

ANNUAL REPORT

1999 - 2000



Pakistan Science Foundation

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PAKISTAN SCIENCE FOUNDATION

**ANNUAL REPORT
1999-2000**

**PAKISTAN SCIENCE FOUNDATION
CONSTITUTION AVENUE
ISLAMABAD**

LETTER OF TRANSMITTAL

Dear Mr. Secretary,

I have the honour to enclose herewith Annual Report of the Pakistan Science Foundation for the Fiscal year 1999-2000, 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. Khalid Mahmood Khan,S.I,
Chairman
Pakistan Science Foundation
Islamabad**

**Secretary
Ministry of Science and Technology
Government of Pakistan
Islamabad.**

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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
ARIQ	Agriculture Research Institute, Quetta
AU	Agricultural University
AEARC	Atomic Energy Agricultural Research Center
BAC	Barani Agricultural College
BU	Balochistan University
BZU	Bahauddin Zakaria University
CEMB	Centre of Excellence in Molecular Biology
CEME	College of Electrical and Mechanical Engineering, Rawalpindi
CEWRE	Centre of Excellence in Water Resources Engineering
CSIR	Council of Scientific and Industrial Research
DMC	Dow Medical College
EU	Engineering University
FGC	Federal Government College
GC	Government College, Lahore
GU	Gomal University
KU	Karachi University
IUB	Islamia University, Bahawalpur
NARC	National Agricultural Research Centre
NIBGE	National Institute for Biotechnology and Genetic Engineering
PARC	Pakistan Agricultural Research Council

PDC	Poultry Development Centre
PMNH	Pakistan Museum of Natural History
PINSTECH	Pakistan Institute of Nuclear Science and Technology
PU	Peshawar University/Punjab University
QU	Quaid-i-Azam University
SALU	Shah Abdul Latif University
SU	Sindh University
PCCC	Pakistan Central Cotton Committee
UAA/UAAR	University of Arid Agriculture, Rawalpindi
UCR	University College of Agriculture, Rawalakot
IU	Islamia University

Disciplines

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

EXECUTIVE SUMMARY

PAKISTAN SCIENCE FOUNDATION (PSF)

Pakistan Science Foundation is the apex body for promotion and funding of scientific and technological activities in the country. The activities 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. The first function is carried out by the Science Wing of PSF while the second one is achieved through Science Promotion Section of PSF and Pakistan Museum of Natural History (PMNH) and third one through Pakistan Scientific and Technological Information Centre (PASTIC), the two subsidiary organizations of PSF. The activities undertaken during the year are reflected in the following.

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 1999-2000, a total of 166 projects in the fields of Agriculture, Biology, Biotechnology, Chemistry, Earth, Engineering, Environment, Medicine and Physics remained under consideration for funding. Among these, 48 projects were newly received while 118 had been carried over from the previous year. Out of these, 30 projects costing Rs.12.612 million were sanctioned in various fields. In addition, an amount of Rs.0.276 million was released to various institutions as institutional support grant for purchase of laboratory equipments and accessories.

Monitoring and evaluation of the on-going research projects sponsored by PSF is an important function of the Research Support Programme. During the year, 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, 17 projects in various fields were completed. The final reports of these projects were reviewed by the PSF experts. The studies completed during the year 1999-2000 and their main achievements are as under:

- Host Plant Resistance of Bioregulator Treated Cotton to Bollworms and Sucking Complex and its Impact on Yield and Yield Components(S-AEARC/Agr -141). Studies indicated that cytokin in combination with cytoplex can effectively be used to

manage cotton bollworms and enhance the seed cotton yield. Furthermore, pix in combination with insecticides significantly reduced the infestation of sucking complex (jassids, thrips, whiteflies and bollworms) as compared to insecticides alone.

- **Diagnosis and Control of *Mycoplasma Gallisepticum* Infection in Poultry (P-PDC/Agr-151).**
The indigenous MG isolate proved to be more virulent than F strain of MG but did not prevent respiratory signs, air sac lesions or mortality in vaccinates.
- **Factors Affecting Successful in-vitro Maturation, Fertilization and Culture of Buffalo Follicular Oocytes (P-AU/Agr-175).**
Studies indicated that scoring method yields significantly higher proportion of total number as well as number of good quality oocytes than aspiration or puncher methods. TCM-199 containing buffalo or cow serum collected either at pro-esterus or esterus are better for in vitro maturation & fertilization of buffalo follicular oocytes.
- **Breeding for Glandless Cotton (S-PCCC/Agr-183).**
The studies conducted so far, have revealed that hybridization successfulness in glandless Cotton varieties is minimum (3-5%) as compared to glanded varieties in Sakrand conditions.
- **Investigation on the Diseases of Betelvine and their Control (S-KU/Agr-184).**
The study revealed that betelvine farms in Karachi, Thatta and Hub are affected by root knot nematodes, root infecting fungi, leaf spot and anthracnose diseases. Therefore, use of chemical pesticides and/or biocontrol agents are necessary for control of damages caused by root knot nematodes and root infecting fungi.
- **Electrophoretic Identification of Pakistani Wheat for Gliadin and HMW Glutenin Subunit Composition and their Relationship with End Use Quality (P-AU/Agr-195)**
Based on the physico-chemical, chemical and rheological properties, wheat cultivars Rohtas-90, LU-26 and Faisalabad-85 got highest scores for chappati making whereas Pb-96 and Faisalabad-83 were rated as good for cookies preparation and other bakery items.
- **Use of Rhizobia in the Integrated Control of Root Rot Diseases of Crop Plants (S-KU/Bio-193).**
It is suggested that brown seaweed may be exploited and used for soil amendment in controlling root infecting fungi which may result in better plant growth. Moreover, use of seaweed with compatible rhizobia also seems promising.
- **Acrididae of the Punjab (S-SU/Bio-198)**
A total of 58 species of grasshoppers belonging to family Acrididae were collected. Out of these, five species have been described as new and eight species are recorded for the first time from this area.
- **Potentials of Owls as Agents for Controlling Rats and Mice populations in Cultivations (P-AU/Bio-238).**
The study documents information about the population status of barn owl (*Tyto alba*) and little spotted owlet (*Athene brama*) in the cultivations of central Punjab with

special emphasis on the potential of two raptors in controlling rats & mice populations in croplands.

- Somaclonal Variations in Sugarcane through Tissue Culture and Subsequent Screening for Salt Tolerance (F-GU/Bio-247).
Salt tolerant somaclones have been developed through tissue culture technology. Vigorous growth of somaclones in saline & sodic soils proved that these somaclones can be grown in any saline soils of Dera Ismail Khan.
- A Study on the Lubricity of Lubricating Oils Produced in Pakistan (F-PU/Chem-284).
The study provides guidelines for the formulation of blends of lube oils with improved performance for specific purposes.
- Ion Exchange Properties of Metal (III) Phosphates (F-PU/Chem-315).
It is concluded that in neutral or slightly alkaline solutions, the metal (III) phosphates are reliable exchange materials and thus can act as an efficient sorbents for metal cations without suffering extensive hydrolysis.
- Synthesis of Neurotensin Mimics (C-FGC/Chem-323)
The study deals with preparation of neurotensin mimics 3 & 4 which are non peptidic and found to be ten times more potent than mimic 2 (i.e. lead compound).
- Economically Important Plants of Cholistan Desert (P-PARC/Envr-37).
A total of 165 species of economically important plants of Cholistan desert have been collected.
- Clinical Applications of ^{13}C Urea Breath Test for Diagnosis of *Helicobacter Pylori* Infection and Confirmation of Eradication Following Therapy (C-Pinstech/Med-172).
It is suggested that ^{13}C Urea Breath Test may be used for diagnosis of *Helicobacter pylori* infections and confirmation of eradication following therapy.
- Theoretical/Computational Studies of Fractals in Materials (P-PU/Phys-94).
The study was undertaken to bridge the gap between polymer science & fracture mechanics.
- Analytical Investigation of non-linear waves in Semi Conductor Superlative Plasmas (P-PU/Phys-99).
It was observed that periodicity of piezoelectric semiconductor structure effects the behavior of the threshold electric field necessary for the onset of parametric instability.

One of the main achievements and usefulness of any research is the publication of its results in scientific journals. As many as, 41 research papers from PSF funded projects were published in different scientific journals. In addition, 4 Ph.D, 8 M.Phil, 3 M.Sc. degrees were awarded to the Research Associates employed in the 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.0.397 million to various Universities and R&D organizations for organizing 17 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, an amount of Rs.0.485 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 programmes 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 Areas. During the year under report, the Caravan Units organized 18 mobile exhibitions and planetarium shows, wherein 355 schools brought their students to see the exhibition and planetarium/film shows.

One of the most powerful means through which science can be popularized is holding of "Science Fairs". Such Fairs are held quite regularly by most countries of the world but most frequently in the developed world. All kinds of new scientific discoveries and achievements are displayed at such Fairs for the knowledge and understanding of the general public. This kind of interaction not only educates the citizens of the country but also helps in the generation of public support which is highly essential for science to prosper.

The National Science & Technology Fair, 99 held at Islamabad from 23rd October to 1st November, 1999 was thus an endeavour of Pakistan Science Foundation in this direction.

Thirty four (34) R&D organizations participated in the Fair and displayed their products. During the Fair eight collateral events were organized as part of the Fair in order to increase public interest and participation viz; Bicycle Race for Science, Walk for Science, Book Exhibition, Computer Exhibition, S&T Art Competition, Science Exhibition for Schools and Colleges, Aeromodelling Competition and a one day Symposium on "R & D Management for Achieving Total Quality".

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. Several other activities like funding to conferences/seminars/workshops etc. also continued during the report period.

An important event entitled "National Science Olympiad-2000" has also been initiated by the Foundation wherein all the 21 Boards of Intermediate & Secondary Education (BISE) in the country are being financed to hold Science Quiz Competitions. Institutional support for the development of Science Centres is another science promotion activity. In this regard a multimedia projector has been purchased which is to be donated to National Museum of Science & Technology, Lahore. Moreover, an amount of Rs.100,000/- has been released to Children Library Complex, Lahore for the establishment of Science Corner.

PAKISTAN MUSEUM OF NATURAL HISTORY (PMNH)

Main task of the PMNH is the collection, curation, preservation and research on plants, animals, rocks, minerals and fossils of Pakistan. Display/exhibits are also developed for creating awareness about the natural resources of the country.

The scientists of the three Divisions of PMNH viz; Botanical Sciences Division, Earth Sciences Division and Zoological Sciences Division carried out 20 field tours to various localities of the country which resulted in the addition of a large number of botanical, zoological and geological samples to the PMNH reference collection. The collected material was preserved and the field data analyzed in the laboratories of these three Divisions. These studies resulted in the publication of 15 articles in national and international journals. Two collaborative research projects were completed whereas two new projects were initiated during the report period.

A 2-day Workshop on "Sustainable use of Biological and Geological Resources of Pakistan" was held in the PMNH wherein many teachers and high level students participated. Two scientists participated in an IUCN Workshop on "Threatened Plants" held in Sri Lanka and presented country paper. Moreover, PMNH collaborated with National Institute of Scientific and Technological Education (NISTE) for the preparation of a textbook for Secondary School level.

PMNH scientists and staff continued work for the completion of various natural history exhibits and dioramas in its new building at Shakarparian. Pakistan Museum of Natural History played an important role in the planning, organizing and executing the various events of the 4th National Science and Technology Fair held in October-November, 1999 by the Pakistan Science Foundation.

PAKISTAN SCIENTIFIC AND TECHNOLOGICAL INFORMATION CENTRE **(PASTIC)**

PASTIC is one of the organs of PSF, established to undertake comprehensive scientific and technological information collection and dissemination Center. 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 four sub-Centres at Karachi, Lahore, Quetta and Peshawar, 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, 2364 requests for supply of articles were received, against which, 1837 were honored. More than 639 bibliographies were supplied to the researchers.

PASTIC publishes "Pakistan Science Abstracts" on regular basis. During the report period, different jobs were undertaken for the preparation of PSA, 1998. Under Reprographic Services of PASTIC, about 1041489 impressions, 2165 pages and 138801 copies were produced against 121 jobs received from 16 S&T organizations. PASTIC library added to its collection 149 books, 75 documents and 1653 periodical issues. The subscription of databases on CD ROM were also renewed.

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 package was provided to five organizations. PASTIC also trains information specialists in modern information handling and management techniques. In this connection, PASTIC/PSF in collaboration with SAARC, organized a Workshop on "Information and Communication Technology" w.e.f. 1-4 February, 2000 at Islamabad.

Director General PASTIC, as a Resource Person and System Analyst, PASTIC as a participant attended a Workshop on "Information Infrastructure in SAARC Region" from 25-27 January, 2000 at Dhaka, Bangladesh.

PASTIC's allied Technological Information Promotion System (TIPS) always remains busy to publish up to date information on technology and trade opportunities. It collects S&T information pertaining to 14 different sectors from the developing countries. During the report period, 1942 trade and technological abstracts received from 39 countries were disseminated to users in Pakistan. Subsequently, 55 Pakistani entrepreneurs/business organizations were provided information as required. It organized computer exhibition at Quetta, Lahore and Faisalabad during the report period. Moreover, Vol. 2-3 and Vol. 4, No. 1 of "White Meat" a bilingual publication regarding Poultry and Fisheries were published.

INTRODUCTION

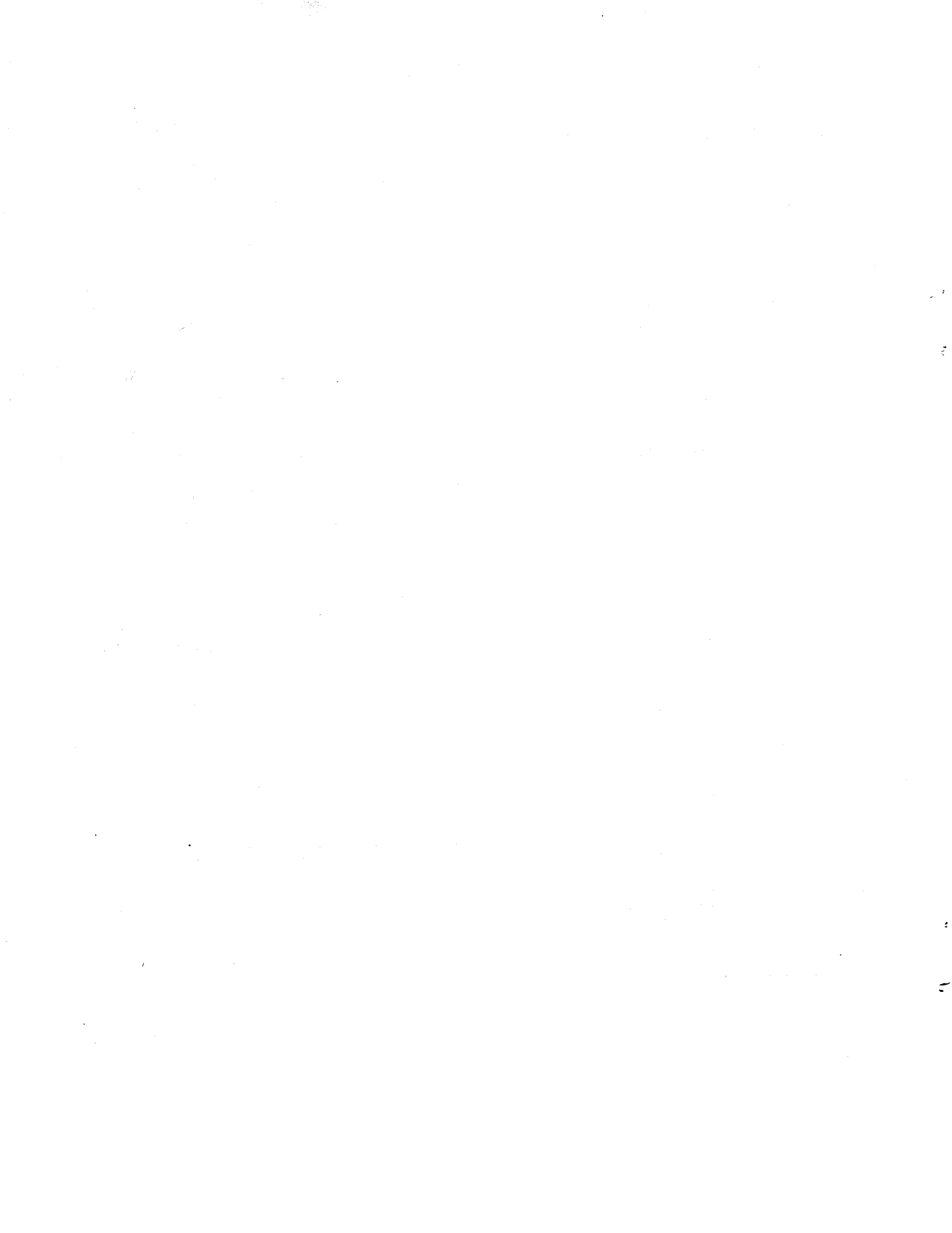
Pakistan Science Foundation was established on June 30, 1973 under the Pakistan Science Foundation Act No. III of National Assembly (Annexure I), as an autonomous body to promote and finance scientific and technological activities having a bearing on the socio-economic needs of the country. Under the 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 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, and
- 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 and
- 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. The 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 Sections performing the following activities:

1. Research Support
 - a) Grants for Research Projects
 - b) Institutional Support
2. Research Evaluation
3. Other research support programs
4. Promotion of Scientific Societies/Learned Bodies
5. Travel Grants
6. International Liaison
7. Awards and Fellowships
8. Survey and Statistics
9. Scientists Pool
10. Planning and Development Programme

(II) Science Popularization Section, which carries out the following activities:

1. Science Popularization Activities including Science Caravans, Science Clubs, Science Fairs and holding Popular Science Lectures, Workshops, Conferences and Symposia.
2. Funding for Conferences, Symposia, Seminars, Workshops.

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 1999-2000 is summarized in the following pages.

PAKISTAN SCIENCE FOUNDATION (PSF)

I. RESEARCH SUPPORT SECTIONS

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 programs.

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. During the report period, 48 new proposals requesting for funds totaling to more than 39.934 million were received in the fields of Agriculture, Biology, Chemistry, Biotechnology, Earth Sciences, Engineering, Environment, Medical, and Physics. While 118 proposals, at various stages of their processing, were carried over from previous year. Thus, in all 166 proposals remained under active consideration of the Foundation. These proposals were sent to the subject experts for evaluation in the light of their scientific merit and relevance to the national needs.

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 the completion of the proposed research within the stipulated time. Each proposal, after getting favourable review report from expert in that 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 year under report, 30 project proposals succeeded in getting the approval of the Foundation at a total cost of Rs.12.612 million. List of those projects is given in 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. to 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 these institutions to enable them to conduct research directed towards the solutions of problems of national importance. During the report period, Institutional Support Grants amounting to Rs. 0.276 million was sanctioned to the following institutions for the purchase of equipments.

<u>S.No.</u>	<u>Institution</u>	<u>Purchase of Equipment</u>	<u>Amount</u>
1.	Pakistan Museum of Natural History (PMNH), Islamabad.	One Computer (P-III)	Rs. 50,000.00
2.	Department of Physics, University of Peshawar	Metallurgical Microscope & High Temperature Furnace	Rs. 2,26,580.00
		Total:	Rs. 2,76,580.00

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 ninety-six (96) reports (semi annual, 1st annual, 2nd annual and final) were received and their progress evaluated as per procedures laid down by the Foundation.

a) On-Going Projects

During the year, seventy-nine (79) semi-annual, 1st annual and 2nd annual reports were received. The semi annual reports were scrutinized by the PSF relevant staff, whereas the annual reports, after initial scrutiny, were sent for evaluation to the subject experts to assess their interim progress. 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.9.676 million were released on account of due installments of ongoing & first installment of newly sanctioned projects. A list of the semi-annual and annual reports is given in Annexure-III.

b) Completed Projects

Final Technical Reports of seventeen (17) research projects were received during the year under the report. These reports were evaluated by the subject experts and subsequently submitted alongwith the evaluation reports to the relevant Technical Committees for consideration and adoption. A list of the completed projects followed by their summaries, is given below:

i. List of Completed Projects

S. No	Project No.	Project Title:
1.	S-AEARC/Agr(141)	Host Plant Resistance of Bioregulator Treated Cotton to Bollworms and Sucking Complex and its Impact on Yield and Yield Components.
2.	P-PDC/Agr (151)	Diagnosis and Control of <i>Mycoplasma Gallisepticum</i> Infection in Poultry.
3.	P-AU/Agr(175)	Factors Affecting Successful <i>in-vitro</i> Maturation, Fertilization and Culture of Buffalo Follicular Oocytes.
4.	S-PCCC/Agr (183)	Breeding for Glandless Cotton
5.	S-KU/Agr (184)	Investigations on the Diseases of Betelvine and their Control.
6.	P-AU/Agr(195)	Electrophoretic Identification of Pakistani Wheat for Gliadin and HMW Glutenin Subunit Composition and their Relationship with End Use Quality.
7.	S-KU/Bio(193)	Use of Rhizobia in the Integrated Control of Root Rot Diseases of Crop Plants.
8.	S-SU/Bio (198)	Acrididae of the Punjab.
9	P-AU/Bio(238)	The Potentials of Owls as Agents for Controlling Rats and Mice Population in Cultivations.
10	F-GU/Bio(247)	Somaclonal Variations in Sugarcane through Tissue Culture and Subsequent Screening for Salt Tolerance.
11.	F-PU/Chem (284)	A Study on the Lubricity of Lubricating Oils Produced in Pakistan.
12.	F-PU/Chem (315)	Ion Exchange Properties of Metal (III) Phosphates.
13.	C-FGC/Chem (323)	Synthesis of Neurotensin Mimics.
14.	C-PARC/Envr(37)	Economically Important Plant Species of Cholistan Desert
15.	C-PINTECH/Med (172)	Clinical Applications of ¹³ C Urea Breath Test for Diagnosis of <i>Helicobacter Pylori</i> Infection and Confirmation of Eradication Following Therapy
16.	P-PU/Phys (94)	Theoretical/Computational Studies of Fractals in Materials.
17.	P-PU/Phys (99)	Analytical Investigations of Non-linear Waves in Semi Conductor Superlattice Plasmas.

ii. Brief Summaries of Completed Projects

Project No: S-AEARC/Agr (141)
Project Title: **Host Plant Resistance of Bioregulator Treated Cotton to Bollworms and Sucking Complex and its Impact on Yield and Yield Components.**

Duration: 3-years

Date of Initiation: 28.04.1995

Date of Completion: 27.04.1998

Location of Scheme: Atomic Energy Agricultural Research Centre (AEARC), Tandojam

Principal Investigator: Mr. S. M. Masoom Shah Rashdi

Total Expenditure: Rs. 1,75,810/92

Main Objectives:

- To work out the best rate of application of bioregulators and to evaluate the host plant resistance of bioregulator treated cotton to bollworms (pink, spotted and American bollworms) and sucking complex (jassids, thrips, whiteflies and mites) in comparison to insecticidal spray.
- To evaluate the impact of bioregulator, either alone or in combination with insecticides on yield and yield components.
- To work out correlation of pest infestations with agronomic traits.
- To minimize the use of insecticides to prevent environmental pollution and to preserve natural fauna of parasites and predators.
- To determine economics of crop production using plant bioregulators in comparison to insecticidal spray.
- To study general and reproductive biology of bollworms, particularly *Heliothis spp.* on cotton treated with plant bioregulators.

