bio (34)	Dr. Tasawar H. Khan Institute of Biology Bahauddin Zakariya University, Multan	3-years	9,35,340/-
20.	Effects of different Weaning Protocols on the Immune System in Buffalo Calves and Prophylactic Application of Levamisol R&D/P-AU/Bio (55)	Dr. Anas Sarwar Department of Veterinary Anatomy University of Agriculture, Faisalabad	2-years	3,97,126/-

21.	Anti-Nutritional Factors in Cereals and Legumes and their Possible Removal R&D/C-NARC/Bio (106)	Mr. Tabassum Hameed Food Technology Research Laboratory, NARC, Islamabad	2-years	3,70,260/-
22.	Improvement and Establishment of Seabuckthorn (Hypophae rhamnoides L.), a Multipurpose Plant in Mountainous Regions of Azad Kashmir R&D/AJK-UCA/Bio (124)	Dr. Syed Dilnawaz Ahmad Gardezi Department of Plant Breeding and Genetics, University College of Agriculture, Rawalakot	3-years	6,29,487/-
23.	Study on the Blight (*ascochyta rabiei*) and Wilt (*fusarium oxysporum f sp. ciceri*) Diseases of Chickpea for Identification of Resistance R&D/C-NARC/Bio (127)	Dr. Sh. Muhammad Iqbal Pulses Program, NARC, Islamabad	2-years	6,44,538/-
24.	Biological Control of Maize Stem Borer, *Chilo partellus* through *Trichogramma chilonis* R&D/F-NIFA/Bio (147)	Dr. Abid Farid Nuclear Institute of Food and Agriculture (NIFA), Peshawar	2-years	4,36,313/-
25.	Ethno-Botanical Studies, Taxonomy and Pictorial Encyclopedia of Economically Important Plants from Mountainous Regions of Northern Pakistan R&D/C-PMNH/Bio (181)	Dr. Muhammad Rashid Awan Pakistan Museum of Natural History, Islamabad	3-years	8,94,897/-
26.	Production of Amino Acids through Fermentation Utilizing Agricultural by-Products R&D/P-NIAB/Bio (183)	Dr. Shahid Nadeem Nuclear Institute for Agriculture & Biology (NIAB), Faisalabad	3-years	5,19,124/-
27.	Studies on the Biomonitors of Trace Metals in Coastal and Estuarine Waters of Karachi R&D/S-KU/Bio (194)	Dr. Itrat Zehra Centre of Excellence in Marine Biology, University of Karachi, Karachi	2-years	5,71,216/-
28.	Isolation, identification and Bioactivity of Natural Products from Murraya paniculata R&D/F-PCSIR/Bio (130)	Mr. Vaqar ul Hassan PCSIR Laboratories, Peshawar	2-years	2,40,730/-

29.	Development of Germplasm for Hybrid Seed Production through Mutation in Basmati Rice R&D/P-NIAB/Bio (197)	Mr. Akbar Ali Cheema NIAB, Faisalabad	3-years	5,95,869/-
30.	Role of Serum Leptin in Primary Infertility in Females. R&D/S-KU/Bio (207)	Dr. Abid Azhar Department of Biochemistry University of Karachi, Karachi	2-years	9,34,534/-
31.	Documentation of Indigenous Knowledge about Medicinal Plants of Pakistan R&D/C-PMNH/Bio (225)	Dr. Muqarrab Shah Botanical Sciences Division PMNH, Islamabad	3-years	10,17,613/
	Biotechnology			
32.	The Use of DNA Fingerprinting to Evaluate the Genetic Stability of Banana Plants Produced via *In Vitro* Culture. R&D/S-HEJ/Biotech (93)	Dr. Saifullah Khan H.E.J. Research Institute of Chemistry University of Karachi, Karachi	2-years	8,23,487/-
33.	Anticholestrimic Activity of Lactobacilli of Locally Fermented Dairy Products R&D/B-PCSIR/Biotech (117)	Mr. Mujeeb ur Rehman PCSIR Laboratories, Quetta	2-years	5,87,742/-
34.	Development of Replicase Mediated CLCud (cotton leaf curl disease) Resistance in Cotton. R&D/P-NIBGE/Biotech (168)	Ms Shaheen Asad NIBGE, Faisalabad	3-years	10,40,410/-
35.	Tissue Culture and Genetic Transformation Studies in Banana (Musa) for Disease Eradication/Resistance. R&D/P-UAA/Biotech (220)	Dr. S.M. Saglan Naqvi Department of Biological Sciences, University of Arid Agriculture, Rawalpindi	3-years	8,73,324/-
36.	Use of Induced Somatic Mutation and Biotechnological Techniques for the Genetic Improvement of Sugarcane (*Saccharum* sp. hybrid) R&D/S-NIA/Biotech (134)	Mr. Imtiaz Ahmed Khan Senior Scientific Officer plant Genetic Division, Nuclear Institute of Agriculture, Tando Jam	3-years	9,98,483/-