- To study the chemical basis of host plant resistance of bioregulator treated cotton to bollworms.

Summary of work done:

Cotton is the principal cash crop of Pakistan which provide edible oil as well as raw material to the textile and garment industry. The cotton crop is grown on an area of 2.142 million hectares with an annual production of 15.9 million tons. The cotton yield is very low in Pakistan as potential production of the crop is reduced by 20.7% due to the ravages of insect pests particularly bollworms and sucking complex.

Studies on evaluation of growth regulators for the management of insect pests of cotton were conducted in randomized complete block design with four replicates. Different growth regulators, Pix, Atonic, Cytokin and Cytoplex either alone or in combination with insecticides were used for the induction of pseudoresistance against insect pests of cotton. Results revealed that growth regulators treated cotton plant harboured lower population of jassids, thrips, whiteflies and bollworms. Host plant resistance studies indicated that Red RBGL and Red Okra were moderately resistant to the attack of jassids & thrips. Whereas Red Okra and AEH-8 were less susceptible to the attack of pink and spotted bollworms. Hence, these lines can effectively be used for integrated control of insect pests of cotton.

Feasibility studies of integration of different bioregulators with insecticides indicated that Cytokin +Cytoplex treatment significantly increased the number of bolls per plant and size of the cotton bolls which subsequently increased the seed cotton yield.

Studies on the evaluation of four bioregulators (Atonic, Cytokin, Cytoplex and Pix) revealed that maximum seed cotton yield and minimum infestation of pink and spotted boll worms were recorded in Pix and Cytokin treated cotton. Maximum seed cotton yield was recorded from the areas treated with Pix + Nuvacron and Pix+ Polytrin-C. It is, therefore, concluded that Pix in combination with insecticides significantly reduced the infestation of sucking complex as compared to insecticides alone. Moreover, the treatment of pix with insecticides (two spray) saved two sprays of insecticides which ultimately reduced the environmental pollution and protected the beneficial insect fauna.

Based on the research work done under this project, two papers have been published in National/International Journals.

Project No: P-PDC/Agr (151)
Project Title: Diagnosis and Control of *Mycoplasma Gallisepticum* Infection in Poultry.

Duration: 3-years
Date of Initiation: 01.01.1994
Date of Completion: 31.12.1996
Location of Scheme: Poultry Development Centre (PRI) Punjab, Rawalpindi.
Principal Investigator: Dr. Ishtiaq Ahmad
Total Expenditure: Rs. 3,24,553/-

Main Objectives:

- Determination of incidence and severity of MG infection in poultry flocks in the region/province.
- Development of culture media and specific reagents for the complete isolation and identification of field isolates of mycoplasma.
- Development of diagnosis SPA/HI antigens from locally isolated strains for quick and accurate screening of mycoplasma carrier flocks.
- Application of molecular biology techniques such as SDS-PAGE, western blot and/or restriction endonuclease analysis for differentiating MG strains.
- Development of suitable live vaccine by using MG strain of low virulence for immunization of poultry flocks.

Summary of work done:

The *Mycoplasma gallisepticum* (MG) is the etiologic agent of chronic respiratory disease (CRD) and is responsible for significant losses to poultry industry. The present study aimed at diagnosis & control of *Mycoplasma gallisepticum* infection in poultry birds was undertaken at Poultry Development Centre (PDC), Rawalpindi during 1994-96. The flocks were comprised of broiler breeder and commercial layers aged between 16-18 weeks. Serum samples from 15655 poultry birds reared around northern areas of the country including Islamabad, Murree, Abbotabad and Mansehra were collected. These samples were screened by Serum plate Agglutination (SPA) test for the presence or absence of antibodies to MG (*Mycoplasma*

gallisepticum) and or MS (*Mycoplasma synoviae*). The percentage agglutination reaction were found to be 35.6 for MG and 28.3 for MS. On the basis of biochemical tests and cultural techniques it was observed that MG is more prevalent among poultry flocks than MS. Out of 19 MG isolates subjected to identification by Growth Inhibition, Agar Diffusion, Precipitation and Immunofluorescence Antibody technique only 15 isolates yielded positive serology with these tests. Pathogenicity and protein profile of standard and indigenous MG strains were also conducted and it was observed that electrophoretic pattern of three standard MG Strains (R, S6 ,F) and two indigenous MG strains (PMG-35 & PMG-198) were similar whereas, two indigenous Strains (PMG-161 & PMG-163) were slightly different. Serum plate agglutination (SPA) antigens were prepared from the indigenous MG isolates (PMG-35, PMG-161, PMG-198) and compared with standard MG strain. Sensitivity and specificity of the prepared vaccines were also tested. It is concluded that one of the indigenous MG isolate proved to be more virulent than F-Strain of MG.

One Ph. D thesis has been produced out of this study.

Project No: P-AU/Agr(175)
Project Title: Factors Affecting Successful *in-vitro* Maturation, Fertilization and Culture of Buffalo Follicular Oocytes.

Duration: 3-years
Date of Initiation: 01.05.1996
Date of Completion: 30.04.1999
Location of Scheme: University of Agriculture, Faisalabad.
Principal Investigator: Dr. Hafiz Abdus Samad
Total Expenditure: Rs. 3,20,691/-

Main Objectives:

- To study the capability of buffalo follicular oocytes classified according to the cumulus cells to mature *in-vitro*.
- To study the effect of source of protein supplements (estrus cow serum/estrus buffalo serum/foetal calf serum) during *in-vitro* maturation.

- Capacitation of ejaculated buffalo bull semen in a defined medium and to document this achievement by *in-vitro* fertilization.
- Top culture fertilized oocytes to blastocyst stage.
- To obtain pregnancy resulting from buffalo oocytes matured, fertilized and cultured *in-vitro* and transferred non-surgically to the recipient buffaloes.

Summary of work done:

The study was planned to investigate the recovery, in vitro maturation, and fertilization of oocytes obtained from the ovaries of slaughtered buffaloes. The ovaries were collected immediately after the slaughter from a local abattoir in a thermos containing physiological saline solution, with added antibiotics, at body temperature (37°C). For the recovery of oocytes, three methods were employed i.e. aspiration, puncture, and scoring. It was observed that scoring method yielded significantly greater number of morphologically good oocytes than puncture & aspiration methods. Four types of serum protein supplements including estrus cow serum (ECS), estrus buffalo serum (EBS), pro estrus buffalo serum (PrBS) and post estrus buffalo serum (PtBS) were added to TCM-199 and evaluated their effect on in vitro maturation & fertilization of buffalo follicular oocytes. Results revealed that maturation & fertilization/cleavage rates in ECS, EBS & PrBS were equally good whereas PtBS gave significantly lower maturation and fertilization /cleavage rate.

The effect of different media on in vitro maturation, fertilization and embryonic development (8-cell stage) of oocytes was also investigated. The maturation media i.e. tissue culture medium (TCM-199) Bovine synthetic follicular fluid (BSFF) and Hams F-10 were found to be equally good, for the purpose.

Project No: S-PCCC/Agr (183)
Project Title: Breeding for Glandless Cotton.

Duration:	3-years
Date of Initiation:	07.05.1996
Date of Completion:	06.05.1999
Location of Scheme:	Central Cotton Research Institute, Sakrand.
Principal Investigator:	Mr. Abdul Razaque Soomro
Total Expenditure:	Rs. 2,51,029/-

Main Objectives:

- To address the problem of gossypol glands present in cotton seed which are toxic to human & animal health.
- To develop glandless (gossypol-free) variety of cotton.

Summary of work done:

To develop glandless cotton, hybridization programme was initiated during August-September, 1996. Twelve exotic lines were kept as female parent while CRIS-133 and CRIS-134 were used as pollinators to induce high yield, early maturity, heat resistance, high ginning out turn percentage from these pollinators. The successful bolls from thirty cross combinations were picked, ginned and sown as F1 alongwith their respective parents. Unfortunately, out of thirty combinations only seven germinated due to low germination percentage of the combinations and the rains. The single plant selection were made and 14 single plant progenies were picked and sown as F2 generation in greenhouse up to May,1998. Then the open bolls were picked to raise F3 generation during the month of June, 1998.

Fresh crosses between cotton leaf curl virus cultivars (female parent) and exotic glandless lines (male parent) were also attempted in 21 cross combinations. However, the successful bolls were harvested in 11 combinations. From these eleven cross combinations, 35 single plant progenies were selected and sown alongwith two commercial checks.

Due to limited space in greenhouse only five combinations were raised as F2. The bolls from these combinations were picked and sown as F3. Single plant selection for high yield and glandless cotton were made. Cotton seed of glandless cotton varieties developed by CRI, Sakrand were sent to Pakistan Institute of Cotton Research & Technology, Karachi for checking its quality for use in human as well as dairy food. Unfortunately, the equipment used for gossypol determination was out of order hence, the results could not be received. One research paper based on the results of above study has been submitted for publication in a National Journal.

Project No: S-KU/Agr (184)
Project Title: Investigation on the Diseases of Betelvine and their Control.

Duration: 3-years
Date of Initiation: 15.06.1996
Date of Completion: 14.06.1999
Location of Scheme: University of Karachi, Karachi.
Principal Investigator: Dr. Saleem Shahzad

Total Expenditure: Rs. 3,46,792/-

Main Objectives:

- To develop a simple, cheap and effective method of controlling the diseases of betelvine by a judicious use of chemicals, biological antagonists and cultural practices alone or in combination.

Summary of work done:

The study was undertaken to find out the occurrence & control of diseases of betelvine in Pakistan.

A survey of Betelvine fields in Karachi and Thatta districts of Sindh and Hub area of Balochistan was carried out during June 1996 to July 1999. As a result of this survey 41 species belonging to 25 genera of fungi, and 12 species belonging to 10 genera of plant parasites and nematodes were isolated and identified. Among the fungi isolated, 28 appear to be new record on betelvine in Pakistan, similarly nine nematodes genera. viz., *Aphelenchoides*, *Aphelenchus*, *Helicotylenchus*, *Hoplolaimus*, *Longidorus*, *Pratylenchus*, *Rotylenchulus*, *Tylenchorhynchus* and *Xiphinema* appeared to be new records on Betelvine in Pakistan.

It was observed that use of benomyl or topsin-M showed significant reduction in leaf spot and anthracnose diseases whereas, furadan was found effective in the control of root-knot nematode. Soil treatment with furadan and spray of benomyl or topsin-M on plants reduced root rot and root knot diseases and yields were also increased.

Application of various microbial antagonists, *Paecilomyces lilacinus*, *Penicillium sp.*, *Trichoderma harzianum*, *T. Koningii*, *T. viride*, *Bacillus subtilis*, *Bradyrhizobium Japonicum*, and *Rhizobium meliloti* inhibited growth of *F. solani*, *F. sporotrichoides*, *R. Solani* and *M. Phaseolina*. Soil application of rice grown culture of *P. lilacinus* provided significant decrease in nematode and fungal infection resulting in increased yield.

It is suggested that change in cultural practices can also reduce the severity of disease but until a model farm is developed for demonstration of the effect of different cultural practices, the farmers may use the conventional methods of cultivation, fertilization and irrigation.

Project No: P-AU/Agr(195)
Project Title: Electrophoretic Identification of Pakistani Wheat for Gliadin and HMW Glutenin Subunit Composition and their Relationship with End Use Quality.

Duration: 2-years

Date of Initiation: 15.07.1997

Date of Completion: 14.07.1999

Location of Scheme: University of Agriculture, Faisalabad.

Principal Investigator: Dr. Javed Aziz Awan

Total Expenditure: Rs. 1,60,301/-

Main Objectives:

- To find out the correlation between high molecular weight (HMW) glutenin subunit with baking products especially, bread and chappati properties by establishing electrophoretic identification procedure based on gliadin bands.
- To find out the environmental influence on electrophoretic identification pattern and other quality parameters.
- To provide the information to the wheat breeders for screening good quality wheat in early generations based on identification correlation.
- To establish electrophoretic pattern for each Pakistani wheat variety which will stop theft of breeding material.
- To enable breeders to correlate/screen their material in early generations for good quality and to revise their breeding programme for quality improvement.

Summary of work done:

The study was undertaken on promising wheat varieties grown at Wheat Research Institute, Faisalabad for two consecutive crop years i.e. 1995-96 and 1996-97. Research work was carried out on chemical, physical, rheological and electrophoretic properties of wheat cultivars. Moreover, high molecular weight glutenin composition was also determined by SDS-PAGE electrophoresis and HMW glutenin subunits were identified by comparing with standard samples of known bands. Amino acid profile with special reference to essential amino acids was estimated in each wheat variety by using high speed amino acid Analyzer. Based on the above characteristics, various wheat cultivars were evaluated for their use in chappati making and baking.

Results revealed that different characteristics of chappati like color and appearance are effected due to wheat cultivars and interaction of cultivars over years. Total chappati scores were found to be highest in Rohtas-90, LU-26 and Faisalabad-85 respectively. With regard to cookies, total cookie scores were found to be highest in Pb-96 and Faisalabad-83. Therefore, these varieties are recommended for cookie preparation and other bakery items. Furthermore, it was investigated that presence of gliadin and HMW glutenin subunits in different cultivars were not effected by growth conditions, location, climatic conditions and crop years.

Project No: S-KU/Bio(193)
Project Title: Use of Rhizobia in the Integrated Control of Root Rot Diseases of Crop Plants.

Duration: 3-Years
Date of Initiation: 15-06-1996
Date of Completion: 14-06-1999
Location of Scheme: University of Karachi, Karachi.
Principal Investigator: Dr. Ehteshamul-Haque
Total Expenditure: Rs. 4,05,315/-

Main Objectives:

- To control the root rot disease and minimize pesticide use.
- To use rhizobia for field application as bio-pesticide.
- To increase crop productivity.

Summary of work done:

The study undertaken during June 1996 – May 1999, aimed at controlling the root rot diseases to minimize the over-use of chemical pesticides by using rhizobia for field applications as bio-pesticides.

Thirty nine rhizobial strains, either obtained from culture collection or isolated from root nodules of leguminous plants when tested in-vitro, showed growth inhibition of root infecting fungi. In dual plate culture assay, rhizobial strains showed variability in antagonistic activity against root infecting fungi. *R. meliloti* and *bradyrhizobium Sp.* inhibited the growth of all test fungi viz, *Macrophomina phaseolina F. solani* & *F. Oxysporum*. Results revealed that culture of rhizobial strains (KUCC 569), *Bradyrhizobim Sp.*(KUCC 821, KUCC 820, KUCC 823 & KUCC 840), *R.trifolii* (KUCC 842 & KUCC 843) and *R. meliloti* (KUCC 845) used as seed dressing or as soil drench significantly suppressed root infection caused by *R. solani* and *F. solani* on Mungbean & Sunflower with improvement on plant growth. It has been observed that use of rhizobia with *Pseudomonas aeruginosa*, the plant growth promoting rhizobacterium showed better control of *M. phaseolina* and *F. solani* infection on Soybean and Mashbean than either used alone. Moreover, use of rhizobia with urea or potash showed better control of infection on Mungbean as compared to rhizobia used alone.

Moreover, Soil amendments with brown seaweeds, green seaweeds and other plants viz, *Prosopis cinerarea* and *Datura fastuosa* at the rate of 1% w/w used alone or with either

fungicide benlate or *Badyrhizobium Sp.* significantly reduced *M. phaseolina*, *F. solani* and *R. solani* infection in chickpea with enhancement in plant growth. It is therefore, suggested that rhizobia with organic amendments can be used in the integrated control of root rot diseases of crop plants.

Project No: S-SU/Bio(198)
Project Title: Acrididae of the Punjab.

Duration: 3-years
Date of Initiation: 01-01-1995
Date of Completion: 31-12-1997
Location of Scheme: University of Sindh, Jamshoro.
Principal Investigator: Dr. Muhammad Saeed Wagan
Total Expenditure: Rs. 3,73,475/-
Main Objectives: To enrich the knowledge about the *Acrididae* (grasshopper fauna), a number of species of which constitute the pests of agriculture.

Summary of work done:

The present study was undertaken to update the knowledge about Acrididae of the Punjab. The work was carried out on taxonomy, distribution, incidence and important host plants of grasshoppers found in different areas of Punjab. The grasshoppers were collected from various districts of Punjab, such as, semi-deserts, semi-mountainous, agricultural lands and mountains with vegetation of crops, grasses, herbs and shrubs. A total of 58 species were collected. Out of these 20 belong to *Locustinae*, 10 to *Gomphogerinae*, 7 to *Eyrepconemidinae*, 5 to *Acridinae*, 4 to *Oxyinae*, 3 to *Cyrtacanthacridinae*, 2 each to *Euthyminae*, *Hemiacridinae* *Calopteninae* and *Truxalinae*, 1 each to *Dericorythinae*, *Tripclidopolinae* and *Catantopinae*. whereas 5 species were new, namely, *Ochrilidae jagoi*, *O. muzzaferi*, *Sphingonotus akbari*, *S. hussaini* and *Aulocobothrus punjabensis*. Eight species were recorded for the first time from this area. It has been observed that distribution of the previously recorded species has been extended to new localities. The description, synonymy, distributional gaps of various species studied are given in the report. A simplified taxonomic key, based on the sub families, genera and species is also presented.

Based on the above data, five research papers have been submitted for publication where as one Research Associate has completed his Ph. D thesis.

Project No: P-AU/Bio(238)
Project Title: The Potentials of Owls as Agents for Controlling Rats and Mice populations in Cultivations.

Duration: 3-Years
Date of Initiation: 01-07-1996
Date of Completion: 31-08-1999
Location of Scheme: University of Agriculture, Faisalabad.
Principal Investigator: Dr. Mirza Azhar Baig
Total Expenditure: Rs. 4,50,515/-
Main Objectives:

- To census the owl population in habitats located within or close to agro-ecosystems in Punjab.
- To estimate the size/composition of small mammal population in and around the selected habitats.
- To know about the composition of diet and prey choice of the owls.
- To collect information on roosting, nesting, breeding and foraging habitats of the owls.
- To find out which particular habitat changes would have favourable effect on demography and foraging efficiency of the owls in agro-ecosystem and formulate a strategy for using owls in controlling rats and mice in farmlands.

Summary of work done:

The main objective of the study was to assess the potential of owls in controlling mice and rats population in croplands. Information was gathered about the population status of barn owl and little spotted owl, their nesting, roosting, food and breeding as well as foraging habits. The research period was from July 1996 to June 1999.

Data from 47 localities in Faisalabad, Jhang, Okara, Sheikhpura and Hafizabad was collected. Wooden boxes were installed in trees to provide nests to owls. Cropland and non-cropland habitats were sampled through snap-trapping to know about abundance of small mammals. Prey preference and diversity indices for seasonal and locality samples of prey were assessed by examining the pellets. 3336 pellets of barn owl, when examined, showed that the house shrew was the primary prey, while rats, mice and bats were secondary preys. Examination of 745 pellets of the little spotted owlet revealed that insects, mice and birds were the chief components of their diet. Most of the nests and roosts of the barn owl were located in the tree hollows. They breed mainly during the winter & fall seasons. It is therefore, concluded that the owls can play some role in minimizing the use of rodenticides and preventing the loss of food energy from agro-ecosystems and preserving bio-diversity.

Based on the work done under this study, two research papers have been published whereas six research papers were presented at 18th & 19th Zoological Congress held at Lahore & Islamabad. Moreover, three research scholars got their M. Phil. Degrees whereas one student completed his M.Sc. thesis.

Project No: F-GU/Bio(247)
Project Title: Somaclonal Variations in Sugarcane through Tissue Culture and Subsequent Screening for Salt Tolerance.

Duration: 3-years

Date of Initiation: 15-06-1996

Date of Completion: 14-06-1999

Location of Scheme: Gomal University, Dera Ismail Khan.

Principal Investigator: Dr. Hamid-Ullah Khan

Total Expenditure: Rs. 3,61,844/-

Main Objectives:

- Development of efficient & reproducible tissue culture technology for local cultivars of sugarcane.
- Establishment of in-vitro grown plants in greenhouse, their multiplication and final screening in salinized plots.

Summary of work done:

Since the Arid Zones of D. I. Khan (NWFP) have a great potential for growing agricultural crops and sugarcane is an important cash crop of the area, research was undertaken at Gomal University D.I. Khan during 1996 –1999, to develop suitable cultivars of sugarcane having salt tolerance properties. The use of tissue culture for creating somaclonal variation in plants for development of salt tolerance offer great advantages over other methods.

Methodology used included preparation of modified basal MS medium. Young leaves of high yielding cultivars of sugarcane were used as explants which were allowed to form callus under dark at 28°C. The pH of the medium was adjusted to 5.8 before autoclaving. The plantlets formed were hardened in jars containing sand and later on, these explants were transferred to pots with mixed soil. These somaclones were, then, taken to field and setts of well developed plants were allowed to germinate in saline sodic soils. Screening for salt tolerance revealed that it is better than source plants. Their performance for sett germination, number of tillers/plant stem height, number of nodes/stem internode shape & length, girth of stem and root band width and brix(%) were also better.

Results revealed that somaclones developed through tissue culture technology are multiplying in the field. Vigorous growth of somaclones in saline & sodic soils have proved that the somaclones can be grown on any saline soils of D. I. Khan.

Project No: F-PU/Chem (284)

Project Title: A Study on the Lubricity of Lubricating Oils Produced in Pakistan.

Duration: 2-years

Date of Initiation: 01-07-1997

Date of Completion: 30-06-1999

Location of Scheme: N.C.E in Physical Chemistry, University of Peshawar.

Principal Investigator: Dr. Ikram ul Haq

Total Expenditure: Rs.4,48,786/-

Main Objectives:

- To formulate an economical, energy saving, durable and efficient blend of lubricating oil for various purposes by using Pakistani base oil.
- To test different brands of lubricating oils of the same grades (API and GL levels) so that their quality levels could be ascertained within the same grades marketed by different companies in Pakistan.
- Recycling of oil.

Summary of work done:

The aim of this project was to carry out a systematic study of the anti-wear properties of Pakistani base oils in the absence and presence of various types of additives under different conditions of machine operation and compare them with the imported blends available in the market and to formulate an economical, energy saving, durable and efficient blends for various purposes by using Pakistani base oils.

Anti-wear performance of engine oils of various brands were evaluated under different experimental conditions, such as applied load, speed, etc. Four-ball machine was employed as wear tester. Different trends in the anti wear performance were studied under conditions of machine operation.

Under this study anti wear performance of six different grades of base oils designated as MVI-B/S, HVI-B/S, MVI-650, HVI-400 and HVI-100, obtained from the National Refinery Limited Karachi, was carried out in the absence and presence of different types of anti wear additives. Results pointed out the complex role of the composition of the lube oil in the over all performance.

It has been concluded from the study that viscosity and VI values of as-received engine oils did not follow the same order. Similarly the viscosity and anti-wear performance of engine oils also did not follow the same order. These results pointed out the fact that it is not the high viscosity but the nature and amount of anti-wear additives, which impart anti-wear characteristics to the lubricating oils.

The results of the study provide a guideline for the formulation of blends of lube oil with improved performance for specific purposes.

Project No: F-PU/Chem (315)
Project Title: Ion Exchange Properties of Metal (III) Phosphates.

Duration:	2-years
Date of Initiation:	01-12-1997
Date of Completion:	30-11-1999
Location of Scheme:	N.C.E. in Physical Chemistry, University of Peshawar.
Principal Investigator:	Dr. S. Mustafa
Total Expenditure:	Rs.2,92,254/-

Main Objectives.

- To determine the changes in the properties i.e. zero charge, surface dissociation and complexation, crystallinity and phase changes of different metal (III) phosphates at different pH and temperatures of the system.
- To determine the ion exchange capacity of the metal ions on metal (III) phosphates as a function of pH, temperature and concentration of metal ions. Metal (III) phosphates as ion exchangers may have a greater utility compared to the well known metal (IV) phosphates.

Summary of work done:

The aim of this study was to investigate the sorption properties of the metal (III) phosphates towards the metal ions under different experimental conditions of temperature, concentrations and pH of the system etc. During the investigations three samples of metal (III) phosphate, i.e. AlPO_4 , CrPO_4 , and FePO_4 were synthesized in the laboratory and characterized by using different physiochemical techniques. The samples were then subjected to potentiometric titration studies, sorption studies in the presence of various ions, desorption of Zn^{2+} studies and spectroscopic studies.

The investigations have revealed that all the three metal (III) phosphates have appreciable exchange capacities towards the metal cations and can be used as scavengers for these metal cations in both the acidic and alkaline solutions. Furthermore, all the three metal phosphates were highly selective toward the Pb^{2+} ion being one of the well-known pollutants especially in the road side of our country. The study thus confirmed the ion exchange behaviour of the metal (III) phosphates like their counter parts ZrP and TiP and other insoluble solid materials. As such they may find their use in water softening and deionization, in the separation and isolation of actinides, radioisotopes, divalent and monovalent ions in industries. They may be used for reducing the corrosions of metal and alloys.

During the report period, two papers have been published in International journals. Whereas two more papers from the data of this project are under preparation.

Project No: C-FGC/Chem (323)
Project Title: Synthesis of Neurotensin Mimics.

Duration: 1-year

Date of Initiation: 01-08-1998

Date of Completion: 31-07-1999

Location of Scheme: Federal Govt. Post-graduate College (Men), Islamabad.

Principal Investigator: Dr. Javid Hussain Zaidi

Total Expenditure: Rs.2,59,221/-

Main Objectives:

- To synthesize the mimics of Neurotensin and their pharmacological testing for designing drug for the treatment of Alzheimer's and Parkinson's diseases.

Summary of work done:

The project aimed at synthesizing (i) analog(s) more potent than mimic2 and (ii) completely non-peptidic NT mimetic 3 & 4. The project also aimed at the pharmacological testing of the synthesized compounds for drug designing for the treatment of Alzheimer's and Parkinson's disease.

In present studies two new compounds labeled as mimic3 and mimic4 have been synthesized. Both these compounds are non-peptidic. Their biological studies have shown that they are ten times more potent than mimic2. Another compound labeled as mimic5 has also been synthesized. It has methoxy group in the indole ring. Its biological investigation is still under investigation. The investigators, however, hope that it would prove to be more potent than mimic 3 and 4 because of the presence of methoxy group which is electron donating.

Two research papers have been prepared and presented at 10th National Science Conference held at Islamabad and 8th International Symposium on "Natural Products" held at Karachi.

Project No: C-PARC/Envr(37)

Project Title: Economically Important Plant Species of Cholistan Desert.

Duration: 1-year

Date of Initiation: 15-09-1998

Date of Completion: 14-09-1999

Location of Scheme: National Agricultural Research Center, Islamabad.

Principal Investigator: Dr. Ghulam Akbar

Total Expenditure: Rs.1,27,716/-

Main Objectives.

- To generate awareness about ecologically and economically important plant species of Cholistan desert among students, general public, pharmaceutical and plant scientists for their long term preservation and exploitation on sustainable basis.

Summary of work done:

During the report period, two field trips were undertaken to collect the economically important plant species of Cholistan desert. A total of 1600 plant species were collected. The collected plant material was dried, pressed, preserved and identified for further detailed studies and establishment of herbaria at PMNH and NARC, Islamabad. Out of that, 25 plant species belonging to different families have been fully described. The report presents an overview of the Cholistan desert and its biophysical resources.

Project No:	C-PINST/Med(172)
Project Title:	Clinical Application of ^{13}C Urea Breath Test for Diagnosis of <i>Helicobacter pylori</i> Infection and Confirmation of Eradication Following Therapy.
Duration:	2-years
Date of Initiation:	01.06.1998
Date of Completion:	31.05.2000
Location of Scheme:	Pakistan Institute of Nuclear Science & Technology, (PINSTECH), Islamabad.
Principal Investigator:	Dr. Rakhshanda Bilal
Total Expenditure:	Rs. 2,80,006/-
Main Objectives:	<ul style="list-style-type: none">• To introduce the ^{13}C UBT for clinical use.• To confirm eradication of <i>H. Pylori</i> Following Drug therapy by non-invasive method as is done in Western Countries.• To Determine the sensitivity and specificity of non-invasive Urea Breath Test.• To determine the cost effectiveness UBT as compared to the conventional tests.

Summary of work done:

The study aimed at introducing the ^{13}C Urea Breath Test (UBT) in clinical setting for initial diagnosis as well as for confirmation of eradication of *Helicobacter pylori* following therapy by determining the sensitivity, specificity and cost effectiveness of UBT as compared to other conventional tests. During the study *Helicobacter pylori* status of 209 patients was checked by ^{13}C urea breath test (137 initial diagnosis and 72 follow up patients). Besides, ^{13}C -UBT, culture, histology and quick urease on biopsy specimen, obtained during upper gastrointestinal

endoscopy was also performed for 122 patients. Out of 137 initially diagnosed, 10 patients underwent two or more follow-ups. The patients found positive at initial diagnosis were treated with different antibiotic regimes. The patients after four weeks of completion of treatment were subjected to repeated ^{13}C -UBT for confirmation of eradication of *H.Pylori*. In follow up UBT, 27 patients became negative after treatment, whereas 7 were lost to follow-up. Patients testing positive at follow-up UBT, underwent further treatment.

Several treatment regimes were used for eradication of *Helicobacter pylori* infection. The data when compiled show that none had an eradication rate of more than 50% when follow-up assessments were made.

At the time of initial diagnosis, the patients were assessed simultaneously with ^{13}C -UBT alongwith culture, Clo and histopathology. The study results show that out of 137 initially diagnosed 80 were found positive by ^{13}C -UBT, 72 by HP, 48 by culture and 69 by Clo. Comparing the diagnostic techniques it has been observed that ^{13}C -UBT was most sensitive followed by histopathology, quick urease and culture in descending order.

The comparison and cost effectiveness of all diagnostic tests was also made. The cost of individual tests requiring biopsy specimen will amount to Rs. 2250/-, whereas, total cost of Urea Breath Test alone is around Rs. 1000/-. The ^{13}C -UBT has the advantage of being a field test and can be performed anywhere.

Incidence of *Helicobacter pylori* in gastroduodenal disease was also studied. The data collected suggest that *Helicobacter pylori* is associated with gastric, duodenal ulcers as well as gastritis and duodenitis. It can be concluded from the study results conducted so far that ^{13}C Urea breath test is very sensitive and useful, especially for confirmation of eradication following therapy.

One Research paper was presented in a National Conference.

Project No:	P-PU/Phys (94)
Project Title:	Theoretical/Computational Studies of Fractals in Materials.
Duration:	3-years
Date of Initiation:	01.06.1996
Date of Completion:	31.05.1999
Location of Scheme:	University of the Punjab, Lahore.
Principal Investigator:	Dr. Nazma Ikram
Total Expenditure:	Rs.3,39,588/-

Main Objectives.

- To study a model which simulates the propagation of fracture.
- To use the fractal dimension as a parameter for quantitative fractalography.
- To apply fractal structures to the development of high toughness materials.
- To highlight the problems in the recent studies undertaken on this subject and to show the applications of fractals to fractures in materials.

Summary of work done:

The industrial importance of adhesives is constantly increasing, yet it is difficult to systematize the vast amount of practical knowledge emerging from chemistry, interfacial physics & mechanics. The present study was proposed to bridge the gap between polymer science & fracture mechanics.

Under this project, a relation for fracture strength of porous solid or random network near the percolation threshold, was developed. Moreover a new view point for the location velocity exponent based on the iteration model of dislocation regeneration process was established. Results indicate that there is a relationship between dislocation velocity exponent and dislocation regeneration dynamic bifurcation with the characteristics in plastic deformation process of materials. The spiraling self avoiding lattice walk in a random environment was studied. The average size of an N-step walk is asymptotically proportional to $\sqrt{N \log N}$ with a coefficient, which increased with disorder. A phase transition appears after scaling the temperature appropriately with system size. In the low-temperature phase the walk segment occupy a few low energy positions while in the high temperature phase they are effectively free. An analogy with the Random Energy Model was pointed out. The model also allows for a spinglass interpretation. The pair varies chaotically with temperature both above and below the critical point.

Furthermore, the researchers have proposed a model for transport properties of natural porous media at low saturation of wetting phase i.e. when the total wetting phase saturation is the sum of thin films and pendular structure inventories.

A differential equation for diffusion in isotropic and homogenous fractal structures was derived within the context of Fractional Calculus. The asymptotic behavior of the probability density function was exactly obtained. Also modeling of the transport properties of natural porous media at low saturation of a wetting phase was done.

As a result of this, one research paper has been published whereas eight (8) papers have been submitted for publication in the National & International Journals of repute. Moreover, a book written by the Principal Investigator on this topic has been accepted by the National Book Foundation. Three M.Phil degrees have been awarded on the basis of the project work.

Project No: P-PU/Phys (99)
Project Title: Analytical Investigation of non-linear waves in Semi Conductor Superlattice Plasmas.

Duration: 3-years

Date of Initiation: 01.11.1995

Date of Completion: 31.10.1998

Location of Scheme: Centre for Solid State Physics, University of the Punjab, Lahore.

Principal Investigator: Dr. H. A. Shah

Total Expenditure: Rs.2,43,820/-

Main Objectives: The main objectives of the project were to investigate the following:

- Propagation of solutions for different waves in piezoelectric and ordinary superlattice semiconductors.
- Modulational instabilities and thresholds of these instabilities in superlattice and semiconductors.
- Non-linear parametric processes

Raman, Brillouin and decay scattering processes in such systems.

Summary of work done:

This project was proposed to investigate the wave propagation in semi-conductor layered structures (or so called superlattices). The first problem to be studied was on parametric instabilities of nonlinear waves in a sinusoidal periodic piezoelectric semiconductor structure. Various techniques were used to model a periodic structure/medium. A periodically modulated medium (sinusoidal) was used which was considered to be analogous with the well known Kronig-Penney Model.

Another problem studied under this project was related to Solitons. The propagation of helicon solutions in a semiconductor superlattice plasma was investigated. The nonlinear evolution equations governing the propagation of these solitons is the set of Zakharov equations. The dependence of the nonlinear Bloch wave number on the propagation frequency were numerically investigated and a propagation band and gap structure for the helicon solution in a semiconductor superlattice plasma has been established. A problem which describe the possible electron heating in the solar wind via the dissipation of obliquely propagating whistler waves was also studied.

Finally, density-wave propagation in a high temperature super-conducting medium consisting of a finite number of layers was studied. An electromagnetic wave interacts with super-conducting electrons to set up charge-density gradients within the super conducting electron plasma. London equations and a two fluid approach was used to investigate the wave behavior in the layered structure, by deriving a dispersion relation. It is shown that the electromagnetic wave dissipates in the layered super conducting medium. The dependence of the complex Bloch-wave number on the propagation frequency using the standard boundary conditions was numerically investigated. Expressions of reflectivity and transmissivity were derived for a periodic layered structure consisting of a finite number of super-conducting layers.

As a result of this study one research paper has been published in an International Journal, one paper has been presented in a conference whereas two papers have been submitted for publication in National/International journals. In addition to this, one Ph.D. thesis based on the project work has been completed.

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. During the report period 41 research papers were published in National and International journals or presented in National/ International Conferences/Symposia. A list of these papers is placed at Annexure-IV.

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 will result strengthening of R&D infrastructure of various scientific organizations. In order to achieve this goal, the PSF has been encouraging scientific manpower, through its research projects. For this purpose Research Associates are provided in the projects, who are required to register for Ph. D or M. Phil. During the report period 8 M. Phil, 4 Ph. D and 3 M.Sc degrees were awarded to research workers under PSF funded projects in the fields of Agriculture, Biology, Chemistry, Physics, Medical and Environment.

List of the scholars who obtained the degrees is given below:

S. No.	Name	Degree	Project No.
1.	Muhammad Ijaz Qadeer	M.sc	P-AU/Agr(175)
2.	Ahmed Raza Rizvi	M.sc	P-AU/Agr(175)
3.	Ishtiaq Ahmad	Ph. D	P-PDC/Agr(151)

4.	Mahmood-ul-Hassan	M.Phil	P-AU/Bio(238)
5.	H. Ali	M.Phil	P-AU/Bio(238)
6.	M. T. Iqbal	M.Phil	P-AU/Bio(238)
7.	G.M. Rashid	M.Sc.	P-AU/Bio(238)
8.	Mr. Kausar Iqbal	Ph. D	F-PU/Chem (284)
9.	Rashid Ali	Ph. D	F-PU/Chem (284)
10.	Syed Murtaza Hussain	Ph. D	PU/Chem (315)
11.	Mrs. Shams-un-Nisa	M. Phil	PU/Chem (315)
12.	Mr. Rashid Iqbal	M. Phil	P-P/Phys (99)
13.	R. Ahmed	M. Phil	P-PU/Phys(94)
14.	R. Mazhar	M. Phil	P-PU/Phys(94)
15.	N. Hussain	M. Phil	P-PU/Phys(94)

3. OTHER RESEARCH SUPPORT PROGRAMMES

Technology Development Research Projects:

The Technology Development Research Projects Programme was approved by the National Commission for Science & Technology (NCST). The basic idea was to strengthen R&D institutions and promote technological activity in the country for achieving socio-economic self-reliance. The responsibility of coordinating the projects was assigned to Pakistan Science Foundation and a cell was set up for the purpose. The pre-proposals of technology development projects were invited from scientists, industrialists, engineers, etc., through an advertisement in the press in fifteen different fields, namely, Agriculture, Biotechnology, Chemical Technology, Communication, Electronics, Energy, Engineering, Environmental Technology, Food Technology, Information Technology, Material Sciences, Medical Technology, Pharmaceuticals, Small Industry, and Textiles. A proforma was designed for submission of the pre-proposals which is available on PSF web site. A total of 815 project pre-proposals were received. All the pre-proposals were reviewed by the subject experts. Out of these 281 pre-proposals passed the first review and their detailed proposals have been invited.

Review Committees have been constituted by the approval of the Minister for Science & Technology for evaluation of technology development projects and it is planned to convene meetings of these review committees during October, 2000. The projects selected in this phase will be forwarded to the Science Board of the Ministry, for final approval.

4. 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. 0.485 million were released to the following Scientific Societies and Journals during the year 1999-2000.

Name of Society/Association/ Journal	Amount of Grant
1. Pakistan Academy of Sciences	Rs. 50,000/-
2. Pakistan Association of Scientists & Scientific Professions (PASSAP)	Rs. 30,000/-
3. Pakistan Association for the Advancement of Science	Rs. 30,000/-
4. Pakistan Medical Association, Centre	Rs. 15,000/-
5. Zoological Society of Pakistan	Rs. 40,000/-
6. Botanical Society of Pakistan	Rs. 40,000/-
7. Biological Society of Pakistan	Rs. 20,000/-
8. Pakistan Society of Biochemistry & Molecular Society	Rs. 25,000/-
9. Chemical Society of Pakistan	Rs. 30,000/-
10. Pakistan Society of Nematologists	Rs.20, 000/-
11. Pakistan Society for Semiconductor Science & Technology.	Rs.15, 000/-
12. Pakistan Thalassaemia Welfare Society	Rs. 25,000/-
13. Pakistan Phytopathological Society	Rs. 15,000/-
14. Society of Economic Geologists & Mineral Technologists	Rs. 20,000/-
15. Pakistan Society of Food Scientists and Technologists	Rs. 15,000/-
16. Pakistan Physiological Society	Rs. 10,000/-

PUBLICATIONS/JOURNALS

1. Mehran University Journal of Engineering. & Technology	Rs. 15,000/-
2. Pakistan Veterinary Journal	Rs. 20,000/-
3. Pakistan Oral & Dental Journal	Rs. 10,000/-
4. Pakistan Journal of Pharmaceutical Sciences	Rs. 15,000/-
5. Journal of Natural Science & Mathematics	Rs. 10,000/-
6. Journal of Pharmacology	Rs. 15,000/-

Total: **Rs. 4,85,000/-**

5. FUNDING FOR CONFERENCES/SEMINARS/SYMPOSIA/WORKSHOPS, ETC.

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 and during the report year, grants amounting to Rs. 0.397 million were

released to various Universities and/or R&D Organizations/Institutions for organizing National/International Conferences, Seminars, Symposia and/or Workshop etc. (Annexure-V).

6. TRAVEL GRANT

The Foundation provides travel grants to Pakistani scientists for their participation in international conferences, seminars, symposia etc. for presentation of their research findings at these international forums. However, this activity of the Foundation remained suspended during the report period due to ban imposed by the Govt. on utilization of GoP funds for travel abroad for participation in meetings, conferences, seminars etc.

7. SCIENTIST POOL

An amount of Rs.30,000/- was paid to The Nematological Research Centre, University of Karachi, on account of subsistence allowance to a PSF Placement Officer, working in the Centre.

8. INTERNATIONAL LIAISON

a) MOU with Royal Society London & National Natural Science Foundation of China

Pakistan Science Foundation has signed a Memorandum of Understanding (MoU) with Royal Society, London and National Natural Science Foundation of China for exchange of scientific visits. No visit could take place during the report period due to ban on utilization of GoP funds for visit abroad.

b) S&T Cooperation with Syria

Training of three Scientists from Atomic Energy Commission of Syria was arranged at various Institutes of Pakistan Atomic Energy Commission.

Expert visits of three Scientists from Pakistan Atomic Energy Commission was arranged to Atomic Energy Commission of Syria.

c) Exchange of Visits

Proposals for exchange of visits, S&T information and collaborative project with Austria, China, Egypt and several other countries were sent to the Ministry of Science and Technology. Out of these, a 3-person visit programme has since been approved. Action is being taken for its implementation.

9. PLANNING AND DEVELOPMENT WORK

- a) Following two development projects have been approved by Departmental Development Working Committee (DDWC) of the Ministry of Science and Technology.

- | | | |
|-----|---|-----------------|
| i. | Strengthening of PASTIC National Science Reference Library. | Rs.7.5 million |
| ii. | Collection and study of Biological and Geological Samples for Pakistan Museum of Natural History. | Rs.0.75 million |

Funds in the Public Sector Development Programme (PSDP), however, were not allocated during 1999-2000. Work on these project, therefore, could not be initiated.

- b) A PC-I of a development project entitled, Jhang Institute of Engineering Sciences and Technology costing Rs.99.231 million was submitted for Government approval. The same however, has not been approved so far.

II. SCIENCE POPULARIZATION SECTION

The importance of advancement in Science and Technology in the modern world can hardly be over-emphasized. No nation can truly develop or even exist without acquiring a very high standard of scientific and technological know-how. Pakistan Science Foundation is rendering valuable services for the popularization and promotion of science and technology in the country. The Foundation has taken up a number of programmes to popularize science in the community particularly among the students. These activities/programmes are detailed as under:

1. Science Caravan (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 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 the 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 Areas of the Country. These Caravan Units continued their activities throughout the report period & organized Science Exhibitions in schools within their jurisdiction.

a) Science Caravan (Balochistan Unit)

S.No.	Place of Exhibition	No. of Schools attended	Period
1.	Noshki & Kharan, and its surrounding	22	25 th Jan,2000 to 15 th Feb,2000
2.	Khuzdar.	08	17 th May,2000 to 1 st June,2000



Students visiting Science Caravan Exhibition



Students are briefed about Science Caravan Exhibition

b. Science Caravan(Federal Unit)

1.	S&T Fair at Sports Complex, Islamabad.		23 rd Sep,1999 to 1 st Nov,1999.
2.	Bhara Kahu.	16	1 st Dec,1999 to 21 st Dec,1999
3.	Malpur	17	1 st Feb,2000 to 15 th Feb,2000.
4.	Rawalpindi.	01	29 th Nov, 1999.

c. Science Caravan(NWFP Unit)

1.	Upper Dir	12	21 st June,1999 to 2 nd July,1999
2.	Kabal, Swat.	16	23 rd Sep,1999 to 5 th Oct,1999
3.	Gumbat, Kohat.	12	27 th Nov,1999 to 8 th Dec,1999
4.	Serai Naurange, District Laki Marwat.	25	20 th Jan,2000 to 5 th Feb,2000
5.	Charsadda.	20	18 th April,2000 to 4 th May 2000
6.	Abbottabad.	14	8 th June,2000 to 29 th June,2000

d. Science Caravan (Sindh Unit)

1.	Taluka Kandh Kot and Kashmore.	70	23 rd Aug,1999 to 16 th Oct, 1999
2.	Taluka Kandiari, District, Nowshero Feroze.	42	10 th Nov,1999 to 30 Nov,1999
3.	Taluka & District Nowshero Feroze.	24	4 th Jan, 2000 to 12 th Feb,2000
4.	District Sanghar.	16	3 rd April,2000 to 13 th April,2000
5.	Taluka Moro	20	17 th April,2000 to 6 th May,2000
6.	Bjoroa ,District Nowshero Feroze.	20	15 th May,2000 to 31 st May,2000

2. Science Exhibitions/Fairs

Various educational boards in the country are provided financial assistance by the Foundation for organizing Science Exhibition Contests/Competitions for the students of secondary schools and colleges. These exhibitions provide a forum for students to display their scientific gadgets / exhibits and initiates healthy competition in our youth, thus preparing them to face the challenges of 21st century.