Chemical Sciences

37	Comparative Studies of Acid Phosphatases from Fish Liver and Egg: Isolation, Purification, Some Kinetic properties, Amino Acid Composition and primary Structure. PSF/P&D/F-GU/Chem(173)	Prof. Dr. Ahmad Saeed, Department of Chemistry, Gomal University, Dera Ismail khan.	3 years.	10,02,000/-
38.	Synthesis and Spectroscopic Characterization of Organotin (IV) Complexes with Hormone-Inhibitors Organic Moieties. PSF/P&D/F-GU/Chem.(182)	Dr. Muhammad Ashfaq, Assistant Professor, Department of Chemistry, Gomal University, Dera Ismail Khan.	3 years.	9,92,200/-

Engineering Sciences

39.	Experimental and Analytctical Studies of Gasketed and Non-Gasketed Flanged Pipe Joints to Determine the Joint Load Capacity for Improved Sealing Capability and their Implementation. PSF/R&D/F-GIK/Engg.(76)	Dr. Muhammad Abid, Assistant professor, Faculty of Mechanical Engineering, GIK Institute of Engineering & Technology, Topi, Swabi, ,NFWP.	3 years.	10,00,000/-

Physics:

40.	(i) Generation of cold plasma by 13.56 MHz RF source, and its characterization by optical emission spectroscopy and Langmuir probe (ii) Study of X-rays emitted from a compact diode and a plasma focus. PSF/R&D/C-QU/Phy (199)	Dr. Mohammad Zakaullah, Associate Professor, Plasma Physics Laboratory, Department of Physics, Quaid-i-Azam University, Islamabad.	3 years.	996,000/-
			Total:	**2,43,80,879/**

Annexure-IX.

List of Newly approved Projects under the Development Project Career Development of Young Scientists and Technologists

S.No.	Title and Number of Project	Name and Address of P.I.	Duration	Total sanctioned cost (Rs.)
1.	Research Study for the Development of a Vegetable Stand Establishment Machine CDYST/C-NARC/Engg (10)	Dr. Muslim Abbas Zaidi Farm Machine Institute, NARC Islamabad	2-years	1,73,400/-
2.	Biology and Management of *Cercospora* Leaf Spots of Peanut (Arachis hypogea L.) CDYST/P-UAA/Bio (13)	Dr. Muhammad Shahid A. Khan Department of Plant Pathology University of Arid Agriculture , Rawalpindi	2-years	2,58,406/-
3.	Screening of Marine Plants for their Nematicidal Properties against Root Knot Nematodes (*Meloidogyne javanica*) CDYST/S-SPGC/Bio (16)	Dr. Muhammad Abid Saint Patrick's Government College Karachi	2-years	2,35,140/-
4.	Abundance and Seasonal Variation of Major Zooplankton Species at Miani Hor Lagoon and Adjacent Open Waters, Balochistan CDYST/S-KU/Bio (21)	Dr. Zarien Ayub Centre of Excellence in Marine Biology, University of Karachi Karachi	1-year	89,188/-
5.	Study of Some Imposexed Gastropod Species in the Polluted Marine Waters along the Coast of Karachi CDYST/S-KU/Bio (22)	Dr. Ghazala Siddiqui Centre of Excellence in Marine Biology, University of Karachi Karachi	1-year	1,55,040/-
6.	Some Studies on the effect of Fascioliasis on reproductive performance in Goats Maintained Around Multan CDYST/P-BZU/Bio (29)	Dr. Zahida Tasawar Institute of Pure and Applied Biology Bahauddin Zakariya University, Multan	2-years	97,920/-

7.	R&D/CDYST/F-VRI/Bio (20) Genetic Improvement of Dairy Goats in NWFP	Dr. Muhammad Subhan Qureshi Veterinary Research Institute, Peshawar	2-years	1,97,268/-
8.	R&D/CDYST/S-PCSIR/Bio (24) Panaeid Shrimp Maturation in Captivity	Dr. Razia Sultana PCSIR Laboratories, Karachi	2-years	2,19,647/-
9.	R&D/CDYST/S-KU/Bio (31) Sea Water Tolerance of *Halosarchia indica*	Dr. Bilquees Gul Department of Botany University of Karachi, Karachi	2-years	2,42,087/-
			Total:	**16,68,096/-**