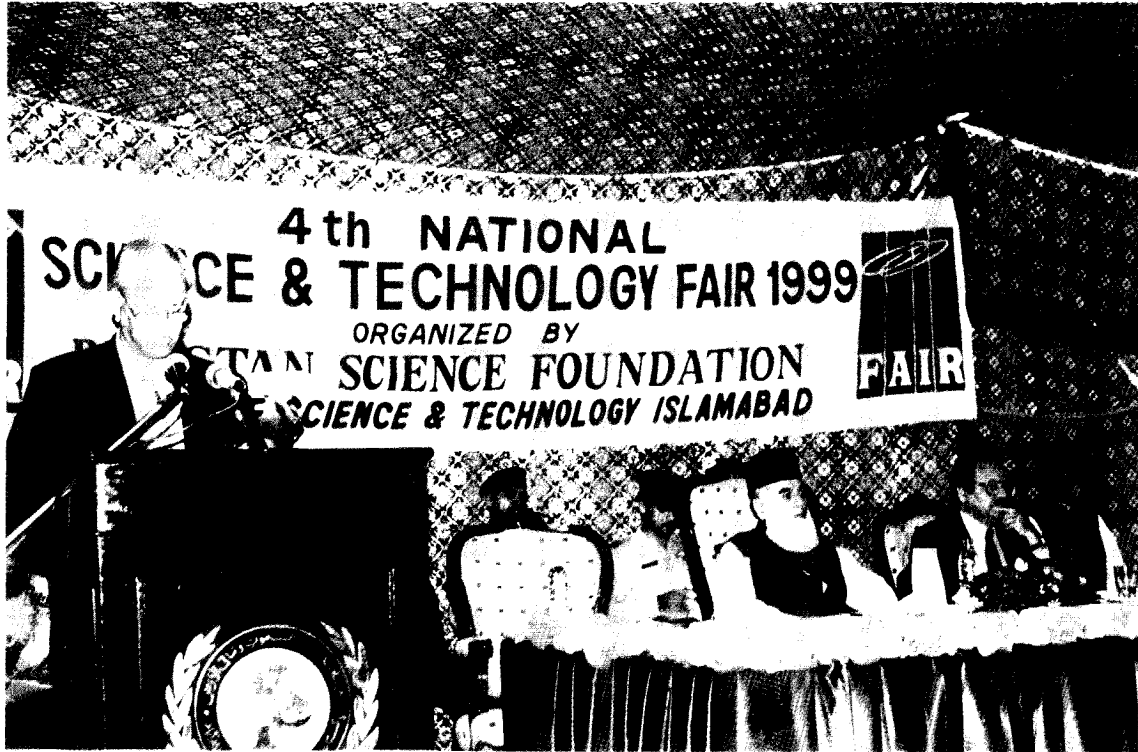
National Science and Technology Fair – 99

The importance of Science and Technology in the socioeconomic development of a nation is now universally recognized. There have been numerous instances in the world during the recent past which have clearly shown that those nations who have given priority to science education and research have become economically and militarily most powerful. The examples of Malaysia, Japan, China and South Korea can be cited in this regard. Pakistan, of course, is no exception to this general principle and thus it has been acknowledged by all concerned that Pakistan must pay special attention to the science and technology sector, if it has to meet the challenges of the present day world and enter into the 21st century with pride.

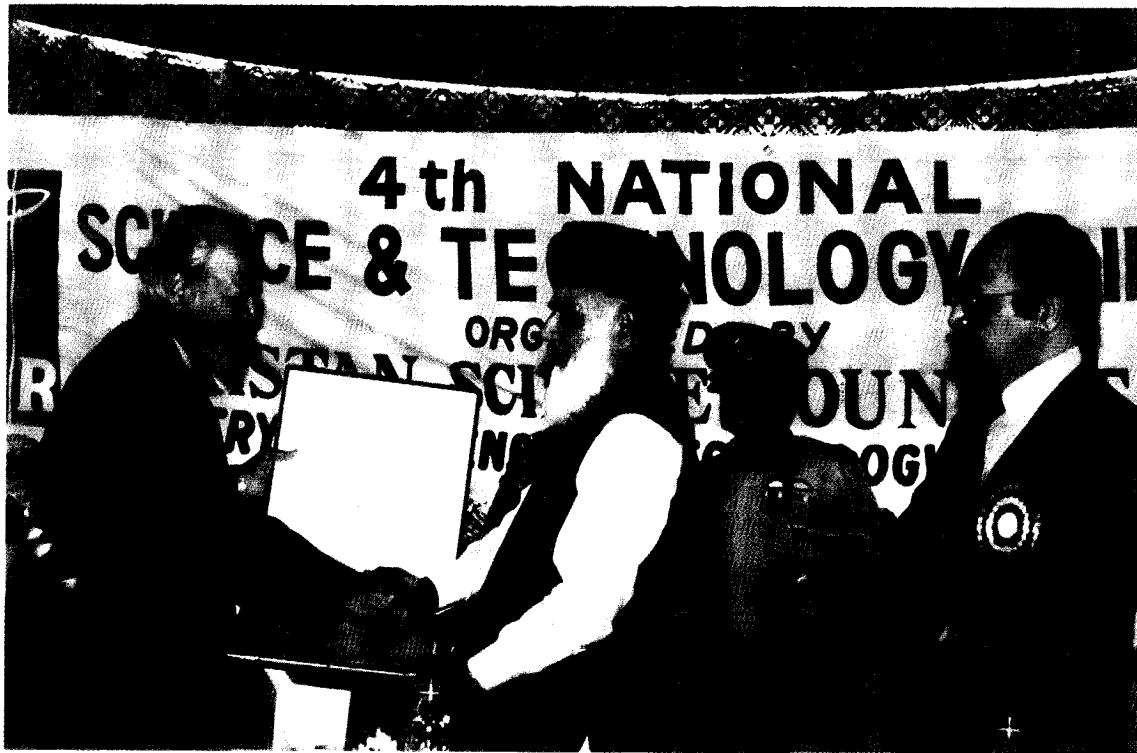
Pakistan Science Foundation (PSF) whose primary function is to support and coordinate scientific and technological research in the country, is quite aware to its responsibilities. This organization has also been given an additional mandate of popularization of science so that, general public especially the young students become more and more aware of the role science plays in our everyday life. One of the most powerful means through which science can be popularized is holding of Science Fairs. Such Fairs are held quite regularly by most of the countries of the world but more frequently in the developed world. All kinds of new scientific discoveries and achievements are displayed at such Fairs for the knowledge and understanding of the general public. This kind of interaction not only educates the citizens of the country but also helps in the generation of public support which is highly essential for science to prosper.

The “National Science and Technology Fair-99”, was organized by PSF at the Sports Complex, Islamabad from October 23 to November 1, 1999. The Fair was inaugurated by H.E. Muhammad Rafiq Tarar, President, Islamic Republic of Pakistan. The President in his inaugural address, appreciated the efforts of Pakistan Science Foundation for organizing such Fairs on regular basis. He lauded the hard work and ingenuity of Pakistani scientists and technologists in the creation of new products to raise the quality of life of masses and to create awareness among public to attain self-reliance in science & technology.

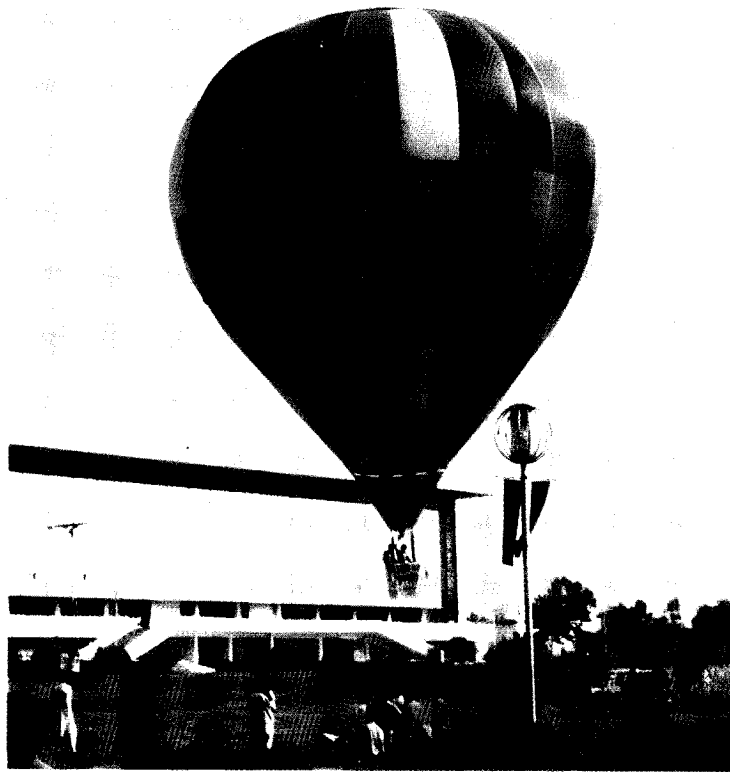
Thirty four (34) R&D organizations participated in the Fair and displayed their products. The outstanding shows were put up by Dr. A. Q. Khan Research Laboratories, Pakistan Atomic Energy Commission (PAEC), Pakistan Ordnance Factories (POF), Space & Upper Atmosphere Research Organization (SUPARCO) and Pakistan Railways. These stalls were selected as winners by a panel of judges, on the basis of decor, material and the way, the exhibits were explained to the public.



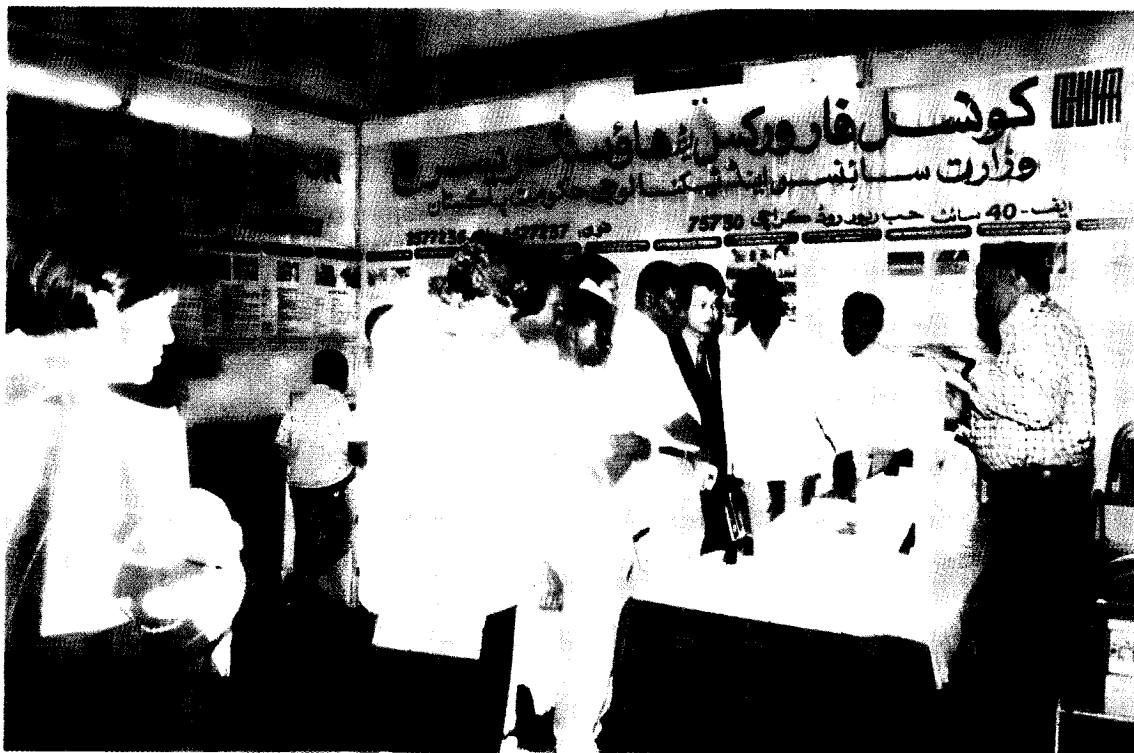
H.E: Muhammad Rafiq Tarar, President Islamic Republic of Pakistan
Presiding over the Inaugural Ceremony.



The Chairman, PSF presenting the crest of the Fair to the Chief Guest,
H.E. Muhammad Rafiq Tarar, President Islamic Republic of Pakistan



A demonstration of Hot Air Ballooning on the occasion of S&T Fair



Foreign delegates visiting S&T Fair



A group of students at the Fair-99



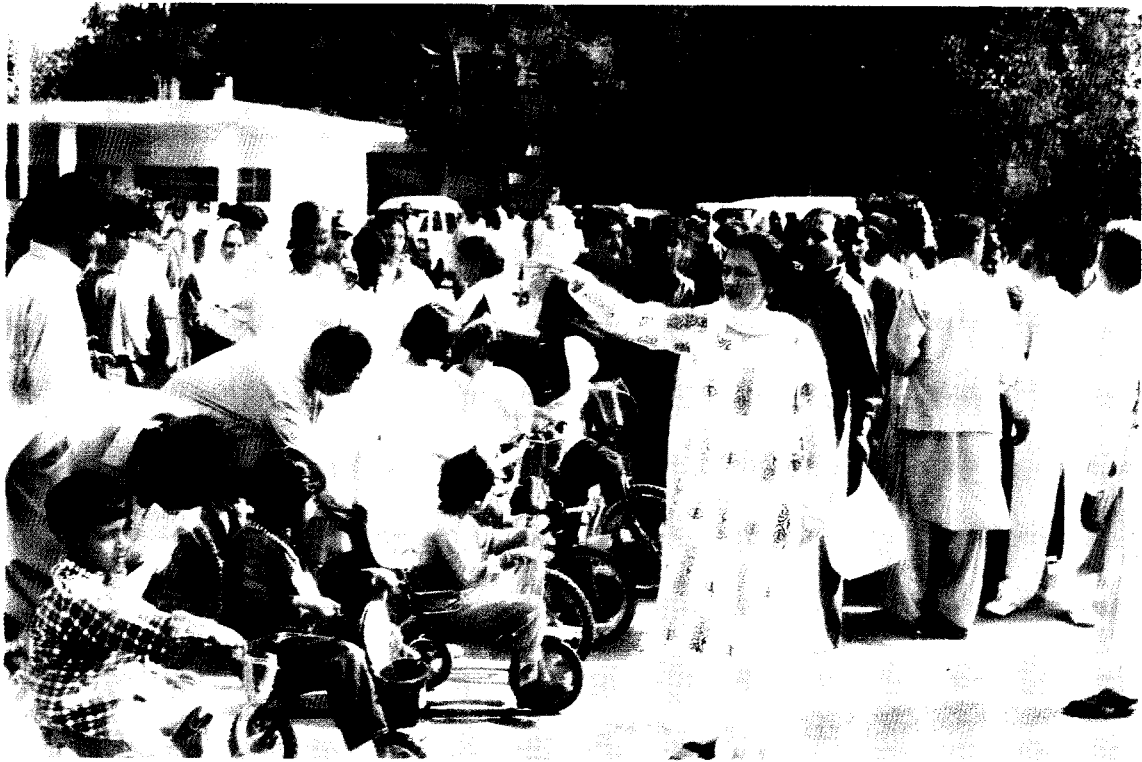
A general view of S&T Fair-99



President of Pakistan visiting a stall of PAEC



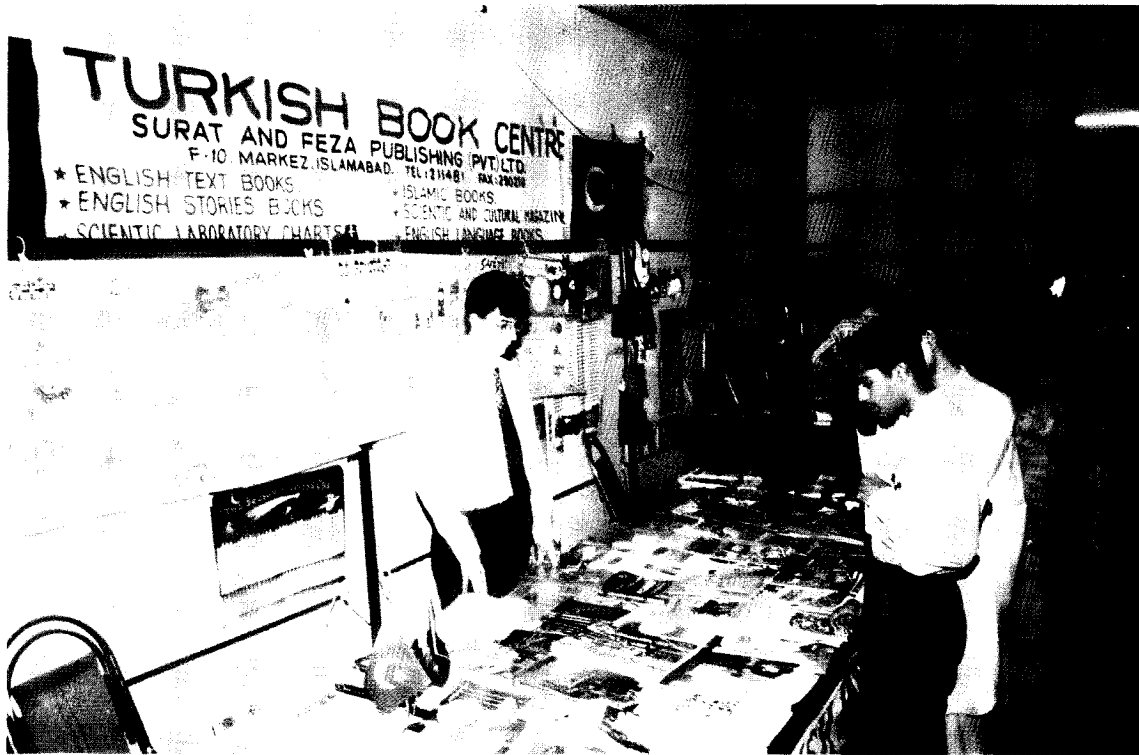
Students visiting S&T Fair



Starting point of Cycle Race for Children



Participants ready for Cycle Race



A view of Book Exhibition on the occasion of S&T Fair



Students at one of the stalls of the Book Exhibition



A view of the public gathering at the starting point of the Walk for Science



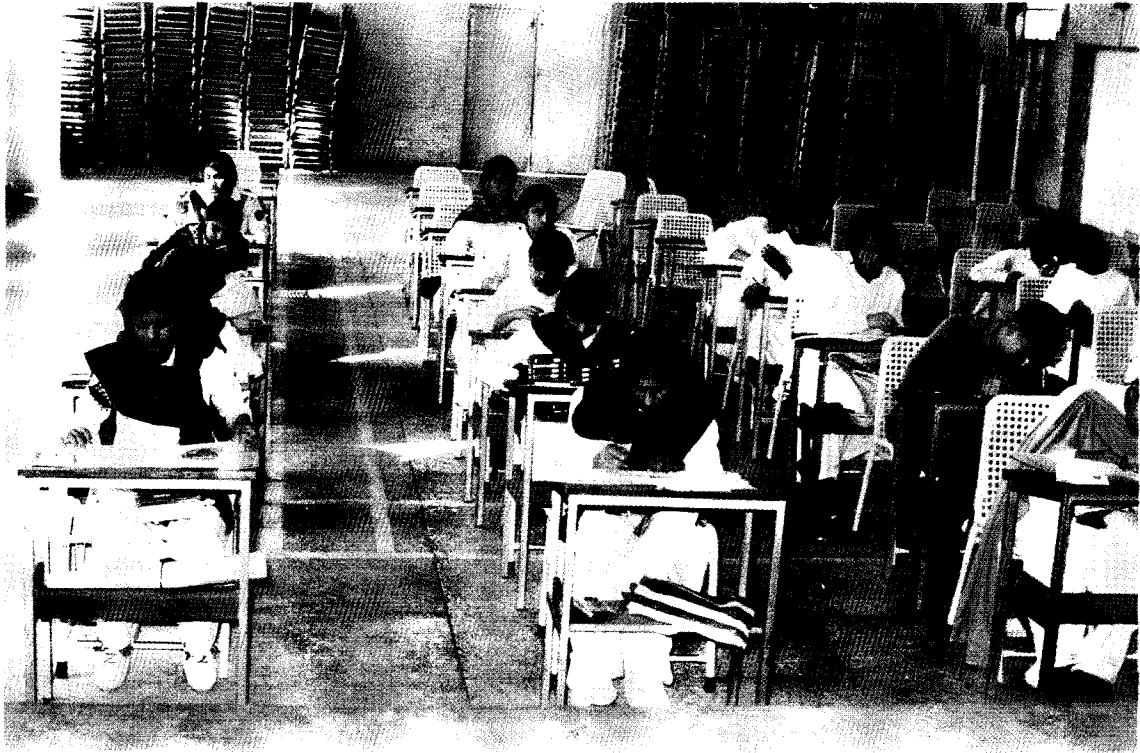
A view of the participants of the Walk for Science



Visitors on the stalls at the occasion of Computer Exhibition



Secretary MoST, Chairman PSF, Director General PASTIC at Computer Exhibition



Contestants of Art Competition at work



Director General PMNH and other Judges evaluating S&T Art Competition paintings made by children

The Fair attracted a large number of people including students who took deep interest in the exhibits and asked probing and intelligent questions, which were responded by the scientists with great patience, pride and persistence.

In addition to the main Fair, a large number of collateral activities were also held as a part of the Fair. As many as, eight programmes/events were organized during the Fair.

Bicycle Race for Science was organized on 17th October, 1999. This event was totally sponsored by the Private Sector. The sponsoring organizations/persons donated valuable items to make the event attractive for the participants/viewers and thus joined hands with the Foundation to popularize science in society. A huge number of visitors witnessed this colourful event and encouraged the young participants of the competition.

A Book Exhibition was organized from 23rd -26th ,october 1999 as an important event of 4th S&T Fair. Eight booksellers and publishers viz; Progressive International Agencies(Pvt) Ltd. Urdu Science Board, Pak Book Corporation, National Book Foundation, London Book Company, Turkish Book Centre and Muqtadra Quami Zaban etc., participated in the exhibition and displayed their books and reading material. The exhibition continued for four days. As there was no entry fee, this exhibition attracted many readers including scientists, educationists, students and parents.

The most colourful event **Walk for Science** was held on 24th October, 1999. People from all walks of life including men, women and children participated and made this event a real success. The Walk started from Pakistan Science Foundation office at Constitution Avenue at 9:00 a.m. and terminated at Pakistan Sports Complex, Islamabad. At the finish point a number of prizes were distributed among the participants through draws.

A Computer Exhibition was organized as a part of the Fair in collaboration with Technological Information Promotion System (TIPS). The exhibition was held on 26th October, 1999 at Marriot Hotel, Islamabad and it was open for all. Since computer technology is ever changing in the present age, these types of exhibitions are necessary to project the achievements of the computer industry and appraise the public about the applications and use of computers in different fields. Nearly all leading computer vendors of Rawalpindi/Islamabad and from other cities participated in this exhibition to display their products, ranging from computer hardware to multi media and networking.

S&T Art competition was held on 27th October, 1999 wherein 20 schools from Rawalpindi/Islamabad participated. The topic of this year's Art Competition "New Trends in Science and Technology-Vision for the Next Millennium" had a futuristic approach and the students came up with innovative ideas and brilliant works of art. The students took keen interest and made excellent drawings and crayon based paintings. A team of senior scientists and artists evaluated their painting for creativity & substance. On the closing ceremony, prizes/awards were given to the best four drawings whereas one special prize was also given to a student .These paintings were kept on show from 28th October, 1999 till the end of Fair.

The list of winners is given below:

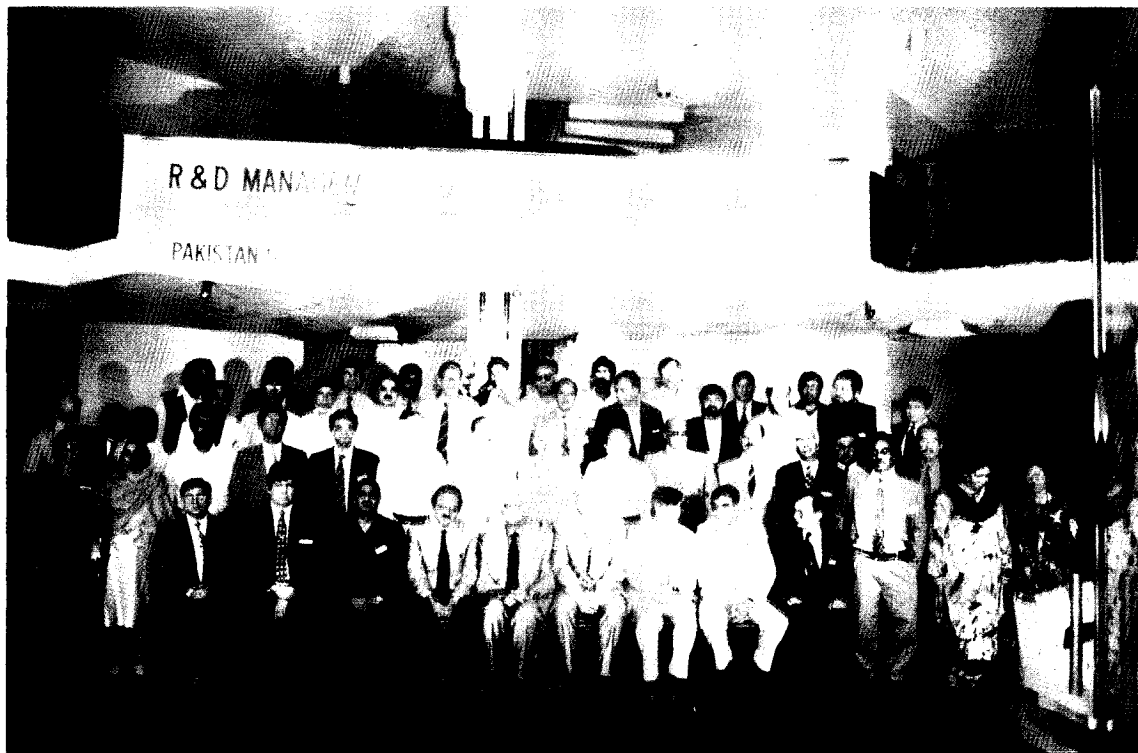
	Name	Institution	Position
1.	Miss Sana Hafeez	Islamabad Model College for Girls, F-6/2, Islamabad	1 st
2.	Miss Wajiha Jilani	Islamabad College of Art & Science, F-8/2, Islamabad	2 nd
3.	Miss Javaria Siddique	F. G. Model School for Girls, G-9/3, Islamabad	3 rd
4.	Mr. Usman Haider	F. G. Model School for Boys, G-9/4, Islamabad	4 th
5.	Mr. Atta Muhammad Raza	Shah Faisal Education Centre, Islamabad	Special Prize

Symposium on “R & D Management for Achieving Total Quality” was organized on October 28, 1999, at PSF Auditorium, Constitution Avenue, Islamabad. The main objective of the symposium was to find out what is so special about ISO 9000 and Total Quality Management (TQM) and why it is necessary for R&D organizations, Industries and Universities to acquire them. The symposium was inaugurated by Dr. Ashfaq Ahmed, Chairman, Pakistan Atomic Energy Commission (PAEC). In order to facilitate the development of new ideas and sharing of experience, the Symposium was divided into a number of sub-themes, as follows:

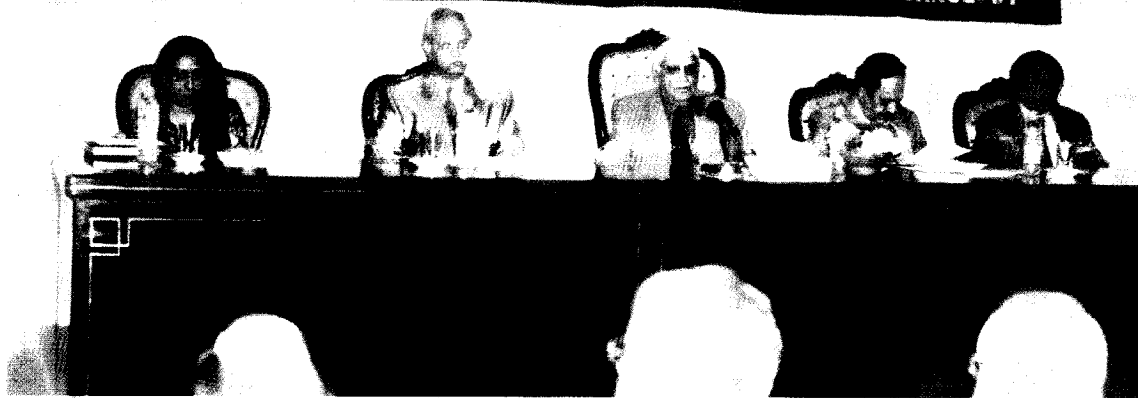
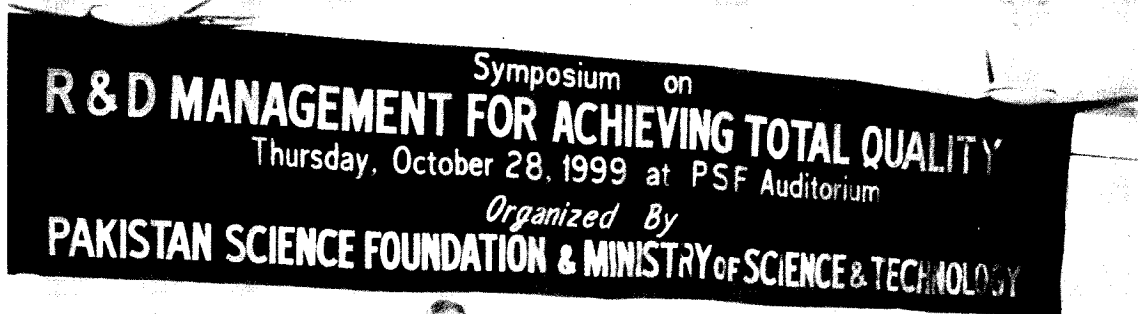
- R&D and TQM
- Human Factor in R&D Management
- R&D Management in Manufacturing Industry
- R&D Management in Service Industry
- University R&D – System vs Culture
- Choices between ISO 9000 and TQM in R&D organizations.

Six prominent experts presented their views on these extremely important topics. The main ideas emerged during the Symposium were discussed in the concluding session and recommendations were formulated.

Science Exhibition was organized from 29th to 31st October, 1999 for schools and colleges of Islamabad and Rawalpindi. The students from Government and private schools and colleges participated in the Science Exhibition. The exhibits were judged by three senior scientists/educationists selected from various institutions.



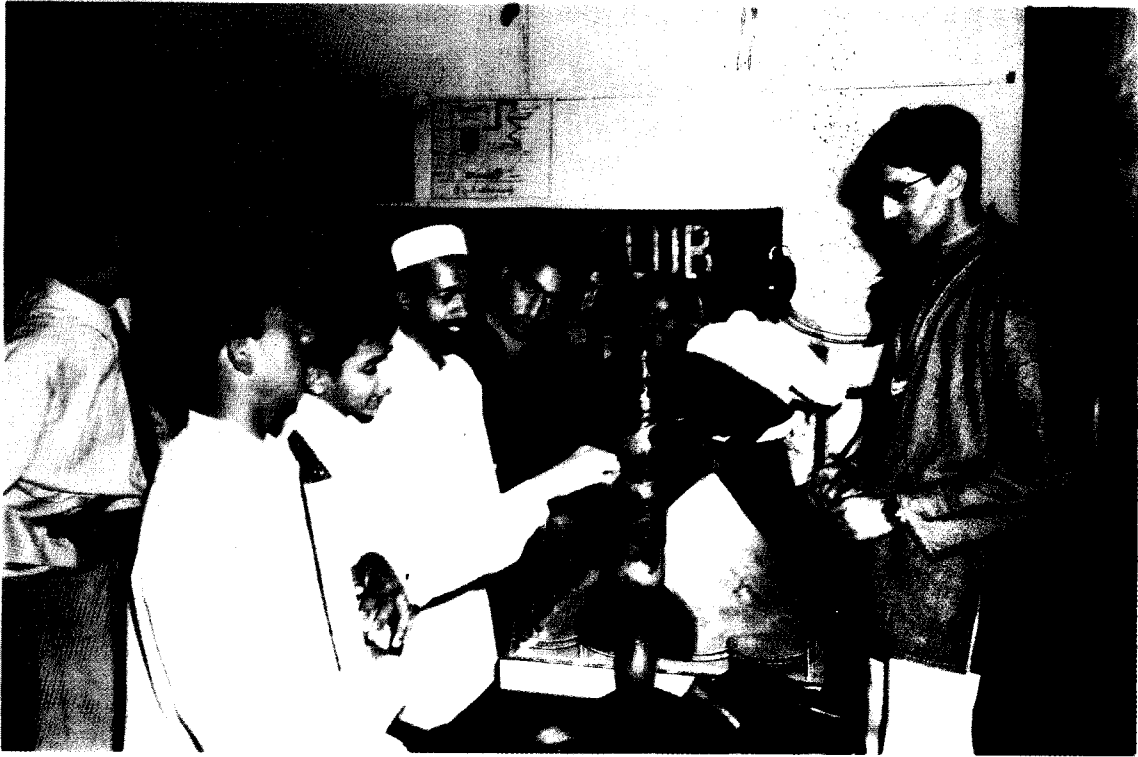
Participants of the Symposium on "R & D Management for Achieving Total Quality" with Secretary MoST, Chairman PAEC and Chairman PSF.



Chief Guest of the Symposium Dr. Ashfaq Ahmed presiding over the Inaugural Ceremony

School / College Science Exhibition during S & T Fair - 1999





Foreign student explaining his exhibits to the visiting students.

The list of the winners is given below:

<u>Name</u>	<u>Institution</u>	<u>Position</u>
GIRLS (Colleges)		
1. Miss Ayesha Anwar Miss Shimaila Miss Sobia Zafar	F. G. Margalla College for Women, F-7/4, Islamabad	1 st
2. Miss Sadaf Satti Miss Amna Noor	Islamabad Model College for Girls, F-7/4, Islamabad	1 st
3. Miss Hannan Yousaf Miss Beenish Baidar Miss Huma Sultan Miss Tehreem Arif	OPF Girls College, F-8/2, Islamabad	2 nd
4. Miss Ayesha Khurshid Miss Hira Iqtadar Miss Sehar Tariq	Islamabad Model College for Girls, F-7/4, Islamabad	2 nd
5. Miss Aneka Imtiaz Miss Zareen Jamal Miss Shahzadi Ifra Mirza	OPF Girls College, F-8/2, Islamabad	3 rd
6. Miss Sadia Raza Khan	F. G. College for Women, F-7/2, Islamabad	3 rd
7. Miss Sadaf Hira	F. G. College for Women, G-10/4, Islamabad	4 th
8. Miss Sidra Mariam	Viqar-un-Nisa Noon Higher Girls Secondary Institute, Rawalpindi	4 th
BOYS (Colleges)		
1. Mr. Ali Haider	Allam Iqbal Degree College Committee Chowk, Rawalpindi	1 st
2. Mr. Meelad Mansoor	Pak Turk International College, Islamabad	2 nd
3. Mr. Asadullah Khan	Pak Turk International College, Islamabad, H.No.28, St. 63, F-10/3	3 rd
GIRLS (Schools)		
1. Miss Naiomi Jamal	OPF Girls College (School Section), F-8/2, Islamabad	1 st
2. Miss Sofia Javed	F. G. Girls Higher Secondary School, I-9/1, Islamabad	2 nd

3.	Miss Fariha Tahir	F. G. Girls Higher Secondary School, I-9/1, Islamabad	3 rd
4.	Miss Shaher Bano	Ambrose Hall School, Peshawer Road, Rawalpindi	3 rd
5.	Miss Hina Malik	F. G. Girls Secondary School No. 4, G-7/2, Islamabad	4 th
6.	Miss Sadaf Khalid Miss Sara Ijaz Gilani	Islamabad Model College for Girls (School Section), F-7/4, Islamabad	4 th

BOYS (Schools)

1.	Mr. Salim Shahzad Mr. Qaiser Romani Mr. Muhammad Nadim	F. G Boys Model School, G-8/4, Islamabad	1 st
2.	Mr. Kamranullah	F. G. Public School, Mahfooz Road, Saddar, Rawalpindi	2 nd
3.	Mr. Misbah Ahmad Mr. Muhammad Hanif	Anglique School, Embassy Road, Islamabad	3 rd
4.	Mr. Waqas Haider	F. G. Boys Model School, G-9/4, Islamabad	4 th

The winners were awarded cash prizes, shields, books and certificates in the closing ceremony of the S & T Fair.

An **Aeromodelling Competition** was organized in collaboration with the "Islamabad Flying Club" on 31st October, 1999. This competition is a regular feature of the series of events arranged in connection with National Science & Technology Fairs. The competition involved radio-controlled flying and display of static models. The event as usual was very successful and colourful. It was witnessed by a large number of spectators. The Chairman, Pakistan Science Foundation was the chief guest at the event and greatly appreciated the expertise of the contestants. As in other events, prizes were distributed to the most outstanding contestants.

It is also pertinent to point out that almost all prizes distributed in various events throughout the Fair were sponsored by the private sector. In some cases the whole event was paid by such donor agencies. There was a long list of such sponsors. But some of them which must be identified in terms of relatively large donations were M/S Pakistan Cycle Industries Co-operative Society Ltd., Lahore, M/S Global Housery (Pvt.) Ltd., Faisalabad, M/S Murree Brewery Company, Rawalpindi, INSTAPHONE, Ministry of Science & Technology, Islamabad, Pakistan state oils & Progressive Book Association, Islamabad.

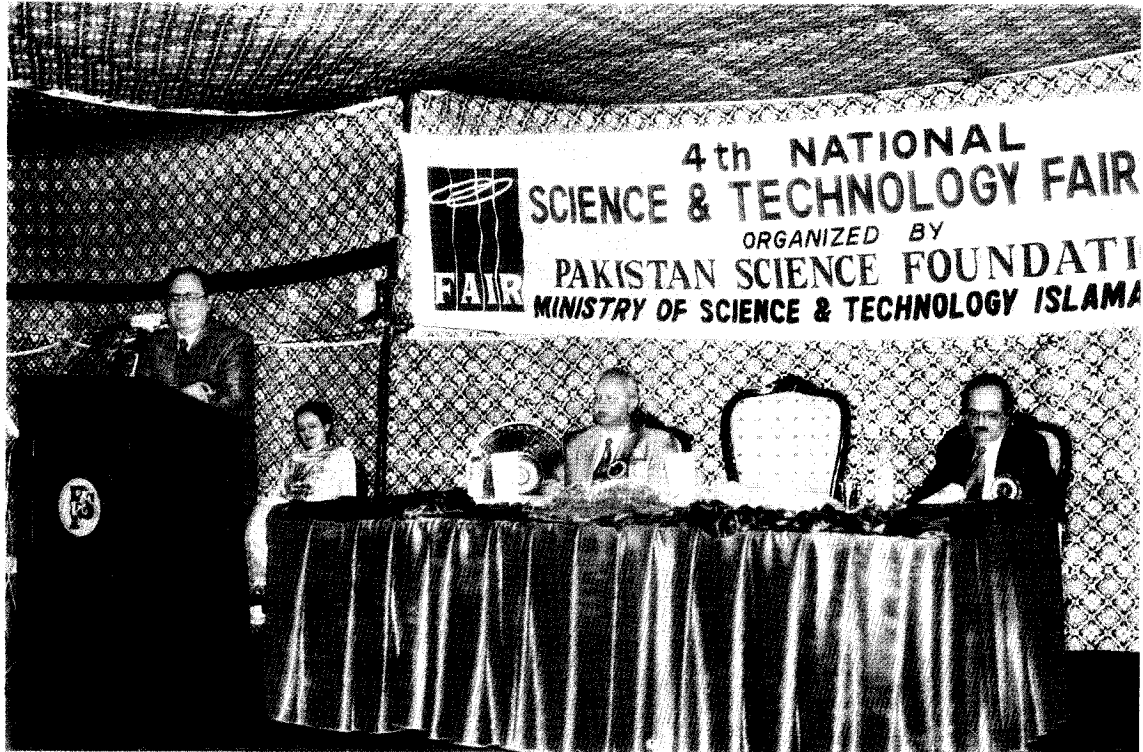
The Fair concluded on November 01, 1999, Dr. Atta-ur-Rehman, Minister for Science & Technology, Co-ordinator General COMSTECH and Director, HEJ Research Institute of Chemistry, University of Karachi, was the Chief Guest at the concluding ceremony.



Participants of Aeromodeling Show preparing for the contest



A model Aeroplane in operation during Aeromodeling Competition



Prof. Dr. Atta-ur-Rehman addressing the audience at closing ceremony of S&T Fair



Prof. Dr. Atta-ur-Rehman (Chief Guest) awarding shields at the Closing Ceremony of the Fair

Overall, the Fair turned out to be highly successful. The main objectives of the Fair i.e. bringing together of scientists, technologists, entrepreneurs and general public, and making citizens of this country aware of the local scientists and their endeavors and achievements, were adequately met. It was proposed that such Fairs should not only be held with regularity, but these should also be held in all major cities of the country so that more and more people can take part in such Fairs.

3. Science Essay Competition

a) Intra Board

The 10th Intra Board Essay Competition was organized by the Foundation during 1998-99. The theme of this competition was "The Challenges of Energy in the 21st Century". As many as, 11 Boards provided their results. An amount of Rs.24,000/- was released on account of prize money to the Boards for distribution among the winner students.

b) Inter Board

On receipt of prize winning essays from various boards, the Inter-Board Science Essay Competitions in English, Urdu, & Sindhi, languages were arranged by the Foundation during 1998-99. An amount of Rs.18,000/- was released to four boards as prize money for the winners of the competition.

The result of the competition are as under:

<u>S.No.</u>	<u>Language</u>	<u>Name of School</u>	<u>Position</u>
<u>English</u>			
1.	Rabia Sajjad	Presentation Convent High School, Sargodha	1 st
2.	M. Shah Rukh Manzoor	P.F Inter College, Chaklala, Rawalpindi	2 nd
3.	Arsalan Larik	Public School, Mirpur Khas	3 rd
<u>Urdu</u>			
1.	Miss. Zunaira Subhani	Comprehensive Higher Secondary School, Sargodha.	1 st
2.	Kamran Manzoor	Gujranwala Board	2 nd
3.	Miss. Nagina Zainab	Fauji Foundation Model School Attock Cantt.	3 rd
<u>Sindhi</u>			
1.	Mr. Mork Gopichand	New Day Sec. School, Karachi.	1 st
2.	Mr. Khushboo Ahmad Bhatti	Zubair Public School Karachi	2 nd
3.	Mr. Aijaz Ali	Govt. Shah Waliullah High school, Mirpur Khas Hyderabad (Sindh)	3 rd

4. Inter Board Science Poster Competition

The contest was organized by the Foundation on the receipt of results from 9 Boards which organized the Intra Board competitions and sent their winning posters for inclusion in the Inter Board Poster contest. A panel of judges selected by the Foundation evaluated these posters and declared the following three as the winner of the contests. These students were awarded prizes during the closing ceremony of the S & T Fair.

S.No.	Name	Institution	Position
1.	Miss Aliena Saffad	Salamat School System, Gulberg-III, Lahore	1 st
2.	Mr. Muhammad Umer Farooq	New Cantt. Public School, PAF Colony, Ghazi Road, Lahore	2 nd
3.	Miss Swera Jeorge	Sacred Heart High School, Jhang	3 rd

The four sets of books were given to those institutions, whose students acquired 1st positions in Inter Board Essay and Poster Competitions.

5. National Science Olympiad

The Foundation has initiated National Science Olympiad-2000 for the students of all the 21-Boards of Intermediate and Secondary Education, (BISE) in the country. It consists of two phases i.e. at Intra Board & Inter Board level. An amount of Rs. 10,000/- has been approved for each Board on account of holding the above competition.

6. Strengthening of Science Laboratories of High Schools

The Foundation provides Laboratory equipments to High Schools for strengthening / upgrading their Science Laboratories. During the report period, an order has been placed for the purchase of two complete sets of Lab. Equipments from National Educational Equipment Centre, Lahore worth Rs.4,57,000/-. The equipment will be provided to four high schools of Sindh and Balochistan .

7. Supply of Computers to High Schools of the country

Four personal computers (Pentium-III) alongwith printers (Dot Matrix) worth Rs.2,49,600/- were purchased and donated to following four high schools:

- 1) GHS, Dervesh, Distt. Haripur
- 2) GHS No Kot, Distt. Mansehra
- 3) GHS, Sahiwal
- 4) Govt. Comprehensive High School, Sahiwal

8. Support A School Back Home Programme

This programme has been exclusively designed for eminent Pakistanis working abroad. Pakistan Science Foundation (PSF), by virtue of its objectives and organization assist them in supporting a school, any school of their choice – an old school or the one in their city or anywhere in the country.

A sum of Rs.1,36,000/- has been released to Government High School, Sahiwal for renovation / construction of Chemistry Lab. & Lecture Room under this programme.

9. Institutional Support

A multimedia projector worth Rs.2,24,500/- has been purchased. The equipment will be donated to National Museum of Science & Technology, Lahore.

Recognizing the benefits of Science Corners for children, the Pakistan Science Foundation is establishing a Science Corner at Children Library Complex, Lahore. In this regard a Memorandum of Understanding (MoU) has been signed.

An amount of Rs.1,00,000/- has been released to Children Library Complex, Lahore, to start the preliminary work regarding the establishment of Science Corner at the Complex.

10. Establishment of Science Corner at Science Caravan Office, Quetta, Balochistan

An amount of Rs. 10,000/- has been released to Science Caravan, Quetta for the establishment of Science Corner. When the Caravan will not be on field trip, students of local schools will be invited to the Science Corner to witness the scientific models, & exhibits.

11. Science Centre, Faisalabad

The Science Centre, Faisalabad was completed and inaugurated by the President of Pakistan **H.E. Muhammad Rafiq Tarar** on January 18, 2000. It is now open for students and General public. The Centre displays exhibits in the fields of Natural History, Biology, Chemistry, Physics, Geology and Computer Science which are geared towards the interests of students and general public, with special emphasis on the applications of scientific principles in

our daily lives. These exhibits stimulate the minds of young and old alike. The exhibits displayed out side the building include the model of Ghouri-II Missile and Solar Fountain. Science Documentaries are regularly shown in the Centre and in schools on request. Pakistan Scientific and Technological Information Centre's (PASTIC) Liaison Office in the Science Centre supplies S&T information from its electronic data bases and library networks to the R&D organizations and individual scholars from R&D institutes and the university. It also provides Technology Information to the local Industry and entrepreneurs.

PAKISTAN MUSEUM OF NATURAL HISTORY (PMNH)

Pakistan Museum of Natural History remained engaged in the collection, curation, preservation and research on the plant, animal and geological resources of Pakistan. The scientists of three Divisions of PMNH viz., Botanical Sciences Division, Earth Sciences Division and Zoological Sciences Division carried out 20 field tours to various localities of the country which resulted in the addition of a large number of botanical, zoological and geological samples to the PMNH reference collection. Research on the collected material and analysis of field data was carried out in the Laboratories of the respective Divisions. These studies resulted in the publication of 15 articles in national and international journals. Two collaborative research projects were completed and two were initiated.

PMNH scientists and staff continued work for the completion of various natural history exhibits and dioramas in its new building at Shakarparian. A 2-day Workshop on "Sustainable use of Biological and Geological Resources of Pakistan" was held in the PMNH wherein many teachers and higher level students participated. Two scientists participated in an IUCN Workshop on "Threatened Plants" held in Sri Lanka and presented country paper therein. The Museum collaborated with National Institute of Scientific and Technological Education (NISTE) for the preparation of a textbook for Secondary School Level.

Pakistan Museum of Natural History played an important role in the planning, organizing and executing the various events of the Fourth National Science and Technology Fair, held in October- November, 1999 by the Pakistan Science Foundation.

A division-wise account of activities during the year 1999-2000 is given below:

1. BOTANICAL SCIENCES DIVISION (BSD)

a) Reference Collection:

During the report period three field tours were undertaken by the botanists of PMNH to various localities of Chitral and Cholistan to collect plant specimens and ethnobotanical data. As a result of these field trips 1800 plant specimens were collected and added to the reference collection of the museum. Moreover, 13 one-day trips were undertaken to Islamabad, Murree and Galiat to collect material like grass-patches, tree-stumps, tree-tops, shrubs, ferns, etc for using in display dioramas which is under preparation. Fifty (50) Algal and 60 fungal specimens were also added to the PMNH reference collection.

b) Laboratory work:

About 2700 higher plants, 1000 Fungal and 500 Algal specimens were preserved, mounted and indexed. Whereas 2000 higher plants, 300 Algae and 200 Fungi were identified during the report period.

c). Extension Work and Service to other Organizations:

- Identified 1300 plant specimens brought by students, teachers and researchers of various institutions.
- Collaborative project with National Agricultural Research Council on “Economically important plants of Cholistan Desert” was completed, while another collaborative project with Shah Abdul Latif University, Khairpur, Sindh on “Floristic studies of Nara Desert Sindh” is in progress.
- Groups of students from various institutions were provided guided tours to the Laboratories and Reference Halls of the Division.

d) Publications:

- Shah, M.(1999). “Hemp-Lifeline of the future” Souvenir, 4th National Science and Technology Fair.109-113.
- Sultana, K, Batra, L.R. Stavely, J.R. and Nasir, M.A. (2000). “Hyperparasitism of *Verticillium lecani* and *Cladosporium cladosporioides* on *Uromyces appendiculatus*, the causal organism for soybean rust” Pak. Journ. Phytopathol. 12(1) :42-45.
- Leghari, M.K. and Leghari, M.Y. (2000) “Ecological survey of Phytoplankton genera in Bakar lake, Sanghar, Sindh, Pakistan” Journ. Drain. Water Manag.2(2):45-49.
- Leghari, S.M. and Leghari. M.K. (2000). “Limnological study of Tatta Pani hot spring river Poonch, Azad Kashmir, Pakistan” Scientific Khyber. 13(1) 73-85.

2. EARTH SCIENCES DIVISION (ESD)

a) Reference Collection:

Five field tours were undertaken by the Geologists of PMNH to various localities of Chitral, Gilgit Agency, Dera Ghazi Khan, Kala Chitta Range and Salt Range to collect rock, mineral and fossil samples. From these areas, large number of geological specimens were also collected and added to the reference collection of PMNH. Four one-day tours were conducted in the Salt Range and specimens were collected for their use in making of display dioramas.

b) Laboratory Work:

A large number of fossil samples of mammals and gastropods were identified, photographed and catalogued and added to the geological reference collection. In addition 30 fossils were identified and 150 catalogued, 100 thin sections of rocks for megascopic and 30 for microscopic studies were prepared and geo-chemical data was computerized.

c) Extension Work and Service to other Organizations:

- A large number of student groups from various Schools and Colleges were provided guided tour to the labs and reference material of the Division.
- About 400 rocks, minerals and fossils were identified for visiting students/researchers.
- Donated 13 geological samples to a Pakistani School at Sharjah. Guided one Ph.D. and one M. Phil. student in their research work.
- Collaborated with ETH (Switzerland), Arizona State University, Quaid-i-Azam University, Punjab University and Institute of Silicon Technology on geological research.

d) Publications:

- Qureshi, M.M, Roohi, G., Baqri, S.R.H., Ahmed, U.B. (1997). "Morphological variations in *Assilina spira* (order: Foraminifera) in Eocene Kohat formation of Jhallar area, Kala Chitta Range, Punjab, Pakistan" *Acta Scientia* 7(7): 85-96.
- Cheema, I.U. & Rajpar, A.R. (1997). "Preliminary analysis of the vertebrate fauna from the Siwaliks of Chakwal district Kallar Kahar – Dhok Tahlian area, Potwar Plateau, Pakistan" *Geol Bull Punj Univ.* No. 31,32: 161-168.
- Chaudhry, M.N., Spencer, D.A, Ghazanfar, M., Hussain, S.S. & Dawood, H. (1997). "The locations of the Main Central Thrust in the northwest Himalaya of Pakistan: Tectonic Implications" *Geol. Bull. Punj. Univ.* No.31, 32.
- Baqri, S.R.H. (1999) "Salt Range, The Geological Field Museum of Natural History in Pakistan". Souvenir, 4th National Science & Technology Fair. 79-85.
- Hussain, S.S. and Dawood, H.(1999). "Mineral wealth of Pakistan" Souvenir 4th National Science. Technology Fair. 86-94.
- Arbaret, L, Burg, J.P., Zeilinger, G, Chaudhri, M.N, Hussain, S.S., Dawood, H. (2000). "Pre-collisional anastomosing shearing zones in the Kohistan Arc, NW Pakistan". In Khan, M.A., et al; (ed) *Tectonics of the Nanga Parbat syntaxis and the western Himalaya* Geol. Soc. London. Special publications 170: 295-311.
- Cheema, I.U. & Rajpar, A.R. (2000). "Miocene small mammals from Jalalpur, Pakistan and their biostratigraphic implications" *Bull Nat Sci. Mus. Ser. C., Tokyo.* 26(1,2): 57-77.

3. ZOOLOGICAL SCIENCES DIVISION(ZSD)

a) Reference Collection:

The zoologists of the PMNH undertook 5 field trips to different localities of Kurram Agency, Swat, Gilgit, Khunjab, Kaghan valley, Upper Yarkhun and Chitral. Three local

trips were also carried out. As a result of these field trips, 580 invertebrates, 100 fishes, 24 amphibians, 70 reptiles and 68 mammals were collected and added to the reference collection of PMNH.

b) Laboratory Work:

During the report period 4240 invertebrates were curated and mounted whereas 4229 invertebrates & 200 vertebrates were identified, 20 birds stuffed and 35 repaired; stuffed 5 and skinned 6 mammals; 60 invertebrates and 60 amphibians were catalogued.

c) Extension Work and Service to other Organizations:

- Provided one week training on "Taxidermy" for Wildlife Department, Government of Punjab, Lahore.
- Worked for the workshop on "Sustainable use of Biological and Geological resources of Pakistan" wherein, 30 teachers from various Schools and Colleges participated.
- Guidance was provided to 2 Ph.D. and one M.Sc. students in conducting their research work.
- Students from University of Arid Agriculture, Rawalpindi were trained in "Techniques for Identification of Faunal Specimens."
- Guided tours to the Division were provided to various student groups of colleges/ universities and nurses of Holy Family Hospital, Rawalpindi.

d) Publication:

- Baig, K.J.(1996). "Herpetofauna of sub-Himalayan region of Pakistan, including Islamabad area" Proc. 4th DAAD Fellowship Seminar. 35-42.
- Hasan, S.A. (1998). "Zoogeography and diversity of butterflies of Hunza Valley, Northern Pakistan". Proc. Pak. Congr. Zool. 18: 131-136.
- Baig, K.J. (1999). "Snake: More than an animal" Souvenir, 4th National Science & Technology Fair,99. 114-118.
- Hasan, S.A. (1999). "Parasitic Diseases in Humans with special reference to Pakistan". Souvenir, 4th National Science & Technology Fair. 95-102.

4. PUBLIC SERVICES DIVISION (PSD)

a) Museum Display & Maintenance:

- Consolidated yearly display schedule for next fiscal year was prepared.
- Preparation of dioramas, their background painting, 3-dimensional display setting, write ups, calligraphy, photography, model-making, panel-designing etc. were also completed during the report period.

- The exhibits for Children Discovery Room, Ocean Diorama, Salt Range Diorama, Prehistoric Wildlife, Gemstones, Bio-diversity are near completion
- Computerized photographs of the diorama specimens were taken which are to be used in the keys of the dioramas.
- Designed cards for the PMNH workshop on “Sustainable use of Biological and Geological Resources of Pakistan”.
- Prepared 450 photographs for the scientific and educational activities of the PMNH.
- A shield was prepared & presented to the Secretary, Ministry of Science & Technology on his visit to the PMNH.
- Carried out electrical maintenance work in various rooms of PMNH.

b) Educational Activities:

- More than 5000 students from various Schools and Colleges visited the Museum.
- Several student groups were shown films on ‘Natural History’ in the audio-visual hall of the PMNH.

c) Extension Work and Service to other Organizations:

- Arrangements were done for the formation of pipe-structures for the display of PSF posters for children.
- Designed a shield for Pakistan Academy of Sciences.
- A float for display in the Pakistan Day Parade (23 March) was designed and prepared.

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 subsidiary of Pakistan Science Foundation.

PASTIC has evolved from the erstwhile "Pakistan National Scientific and Technical 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 four Sub-Centres at Karachi, Lahore, Peshawar 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 services.
7. To compile Directory of S&T Periodicals of Pakistan, Union Catalogue of S&T Serials and Bulletin of Technology Information.
8. To publish an abstracting and indexing journal entitled "Pakistan Science Abstracts"

TECHNICAL SERVICES AND ACTIVITIES

During the year 1999–2000 the activities undertaken by PASTIC are briefly described below:

1. DOCUMENT PROCUREMENT AND SUPPLY SERVICE

Under the Document Procurement and Supply Service, queries are received from various R&D organizations for supply of reprints of research articles/conference papers and reports, which are procured locally or from abroad. A total of 1837 S&T documents were procured and supplied against 2364 requests received from scientists and researchers.

2. BIBLIOGRAPHIC SERVICE

References from International databases on CD ROM are supplied to users according to their research topics on request. Against 1541 orders, 639 bibliographies and 22,865 references on various S&T topics were collected and supplied to the researchers.

3. CURRENT CONTENT SERVICE

Under the Current Contents Service, Table of Contents of 120 S&T journals on Chemistry, Biology, Physics, Earth Sciences, Mathematics and Medicine were provided to 527 scientists.

Current Contents Annual database for 1998 has been installed on CD-ROM for providing information to the researchers.

4. ABSTRACTING AND INDEXING SERVICE

PASTIC publishes a quarterly journal viz, "Pakistan Science Abstract" which contains abstracts of research articles published in recent S&T journals of Pakistan.

During the report period the following activities were under taken:

- Pakistan Science Abstract 1995-96 was distributed among 54 subscribers and to 80 Organizations/Institutions on exchange basis.
- 295 abstracts were classified according to UDC schedules and 2037 keyword entries prepared for PSA 1998, Vol 38, Issue No.1-4.
- 30 journals were scanned and 9 abstracts of research articles were written out for PSA 1998, vol.38, issue No.1-4.
- Five audio cassettes of the proceedings of "Symposium on R&D Management for Achieving Total Quality" held during 4th National S&T Fair, 1999 were transcribed.
- Bibliographic information services provided during 1995-1999 were classified according to their subject (1821 titles).

5. UNION CATALOGUE

During the report period, updating of union catalogue has been continued and 545 S&T Organizations/Institutions of Pakistan were contacted for acquiring serial holding record of libraries. Moreover, data from 44 Organizations has been received and forwarded to computer section for up-dation and computerization.

6. PASTIC NATIONAL SCIENCE REFERENCE LIBRARY

About 1653 issues of various S&T periodicals, 75 documents and 149 books were received in the library of PASTIC National Centre. Whereas 1541 references were supplied to the researchers/scientists.

The subscriptions of the following databases on CD-ROM were renewed:

i) Life Sciences ii) POLTOX iii) Medline iv) Applied Science & Technology Abstracts.

7. REPROGRAPHIC SERVICE

The Reprographic Section of PASTIC has facilities ranging from photocopying to offset printing. During 1999-2000 about 1041489 impressions, 2165 pages and 138801 copies were produced by the Reprography Unit against 121 orders received from 16 Organizations.

8. COMPUTERIZATION ACTIVITIES

During the report period, 10669 Laser prints 1720 D.M. pages composed, 45 colour printouts & slides were prepared by the Computer Section. These pages were composed for Quaid-i-Azam University, PSF, TIPS, MoST, COMSATS, PMNH, PCST and for Computer Exhibitions and Workshops organized by PASTIC in different cities of Pakistan. Computer Software/Hardware Services were also provided to various S&T organizations.

9. INTERNATIONAL LIAISON

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

INFOTERRA: INFOTERRA is the United Nations Environment Programmes Global Information Network based at Nairobi comprising of National Focal Points in about 200 member states. INFOTERRA provides information by searching the database on Environmental Information Sources it has developed with the assistance of the NFPs. During the period under consideration the following activities were undertaken.

Information was supplied to 13 clients in response to queries regarding water treatment, foreign currency risk, environmental economics, detection of compounds from aerosol particle by XRD, stock marketing, relative distribution of metals in hair and dust, heat occupation, lubricating oil analysis, trace elements, environmental analysis, capacity development needs on climate change, laws or regulations for the water flow in water courses, health hazards from cellular (cell phone) towers and environment legislations in Pakistan, tentative list of environmental issues and environmental organizations in Pakistan etc.

INFOTERRA publications were also distributed.

WHO/CEHANET: The world Health Organization's Centre for Environmental Health Activities Information Network gathers information about published material on environmental health from 22 National focal points. During the report period, 15 records were added to Environmental Health Documents Database.

ASTINFO: It is a UNESCO supported network for the exchange of experience and information in Science and Technology in Asia and the Pacific. It aims to build and strengthen the information infrastructure in the member states. Under this network PASTIC is responsible for distributing the UNESCO developed Software Packages CDS/ISIS and IDAMS and provides training on this package.

ASTINFO Publications were distributed to various S&T organizations in Pakistan. Procured WINISIS Package, supplied to 4 organizations, installed WINISIS and databases on CDS/ISIS version 3.7 transferred in WINISIS version.

SAARC Documentation System: SDC was established in 1994 for facilitating exchange of information amongst the SAARC Member States.

The Prospectus for Master's level Training Course in "Associationship in Information Science (AIS)" at INSDOC, New Dehli, India, were distributed for inviting nominations.

BILATERAL COOPERATION:

Prepared two project proposals for S&T Cooperation Agreement with Egypt, South Korea and Iraq & sent to MoST.

Project proposal to be funded by Perez-Guerrero Trust Fund for economic and technical Co-operation among developing countries was prepared and sent to Iran and Turkey.

Nominations were sent for JICA Training Courses, INSDOC Master's level courses, CICC Scholarship and Korea International Cooperation Agency (KOICA) training.

10. TECHNICAL MEETINGS/VISITS/FUNCTIONS

- Training Workshop on Solar Domestic Appliances on September 28, 1999.
- Second Software Engineering Workshop on October 10, 1999.
- Quiz Competition on World Water Day on March 22, 2000.
- International Seminar on Prospects for Saline Agriculture on April 10, 2000.
- Millennium Lahore Book Fair, Opening Ceremony on April 22, 2000 at Lahore.
- Silver Jubilee Inaugural Function of the 25th International Nathiagali Summer College on Physics and Contemporary Needs on June 26, 2000.

11. TRAINING

a) Training received

D.G. PASTIC, as a Resource Person and System Analyst, PASTIC as a participant attended a Workshop on "Information Infrastructure in SAARC Region" from 25-27 Jan., 2000 at Dhaka, Bangladesh.

b) Training/Lectures Imparted

PASTIC/PSF and SAARC organized a Four Days Workshop on "Information and Communication Technology" from 1-4 Feb. 2000 at Islamabad.

12. TECHNOLOGICAL INFORMATION PROMOTION SYSTEM (TIPS)

Technological Information Promotion System based at PASTIC has been regularly publishing weekly and fortnightly bulletins in Pakistan which provide up-to-the-minute and detailed information on technology and trade opportunities. It covers fourteen different sectors and has the largest database in the world on trade/technology information from the developing countries. The 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.

- Tips provided about 1942 trade and technological abstracts from TIPS Network to its various subscribers in Pakistan Similarly, information from fifty-five Pakistani companies about their products and services was disseminated to 42 TIPS member countries.
- During the report period TIPS Organized "Computer & Office Equipment Exhibition" at Quetta, Lahore, Faisalabad and Islamabad.
- Vol 2,3, and 4 (1) of "White Meat Journal" has been published.

CHAPTER 2

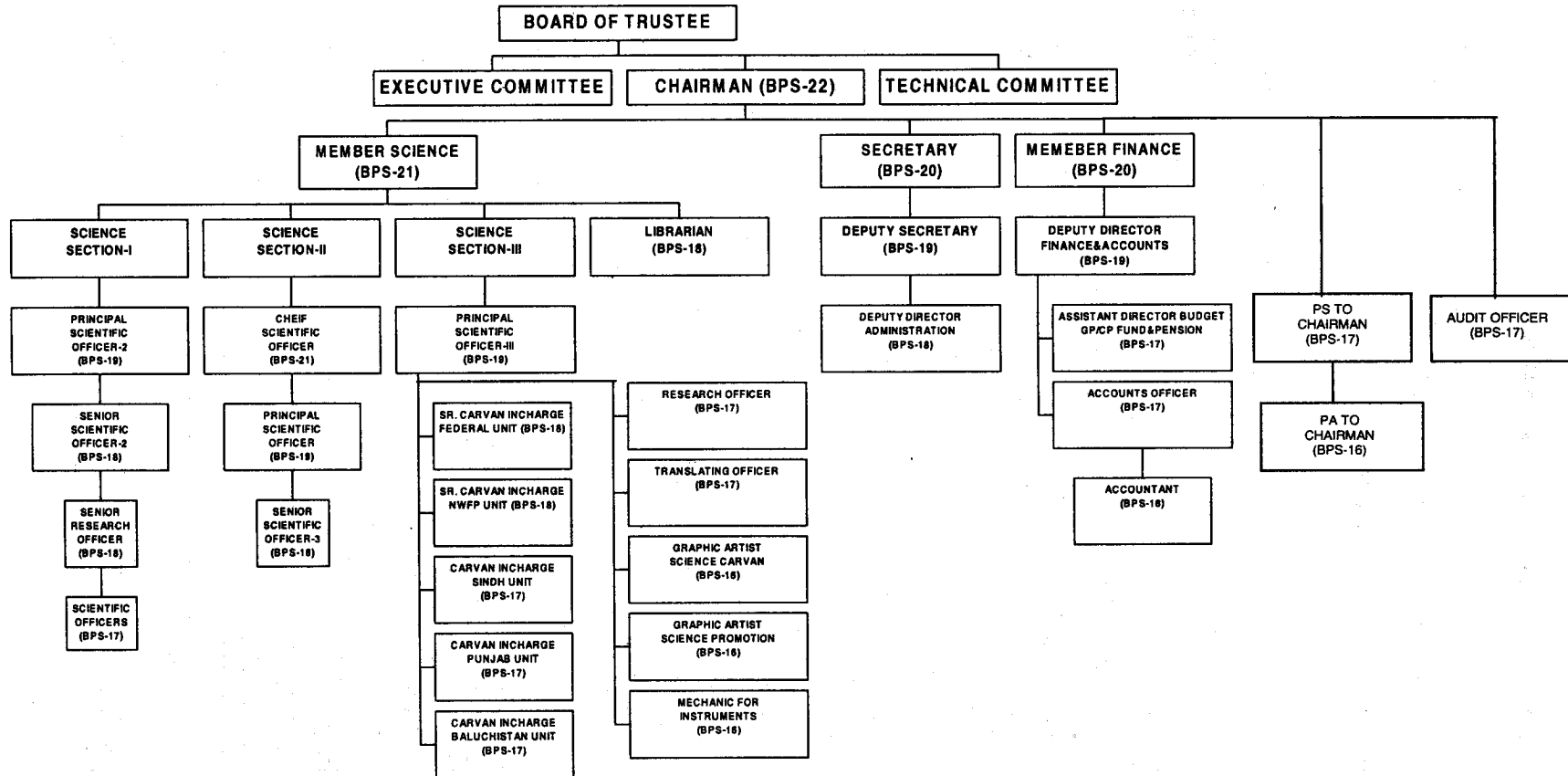
ORGANIZATION AND ADMINISTRATION

The organizational structures of the Pakistan Science Foundation, Pakistan Museum of Natural History and Pakistan Scientific & Technological Information Centre are given on the forth-coming pages. The sanctioned strength of staff in the Foundation, PMNH & PASTIC during the report period was as under:

Pakistan Science Foundation (PSF)

S.No.	Designation	Number
1.	Chairman	1
2.	Member (Science)	1
3.	Member (Finance)	1
4.	Chief Scientific Officer	1
5.	Secretary	1
6.	Principal Scientific Officer	4
7.	Senior Scientific Officer	5
8.	Senior Research Officer	1
9.	Deputy Director (F&A)	1
10.	Deputy Secretary	1
11.	Deputy Director (Admn)	1
12.	Public Relations Officer	1
13.	Accounts Officer	1
14.	Assistant Director (Budget, CP Fund & Pension)	1
15.	Research Officer	1
16.	PS to Chairman	1
17.	Librarian	1
18.	Scientific Officer	2
19.	Internal Audit Officer	1
20.	Senior Caravan Incharge	2
21.	Caravan Incharge	3
22.	Graphic Artist	2
23.	Administrative Officer	1
24.	Translating Officer	1
25.	PA to Chairman	1
26.	Mechanic for Instruments	1
27.	Assistant Scientific Officer	1
28.	Accountant	1
29.	Supporting Staff	125
	Total:	165

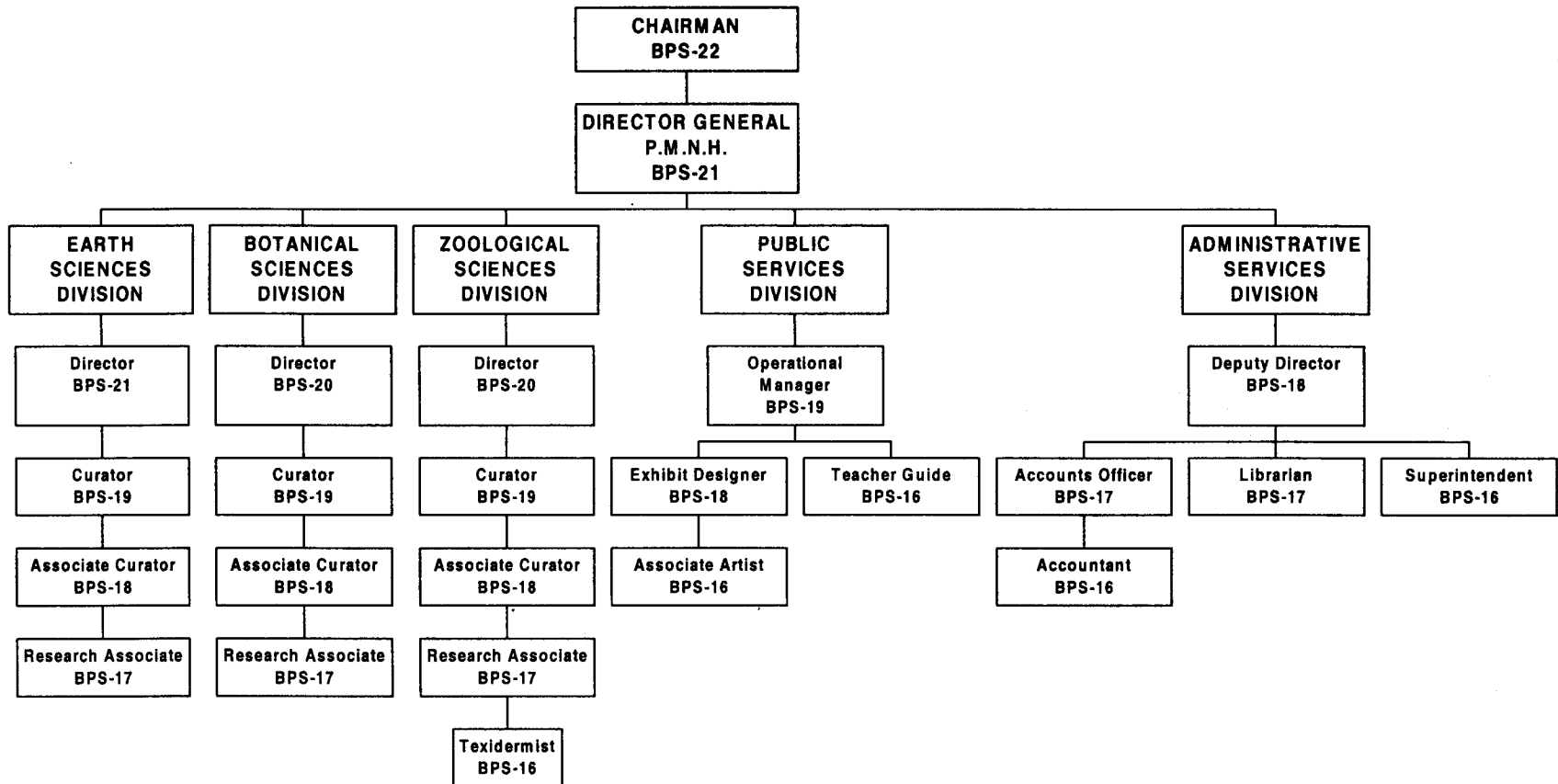
PAKISTAN SCIENCE FOUNDATION ORGANIZATIONAL CHART



PAKISTAN MUSEUM OF NATURAL HISTORY (PMNH)

S. No.	Designation	Number
1.	Director General	1
2.	Director	3
3.	Curator	6
4.	Associate Curator	10
5.	Manager Operations	1
6.	Research Associates	19
7.	Exhibit Designer	1
8.	Deputy Director(Admin)	1
9.	Accounts Officer	1
10.	Librarian	1
11.	Taxidermist	2
12.	Associate Artist	2
13.	Teacher Guide	1
14.	Superintendent	1
15.	Accountant	1
16.	Supporting Staff	85
	Total	136

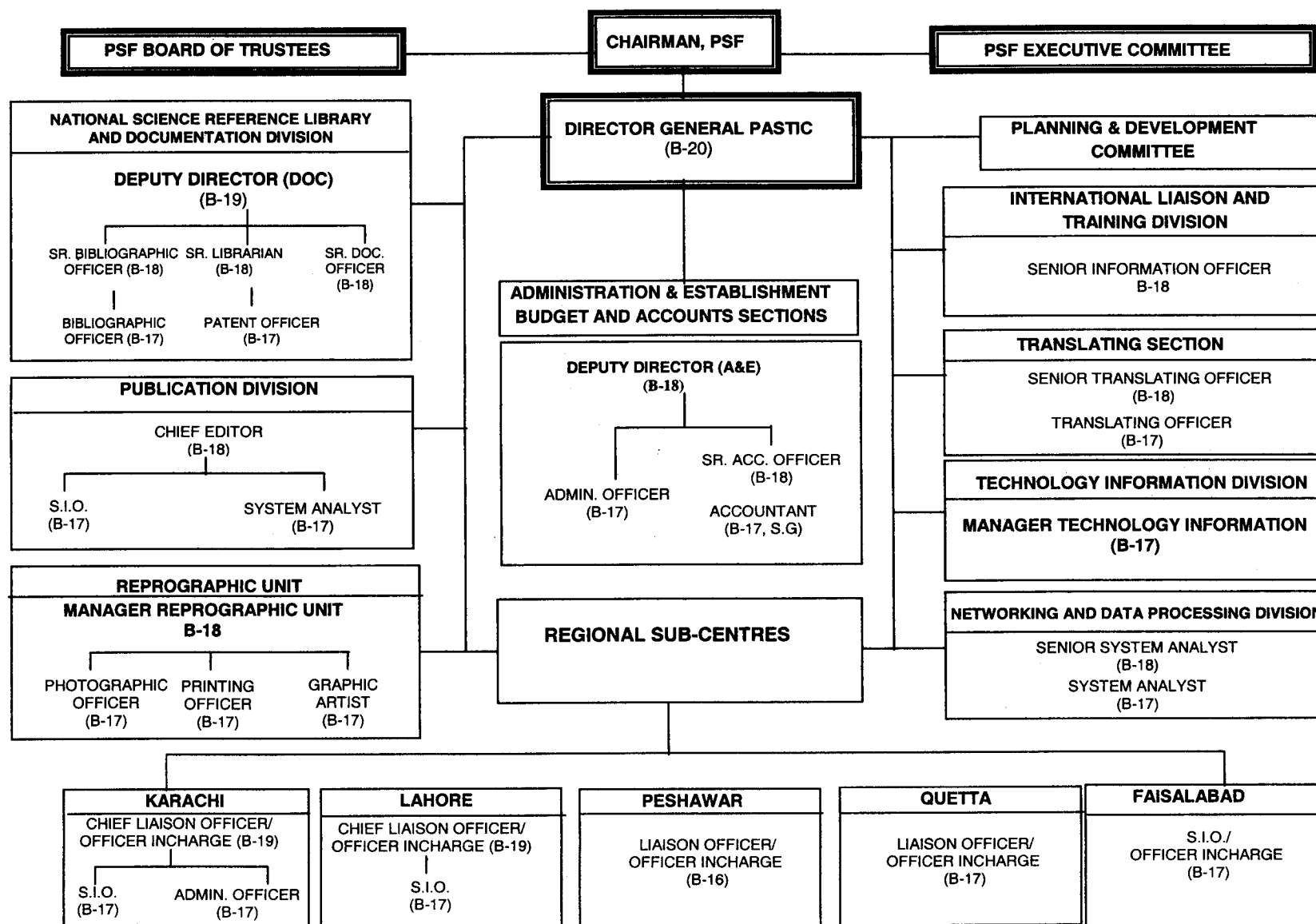
**PAKISTAN MUSEUM OF NATURAL HISTORY
ADMINISTRATIVE ORGANIZATIONAL CHART**



**PAKISTAN SCIENTIFIC AND TECHNOLOGICAL
INFORMATION CENTRE (PASTIC)**

S.No.	Designation	Number
1.	Director General	1
2.	Deputy Director (Doc.)	1
3.	Deputy Director (Admn & Estt)	1
4.	Senior Bibliographic Officer	1
5.	Chief Editor	1
6.	Senior Documentation Officer	1
7.	Senior Translating Officer	1
8.	Senior Information Officer	1
9.	Senior Librarian	1
10.	Manager Reprographic Unit	1
11.	Senior System Analyst	1
12.	Chief Liaison Officer (Karachi & Lahore)	2
13.	Senior Accounts Officer	1
14.	System Analyst	2
15.	Translating Officer	1
16.	Photographic Officer	1
17.	Printing Officer	1
18.	Graphic Artist	1
19.	Bibliographic Officer	1
20.	Patent Officer	1
21.	Scientific Information Officer	3
22.	Manager Technology Information	1
23.	Admin-cum Accounts Officer (Karachi)	1
24.	Liaison Officer PSC, Quetta/Peshawar	2
25.	P.A. To Director General	1
26.	Assistant Information Officer	1
27.	Assistant Programmer	4
28.	Superintendent	2
29.	Assistant Scientific Information Officer	4
30.	Assistant Manager Reprographic Unit	1
31.	Accountant	1
32.	Assistant Documentation Officer Karachi/Lahore/Quetta	3
33.	Supporting Staff	108
	Total:	154

**PAKISTAN SCIENTIFIC AND TECHNOLOGICAL INFORMATION CENTRE (PASTIC)
ORGANIZATIONAL CHART**



CHAPTER-3

PAKISTAN SCIENCE FOUNDATION FINANCIAL STATEMENTS JUNE 30, 2000

AUDITORS' REPORT TO THE BOARD OF TRUSTEES

We have audited the accompanying balance sheet of the PAKISTAN SCIENCE FOUNDATION as at June 30, 2000 and the related receipt and payment account together with notes forming part thereof for the year then ended. These financial statements are the responsibility of foundation's management. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with the international standards on auditing. 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 test basis, supporting the amounts and disclosures in financial statements. An audit also includes assessing the accounting principles used and significant estimates made by the management, as well as evaluating the overall financial statement presentation. We believe that our audit provides a reasonable basis for our opinion.

In our opinion, the financial statements give a true and fair view of the financial position of the Foundation as at June 30, 2000 and of the results of its activities for the year then ended.

S. M. Masood & Co.
S. M. MASOOD & CO.
Chartered Accountants *S. M. Masood*

ISLAMABAD

DATED: *Feb. 08, 2001*

**PAKISTAN SCIENCE FOUNDATION
BALANCE SHEET
AS AT JUNE 30, 2000**

		2000 Rupees	1999 Rupees			2000 Rupees	1999 Rupees
GRANT AND LIABILITIES	NOTE			PROPERTY AND ASSETS	NOTE		
GENERAL FUND	3	25,215,251	27,209,017	TANGIBLE FIXED ASSETS	6	23,250,022	24,617,600
RESEARCH SUPPORT GRANT	4	47,956,517	43,263,597	RESEARCH PROJECTS IN PROGRESS		47,956,517	43,263,597
CURRENT LIABILITIES				LONG TERM DEPOSITS	7	1,617,195	1,617,195
Accrued and other liabilities	5	682,034	380,276	CURRENT ASSETS			
				Advances and prepayments	8	462,897	1,078,105
				Cash and bank	9	567,171	276,393
						1,030,068	1,354,498
		<u>73,853,802</u>	<u>70,852,890</u>			<u>73,853,802</u>	<u>70,852,890</u>

Auditors' report to the Board of Trustees is annexed.

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



TRUSTEE



CHAIRMAN

**PAKISTAN SCIENCE FOUNDATION
RECEIPTS AND EXPENDITURE ACCOUNT
FOR THE YEAR ENDED JUNE 30, 2000**

	NOTE	2000 Rupees	1999 Rupees
RECEIPTS			
Grant from Federal Government		30,733,000	29,871,000
Grant from Ministry of Science and Technology			100,000
		30,733,000	29,971,000
EXPENDITURE			
Scientific functions	10	14,394,983	13,343,191
Administrative expenses	11	18,331,782	16,929,468
		32,726,765	30,272,659
EXCESS OF EXPENDITURE OVER RECEIPTS		<u>(1,993,765)</u>	<u>(301,659)</u>

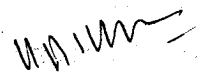
Auditors' report to the Board of Trustees is annexed.

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

Sum



TRUSTEE



CHAIRMAN

**PAKISTAN SCIENCE FOUNDATION
NOTES TO THE ACCOUNTS
FOR THE YEAR ENDED JUNE 30, 2000**

1. STATUS AND OBJECTS

Pakistan Science Foundation (Foundation) is a statutory organization established under Pakistan Science Foundation Act, 1973 on the 2nd day of February 1973. The main objects of its establishment is to promote and finance scientific activities having a bearing on the socio-economic needs of the country.

2. ACCOUNTING POLICIES

The principle accounting policies which have been adopted in the preparation of Foundation's accounts are as follows:

2.1 Grants Received

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

2.2 Research Support Grant

Research support grant has been accounted for on actual payment basis.

2.3 Fixed Assets

Fixed assets have been valued at cost less accumulated depreciation except lease hold land which is stated at cost. Depreciation on fixed assets is charged on reducing balance method, at the rates specified in note 6. Full year depreciation is charged on the assets acquired during the year and no depreciation is charged on the assets disposed off during the year.

3. GENERAL FUND

	2000 Rupees	1999 Rupees
Balance as on July 01,	27,209,017	27,510,676
Deficit transferred from Receipts and Expenditure account	<u>(1,993,765)</u>	<u>(301,659)</u>
	<u>25,215,251</u>	<u>27,209,017</u>

4. RESEARCH SUPPORT GRANT

Balance as at July 01,		43,263,597	38,675,783
Add: Disbursements during the year	4.1	<u>9,951,996</u>	<u>9,040,776</u>
		53,215,593	47,716,559
Less: Projects completed during the year	4.2	<u>5,259,076</u>	<u>4,452,962</u>
		<u>47,956,517</u>	<u>43,263,597</u>

Sum

	2000 Rupees	1999 Rupees
4.1. DISBURSEMENTS DURING THE YEAR		
Mathematics and computer sciences		110,628
Physical sciences	584,039	1,153,620
Chemical sciences	1,705,944	1,582,753
Biological sciences	2,368,527	1,517,707
Earth sciences	174,450	682,183
Environmental sciences	1,004,837	442,873
Engineering sciences	147,165	191,603
Agricultural sciences	2,385,923	2,574,391
Medical sciences	1,150,644	75,325
Institutional support	276,581	557,247
Board / Committee meetings	153,886	152,446
	<u>9,951,996</u>	<u>9,040,776</u>
4.2. PROJECTS COMPLETED DURING THE YEAR		
Physical sciences	887,076	1,155,699
Chemical sciences	940,942	1,723,847
Biological sciences	1,613,843	715,901
Agricultural sciences	1,537,209	857,515
Medical sciences	280,006	
	<u>5,259,076</u>	<u>4,452,962</u>
5. ACCRUED AND OTHER LIABILITIES		
Accrued expenses	152,562	169,406
Advance for Conference	-	100,000
Security deposits	40,495	64,795
Other liabilities	488,977	46,075
	<u>682,034</u>	<u>380,276</u>

Sum

6. TANGIBLE FIXED ASSETS

Particulars	COST			DEPRECIATION			Written down value as at June 30, 2000	
	As at July 01, 1999	Additions	As at June 30, 2000	RATE	As at July 01, 1999	For the year		As at June 30, 2000
Lease hold land	3,713,418	-	3,713,418	-	-	-	-	3,713,418
Building	19,484,540	-	19,484,540	5%	3,614,261	793,514	4,407,775	15,076,765
Motor vehicles	3,706,809	-	3,706,809	20%	2,944,627	152,436	3,097,063	609,746
Office equipment	3,135,361	-	3,135,361	15%	1,819,094	197,440	2,016,534	1,118,827
Science equipment	1,786,275	-	1,786,275	15%	1,156,795	94,422	1,251,217	535,058
Furniture and fixture	1,957,216	-	1,957,216	6%	745,579	72,698	818,277	1,138,939
Air conditioners	194,974	-	194,974	15%	181,478	2,024	183,502	11,472
Library books and Films	1,455,004	-	1,455,004	5%	354,172	55,042	409,213	1,045,791
Bicycle	680	-	680	20%	672	2	674	6
2000	Rupees	35,434,277	-	35,434,277	10,816,676	1,367,578	12,184,255	23,250,022
1999	Rupees	34,608,058	826,219	35,434,277	9,309,825	1,506,851	10,816,676	24,617,600

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	2000 Rupees	1999 Rupees
7. LONG TERM DEPOSITS		
Electricity Connection (WAPDA)	1,472,195	1,472,195
Gas connection (SNGPL)	145,000	145,000
	<u>1,617,195</u>	<u>1,617,195</u>
8. ADVANCES AND PREPAYMENTS		
TO STAFF		
- for vehicle/motorcycle	204,637	232,813
- for house rent	244,453	845,292
	449,090	1,078,105
Prepaid insurance	13,807	-
	<u>462,897</u>	<u>1,078,105</u>
9. CASH AND BANK		
Cash at bank	529,472	210,870
UNESCO Coupons	12,630	34,571
Cash in hand	25,069	30,952
	<u>567,171</u>	<u>276,393</u>
10. SCIENTIFIC FUNCTIONS		
Research and support grant	9,951,996	9,040,776
Scientific societies and professional bodies	500,000	560,000
Scientific conferences, meetings and seminars	427,400	348,000
Operation of science caravan	980,524	1,814,965
Science centers and herbaria	-	400,000
International liaison	2,140	-
Science promotion activities	1,496,128	1,059,450
Science fair	1,000,000	-
Special scientific survey and collection of statistics	6,795	-
Scientists Pool / Senior scientists emeritus	30,000	120,000
	<u>14,394,983</u>	<u>13,343,191</u>

Sum

	2000 Rupees	1999 Rupees
11. ADMINISTRATIVE EXPENSES		
Salaries and other benefits	10,752,833	9,949,275
Travelling	213,029	121,092
House rent facility	2,658,409	1,943,626
Ground rent to CDA	17,944	17,944.00
Electricity, gas and water	434,358	543,633
Postage, telephone and telegram	926,051	907,612
Printing and stationery	195,837	270,373
Vehicle running and maintenance	1,325,615	1,039,164
Newspapers and advertisement	170,426	148,023
Liveries and uniforms	-	14,000
Entertainment	85,139	49,515
Repair and maintenance of office equipment	78,233	191,076
Audit fee	12,500	12,500
Legal charges	-	34,500
Depreciation	1,367,578	1,506,851
Maintenance of office building	40,555	114,546
Staff welfare fund	30,000	27,500
Miscellaneous	23,275	38,238
	<u>18,331,782</u>	<u>16,929,468</u>

12. FIGURES

- a) have been rounded off to the nearest of Rupee.
 b) of the previous year have been regrouped and rearranged wherever deemed necessary.


TRUSTEE


CHAIRMAN

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 within the meaning of the Chartered Accountants Ordinance, 1961 (X of 1961) and are appointed by the Foundation in consultation with the Auditor-General of Pakistan.
16. Appointment of Officers and Servants. (1) The Foundation may appoint such officers and servants and engage such consultants or experts, as it may consider necessary for the efficient performance of its functions, on such terms and conditions as it may deem fit. (2) In fixing the terms and conditions of service of its officers and servants, the Foundation shall, as nearly as may be, conform to the scales of pay, allowances and conditions of service applicable to the corresponding class of employees of the Federal Government.
17. Annual Reports. (1) The annual report of the Foundation, which shall among other things, clearly bring out the benefits accruing to the nation as a result of the activities sponsored by the Foundation, shall be prepared by the Chairman and submitted through the Board to the Federal Government 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.

LIST OF NEW PROJECTS APPROVED BY THE FOUNDATION DURING 1999-2000

<u>No.</u>	<u>Title and Number of Project</u>	<u>Name & address of Principal Investigator</u>	<u>Project Cost (Rs)</u>
a) Agricultural Sciences:			
1.	Identification of Resistant Sources Against Major Potato Viruses and their Diagnosis Based on Serological Tests. P-AU/Agr (236)	Dr. Muhammad Aslam Khan Assistant Professor University of Agriculture, Faisalabad.	4,14,303/-
2.	Genetic Improvement of Wheat in Relation to Salinity Stress P-AU/Agr (244)	Dr. Abdus Salam Khan Associate Professor University of Agriculture, Faisalabad.	4,61,683/-
3.	Determination of Insecticidal Resistance in Codling Moth and Spotted Spider Mites, Serious Pests of Apple in Balochistan. B-ARIQ/Agr (247)	Mr. Altaf Hussain Hazara Entomologist Agriculture Research Institute, Quetta.	3,72,234/-
4.	Identification, Characterization and Distribution of Phytoplasmal Diseases of Potato in Pakistan. C-NARC/Agr (266)	Dr. Iftkhar Ahmed, Director Crop Diseases Research Institute, NARC, Islamabad.	6,64,520/-
5.	Characterization and Monitoring of Banana Bunchy Top Virus (BBTV). C-NARC/Agr(270)	Dr. Saif Khalid Senior Scientific Officer National Agricultural Research Centre, Islamabad	7,12,439/-
b) Biotechnology and Genetic Engineering			
6.	Process Development for the Manufacture of Bacillus thuringensis Bioinsecticides. (Biotech/P-CEMB/Ind(21)	Dr. M. A. Qadeer Centre of Excellence in Molecular Biology, Lahore.	5,98,097/-
7.	Technologies Development for the Production of Gonadotropins from Animal Sources. Biotech/P-AU/Med(24)	Dr. Nafees Akther University of Agriculture, Faisalabad.	1,48,986/-
8.	Isolation, Identification and Molecular Characterization of Economically Important Potato Virus (PLRV) OF Pakistan and Development of Transgenic Potato. Biotech/P-NIBGE/Agr(27)	Dr. Yousuf Zafar NIBGE, Faisalabad.	2,76,624/-

c) Biological Sciences

- | | | | |
|-----|---|--|------------|
| 9. | Propagation of Floriculture/Ornamental Plants through <i>In-Vitro</i> Culture
P-GU/Bio(296) | Dr. Abdul Ghafoor
Professor
Gomal University, Dera Ismail Khan | 3,78,012/- |
| 10. | Micropropagation of Jojoba (<i>Simmondsia chinensis</i>) an Oil Yielding Plant of High Commercial Value
P-PU/Bio (304) | Dr. Javed Iqbal
Professor
University of the Punjab, Lahore | 3,83,092/- |
| 11. | Eco-taxonomic Studies of Algal Flora of Pakistan
(Punjab & Islamabad)
C-PMNH/Bio(311) | Dr. M. K. Leghari
Associate Curator
Pakistan Museum of Natural History,
Islamabad | 1,41,576/- |
| 12. | Distribution and Abundance of Juvenile Fish Stock in Korangi Creek
S-KU/Bio (319) | Dr. S. Makhdoom Hussain
Professor
Centre of Excellence in Marine Biology
University of Karachi, Karachi | 3,90,232/- |
| 13. | Pathobiology, Molecular Characterization and Control of Avian Influenza (AI) Viruses
C-NARC/Bio (321) | Dr. Khalid Naeem
Senior Scientific Officer
National Agricultural Research Center,
Islamabad | 2,33,764/- |
| 14. | Identification of Loci in Pakistani Kindreds with Ectodermal Dysplasia (ED).
C-QU/Bio (323) | Dr. Wasim Ahmad
Assistant Professor
Quaid-i-Azam University, Islamabad | 8,24,435/- |

d) Chemical Sciences

- | | | | |
|-----|---|---|------------|
| 15. | To study the effect of Siderophores on Biologically Active Trace Metals.
B-BU/Chem(322) | Dr. Fouzia Sultana Rehmani, Associate Professor, Institute of Biochemistry,
University of Baluchistan, Quetta. | 2,77,032/- |
| 16. | Preparation and Applications of Alkyl derivatives of Aluminum, Gallium, Silver, Gold, Tin, Titaniums and Vanadium: Spectroscopic and Phyrolysis Studies of Metal/Metal Oxide Deposition Precursors.
(P-PU/Chem(339) logerathim | Dr. Zaid Mahmood,
Assistant Professor,
Institute of Chemistry,
University of the Punjab,
Quaid-I Azam Campus, Lahore. | 5,46,383/- |
| 17. | “Exploitation of cheaper materials for the removal of toxic and harmful substances from industrial effluents”
C-PENSTECG/CHEM(341) | Dr. Syed Moosa Hasany,
Pakistan Institute of Nuclear Science and Technology Nilore, Islamabad. | 1,27,694/- |
| 18. | Extrapyramidal and Monoaminergic Effects of Neuroleptics: Modulation by I-tryptophan and I-valine.
S-KU/Chem(348) | Prof. Dr. Dharakhshan J. Haleem,
Department of Biochemistry,
University of Karachi,
Karachi | 4,39,997/- |

19. Pilot Production of Barium and Strontium Pigments from Indigenous Barite and Celestite Minerals.
P-AU/Chem(353) Prof. Dr. Riaz Ahmed,
Department of Chemistry,
University of Agriculture,
Faisalabad. 5,37,917/-
20. Purification, Characterization and Applied Studies of Protein Antibiotics from Indigenous Staphylococci.
S-KU/Chem(363) Prof. Dr. Sheikh Ajaz Rasool
Department of Microbiology,
University of Karachi,
Karachi. 4,58,357/-
21. Direct and Indirect Electrochemical Attack on Cancer Cells.
S-KU/Chem(367) Dr. Ahsana Dar,
Assistant Professor,
HEJ. Res. Instt. Of Chemistry,
University of Karachi,
Karachi. 8,03,816/-

e) Environmental Sciences

22. Combating Desertification in Cholistan Desert through Exploitable Genetic Potential of *Prosopis cineraria* L. Druce.
P-IUB/Envr(48) Dr. Mohammad Arshad
Research Officer, CIDS.
Cholistan Institute of Desert Studies
(CIDS),
Islamia University, Bahawalpur. 317,495/-
23. Population Dynamics and Dispersal Pattern of Fiddler Crabs in the Mangroves areas of Karachi Coast.
S-KU/Envr(51) Dr. Naureen Aziz Qureshi
Assistant Professor
Center of Excellence in Marine
Biology,
University of Karachi, Karachi 3,15,163/-
24. Studies on the Degradation of Chlorinated Phenolic Compound by *Pseudomonas* species.
C-QU/Envr (58) Dr. Safia Ahmed
Lecturer
Department of Biological Sciences
Quaid-I-Azam University, Islamabad 3,12,722/-

f) Medical Sciences

25. A Study of Host and Virus Related Factors that Determine Response to Interferon Therapy in Pakistani Patients with Chronic Hepatitis C Virus Infection.
S-AKU/Med(177) Dr. Saeed Hamid
Associate Professor
The Aga Khan University, Karachi. 8,71,365/-
26. Haem Degradation Products in the Feces of Newborn Infants.
S-DMC/Med(180) Dr. Sina Aziz
Assistant Professor of Pediatrics
Sindh Institute of Urology and
Transplantation (SIUT), Department of
Pediatrics, Dow Medical College &
Civil Hospital, Karachi. 1,14,205/-

27.	Role of Vitamins B6, B12 and Folate Glutathione and Cytokines in the Development of Coronary Artery Disease in a Pakistani Population.	Dr. Perwaiz Iqbal, Professor, Department of Biochemistry, Faculty of Health Sciences, Medical College, Agha Khan University, Karachi-74800.	4,73,871/-
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g)Physical Sciences

28.	Study of X-Rays, Neutron/Ion Beam, Emitted from Mather Type Plasma Focus. C-QU/Phys(108)	Dr. M. Zakaullah Quaid-I-Azam University, Islamabad.	3,44,219/-
29.	Pomeron (Odderon) in Soft and Hard Processes. C-QU/Phys(114)	Dr. Fazal-e-Aleem Centre for High Energy Physics, University of the Punjab, Lahore.	3,36,615/-
30.	Investigations in CP Violation P-PU/Phy(117)	Dr. Kh. Harris Rashid Centre for High Energy Physics, University of the Punjab, Lahore	3,35,202/-
<u>TOTAL</u>			12,612,050/-

**DETAILS OF MONITORING AND EVALUATION OF ON-GOING PSF FUNDED
PROJECTS DURING 1999-2000**

a) Semi-Annual Reports.

No.	Project No.	Project Title	Reports
1.	F-AU/Agr(182)	Management of Onion Downy Mildew under IPM in the NWFP, Pakistan	3 rd semi-annual
2.	P-AU/Agr(191)	Evaluation of Cotton Germplasm for the Development of Multipurpose Variety.	3 rd semi-annual
3.	P-PU/Agr(192)	Development of Maize Population for Fodder Purposes.	3 rd semi-annual
4.	S-KU/Agr(200)	Breeding of Some Important Commercial Marine Shrimps of Pakistan in Captivity	3 rd semi-annual
5.	P-BAC/Agr(209)	Biology and Management of Black Scurf of Potato.	3 rd semi-annual
6.	C-NARC/Agr(216)	Mating Types, Races and Genetic Variability in <i>Phytophthora infestans</i> , the cause of Late Blight of Potato.	3 rd semi-annual
7.	S-KU/Agr(217)	Studies on the Entomopathogenic Nematodes in Sindh	3 rd semi-annual
8.	P-AU/Agr (223)	Development of Commercial Diet for Rearing of Lacewing, <i>Chrysopa carnea</i> -A Biological Control Agent	1 st semi-annual
9.	P-UAAR/Agr (230)	Studies on the Control of Codling Moth, <i>Cydia pomonella</i> (<i>Tortricidae</i> ; <i>Lepidoptera</i>), Murree Hills of Punjab	1 st semi-annual
10.	F-AU/Agr (232)	Assessment of Soil Losses, Runoff Estimates and Charges in Some Physico-Chemical Properties of Soil Under Different Cropping Systems.	1 st semi-annual
11.	P-UAAR/Agr (234)	Dynamics of Microbial Biomass C, N and P in Rainfed Soils in Relation to Wheat and Maize Production.	1 st semi-annual
12.	P-AU/Agr (248)	Fungi as Bio-Control Agents Against Weeds: Bio-Control of Weeds of Rice Crop. Bio-Control of Weeds of Wheat Crop.	1 st semi-annual

13.	F-AU/Agr (258)	Identification and Field evaluation of Bio-Control Agents of the family <i>Braconidae</i> (<i>Hymenoptera</i>) against Important Crop Pests of Pakistan.	1 st semi-annual
14.	S-PCCC/Agr (183/1)	Breeding for Glandless Cotton	1 st semi-annual
15.	P-AU/Agr(199)	Epidemiological and Aetiopathological Investigations of Neonatal Lamb Mortality	2 nd semi-annual
16.	F-AU/Agr (214)	Characterization of Soybean Mosaic Virus and Screening of Soybean Germplasm for the Source of Resistance to it	1 st semi-annual
17.	P-PU/Bio(228)	Evaluation of the role of salt tolerant bacteria in developing resistance of plants to salt stress conditions	3 rd semi-annual
18.	P-AU/Bio (246)	Development of Subunit Recombinant Vaccine(s) and Sensitive Diagnostic Tests for Controlling Infectious Bursal (Gumboro) Disease of Poultry	2 nd semi-annual
19.	P-PU/Bio (251)	Biodiversity: I. Studies on termites of Gilgit and Skardu with emphasis on Heterotermitinae.	2 nd semi-annual
20.	P-GC/Bio (283)	Citric Acid Fermentation by Mutant Strain of <i>Aspergillus niger</i> GCM-7 in Stirred Fermenter.	2 nd semi-annual
21.	C-NARC/Bio (271)	Biology and Host Pathogen Interaction in Powdery Scab of Potato in Pakistan	3 rd semi-annual
22.	P-AU/Bio (286)	Taxonomy, Ecology of Spider Communities of Citrus Orchards and the Role of Spiders as Predators.	1 st semi-annual
23.	C-PMNH/Bio (295)	Studies on Taxonomy and Traditional uses of Economically Important Plants of Chitral	1 st semi-annual
24.	S-AKU/Bio (239)	Elucidation of the Structure and Function of a New Form of Dihydrofolate Reductase	3 rd semi-annual
25.	Biotech/P-NIBGE/Med (4)	Development of Primer based RT-PCR based Diagnostic Test and Study of Hepatitis C Virus genotypes Prevalent in Pakistan.	2 nd semi-annual
26.	C-QU/Chem (303)	Studies on Biologically Active Organotin Compounds containing Silicon and Germanium.	1 st semi-annual

27.	C-PINSTECH/Chem (341)	Exploitation of Cheaper Materials for the Removal of Toxic and Harmful Substances from Industrial Effluents.	1 st semi-annual
28.	F-PU/Chem (315)	Ion Exchange Properties of Metal-III Phosphates.	2 nd semi-annual
29.	S-KU/Chem (321)	Characterization of Plasma Membrane Glycoproteins of Rabbit Corneal Epithelium.	2 nd semi-annual
30.	S-KU/Chem (342)	Influence of Long Chain Branching and High Molecular Weight Components on Elongational and Shear Properties of Polyolefins.	1 st semi-annual
31.	C-QU/Chem (303)	Studies on Biologically Active Organotin Compounds containing silicon and Germanium.	1 st semi-annual
32.	S-KU/Chem (311)	Isolation & Characterization of Antibiotics from Soil Fungi for the Development of Drugs.	3 rd semi-annual
33.	F-PU/Earth (68)	Revision and Compilation of the Stratigraphy of Pakistan.	1 st semi-annual
34.	F-PU/Earth (51)	Geological Bibliography of the Himalayan Karakoram-Hindukush region of Pakistan.	1 st semi-annual
35.	P-CEME/Engg (73)	Design and Development of PC-based Laboratory Test Instruments.	1 st semi-annual
36.	P-UARR/Envr(42)	To Evaluate Suitability of Sewage Sludge as Organic Manure for Crop Production in Potohar Region.	2 nd semi-annual
37.	P-AU/Envr(44)	Studies on Metals Eco-Toxicity of the River Ravi.	2 nd semi-annual
38.	S-SALU/Envr(45)	Floristic Study of Arid Zone (Desert Nara-Region), Sindh .	2 nd semi-annual
39.	S-AKU/Med(161)	Low Urinary Citrate, a Major Risk factor for Calcium Stone Formation in Pakistan- Is it Diet Induced?	2 nd semi-annual
40.	C-PINST/Med(172)	Clinical Application of ¹³ C Urea Breath Test for Diagnosis of <i>Helicobacter pylori</i> Infection and Confirmation of Eradication Following Therapy.	2 nd semi annual
41.	C-QU/Phys (104)	Laser Assisted Atomic Structure studies.	2 nd semi-annual

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| 42. | P-IU/Phys (110) | Generation and Characterization of Hydrogen Methane Cold Plasma. | 1 st semi-annual |
| 43. | C-QU/Phys (111) | Numerical Study of Pinch Dynamics/Stability and Study of Nonlinear Wave Propagation in Magnetized Plasma. | 1 st semi-annual |
| 44. | C-QU/Phys (115) | Quantum State Measurements | 1 st semi-annual |

b) First Annual Report.

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| 1. | S-PCCC/Agr(183/1) | Breeding for Glandless Cotton | |
| 2. | P-AU/Bio(246) | Development of Submit Recombinant Vaccine(s) and Sensitive Diagnostic Tests for Controlling Infectious Bursal (<i>Gumboro</i>) Disease of Poultry | |
| 3. | S-KU/Bio(277) | Assessment of Biological Activity in the Marine Cyanobacterial Species from Coastal and near-shore Environment | |
| 4. | P-GC/Bio(283) | Citric Acid Fermentation by Mutant Strain of <i>Aspergillus niger</i> GCM-7 in Stirred Fementer. | |
| 5. | Biotech/P-NIBGE/Env (5) | Biotechnological Solution of Liquid Effluents from Leather Tanning Industry. | |
| 6. | Biotech/S-AKU/Med (12) | Determination of Leishmania Species using Molecular Biology Techniques. | |
| 7. | C-QU/Chem (303) | Studies on Biologically active Organotin compounds Containing Silicon and Germanium. | |
| 8. | S-KU/Chem (294) | Spectrophotometric & High Performance Liquid Chromatographic determination of Copper, Nickel, Ions, Cobalt, Vanadium, Cadmium, Lead and Mercury using New-Semi-Carbazones as Complexing Reagents. | |
| 9. | F-PU/Earth (52) | Measurement of Runoff and Sediment load from Glaciers of the Rakaposhi and Haramosh Range, North Pakistan. | |
| 10. | F-PU/Earth (50) | Crustal Evolution of the Kohistan Island Arc: Study of Structure Lithostratigraphy and Volcanism in Arc-related Basins. | |
| 11. | F-PU/Earth (66) | Structural and Stratigraphic Analysis of Himalayan Fold-Thrust Belt in Kohat, Krak and Bannu Transect, North Pakistan. | |
| 12. | F-PU/Earth (52) | Measurement of Runoff and Sediment Load from Glaciers of the Rakaposhi and Haramosh Range, North Pakistan. | |

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| 13. | C-PINSTECH/Engg (41) | Determination of Lateral and Vertical Penetration of Canal Water in Reehna Doab using Environmental Istopes. |
| 14. | C-PINSTECH/Engg (70) | Stress Analysis of Piping system subjected to Dynamic Loading. |
| 15. | P-CEWRE/Engg (43) | Impact of Irrigation Management Practices on Nitrate Leaching at Farmers field. |
| 16. | C-PINSTECH/Engg (70) | Stress Analysis of Piping System subjected to Dynamic Loading. |
| 17. | P-CEME/Engg (73) | Design and Fabrication of a Rock Bed Storage System for a Solar Air Heated Hospital at Goma-Skardu, Pakistan. |
| 18. | C-PINSTECH/Engg (38) | Stress Corrosion Cracking and Pitting of low Alloy Steel (LAS) Corrosion in Sour Environment. |
| 19. | P-CEMB/Engg (73) | Design and Fabrication of a Rock Bed Storage System for a Solar Air Heated Hospital at Goma Skardu, Pakistan. |
| 20. | P-AU/Envr(44) | Studies on Metals Eco-Toxicity of the River Ravi. |
| 21. | S-SALU/Envr(45) | Floristic Study of Arid Zone (Desert Nara –Region), Sindh |
| 22. | S-AKU/Med(160) | Analysis of Morphological, Immunohistochemical & Genetic Prognostic Determinants in Predicting Diseases Free Survival of Breast Carcinoma Patients. |

c) Second Annual Reports

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| 1. | F-AU/Agr(182) | Management of Onion Downy Mildew under IPM in the NWFP, Pakistan |
| 2. | P-PU/Bio(228) | Evaluation of the Role of Salt Tolerant Bacteria in Developing Resistance of Plants to Salt Stress Conditions |
| 3. | C-NARC/Bio(271) | Biology and Host Pathogen Interaction in Powdery Scab of Potato in Pakistan |
| 4. | F-PU/Chem (288) | Electro deposition of Alloys. |
| 5. | S-KU/Chem (311) | Isolation & Characterization of Antibiotics from Soil Fungi for the Development of Drugs. |
| 6. | S-KU/Chem (321) | Characterization of Plasma Membrane Glycooprotiens of Rabbit Corneal Epithelium. |
| 7. | F-PU/Earth (50) | Crustal Evaluation of the Kohistan Island Arc: Study of Structure Lithostratigraphy and Volcanism in Arc-related Basins. |
| 8. | P/CEWRE/Engg (43) | Impact of Irrigation Management on Nitrate Leaching at Farmers Field. |

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| 9. | C-PINSTECH/Engg (41) | Determination of Lateral and Vertical Penetration of Canal Water in Rechna Doab, using Environmental Isotopes. |
| 10. | C-PINSTECH/Engg (38) | Stress Corrosion Cracking and Pitting of Low Alloy Steel (LAS) Corrosion in Sour Environment. |
| 11 | P-AU/Envr (44) | Studies on Metals Eco-toxicity of the River Ravi. |
| 12. | P-AU/Envr(44) | Studies on Metals Eco-Toxicity of the River Ravi. |
| 13 | C-QU/Phys (104) | Laser Assisted Atomic Structure Studies. |

**LIST OF PUBLICATIONS PRODUCED THROUGH PSF SUPPORTED PROJECTS
COMPLETED DURING 1999-2000**

- Bughio, A.R., S.M.M.S. Rashdi, T. Hussain, M. Ali and Z. Hussain (1998). Host plant resistance of bioregulator treated cotton to bollworms and sucking complex and its impact on yield & yield components. Proc. World Cotton Research Conf-II Sept. 6-12, 1998, Athens, Greece. (In press)
- Rashdi, S.M.M.S., A.R. Bughio, N.Ahmad and A.A. Rajput (1999). Evaluation of plant growth regulators for the management of cotton pests. Proc. Pak. Cong. Zool. 19 (In press)
- Khan, I.Q., H.A. Samad and N.U. Rehman (1997). Quantity and quality of buffalo follicular oocytes recovered by aspiration and scoring methods for in vitro studies. Pakistan Vet. J., 17(4) 187-189.
- Samad, H.A., I.Q. Khan, N.U. Rehman and N. Ahmad (1998). The recovery, in vitro maturation and fertilization of Nili Ravi buffalo follicular oocytes. Asian Australian J. Anim. Sci., 11(5): 491-497.
- Samad, H.A. and A. Raza (1999). Factors affecting the recovery of buffalo follicular oocytes. Pakistan Vet. J., 19(2).
- Samad, H.A., A. Raza, and N.U. Rehman (1999). Effect of different media on in vitro maturation, fertilization and early embryonic development of buffalo follicular oocytes. Inter. J. Agri. Biol. (In press)
- Soomro, A.R. (1999). Assessment of useful heterosis in glandless *Gossypium hirsutum* cotton strains through their performance in hybrid combination. Pak. J. Bot. (In press)
- Amer, Z., F. Shahina and S. Shahzad (1999). New records of nematodes associated with betelvine. Pak. J. Nematol. 17: 47-50.
- Shahzad, S. (1999). Fungi associated with root and stem of betelvine in Pakistan. Pak. J. Bot. (In press).
- Amer, Z and S. Shahzad (1999). Leaf spot of betelvine in Pakistan. Pak. J. Bot. (In press)
- Ansari, S. and S. Shahzad (1999). Effect of fungicides on in vitro growth of fungi associated with roots of betelvine. Pak. J. Phytopathol. (Submitted).
- Anwar, F. & S. Sahzad (1999). Interaction of microorganisms with pathogenic fungi isolated from Betelvine roots. Pak. J. Phytopathology (Submitted)
- Siddiqui, I.A.S., Ehteshamul-Haque and A. Ghaffar (1998). Effect of fungicides on the efficacy of *Rhizohum meliloti* and *Bradyrhizobium sp.* in the control of root rot disease of chickpea (*Cicer arietium L.*) Pak J. Bot. 30: 69-74.
- Siddiqui, I.A., S. Ehteshamul-Haque and A. Ghaffar (1998). Effect of rhizobia and fungal antagonists in the control of root infecting fungi on sunflower and chickpea. Pak J. Bot. 30: 279-286.
- Siddiqui, I.A., S. Ehteshamul-Haque and A. Ghaffar (1999). Use of *Pseudomonas aeruginosa* with rhizobia in the control of root rot disease of mashbean. Pak J. Bot. 31: (1) (In press).
- Siddiqui, I.A., S. Ehteshamul-Haque and A. Ghaffar (1999). Use of rhizobia in the control of root infecting fungi in Okara. Pak J. Bot. 31: (2).
- Siddiqui, I.A., S. Ehteshamul-Haque and A. Ghaffar (1997). Effect of urea and potash on the efficacy of rhizobia in the control of root infecting fungi of mungbean and mashbean. Acta Agrobotanica (submitted)

- Siddiqui, I.A., S. Ehteshamul-Haque and A. Ghaffar (1997). Use of *Pseudomonas aeruginosa* plant growth promoting bacteria and rhizobia in the control of root infecting fungi of soyabean. Tropical Science (Submitted).
- Siddiqui, I.A., S. Ehteshamul-Haque and A. Ghaffar (1999). Effect of rhizobia in the control of root infecting fungi under laboratory and field conditions. Tropical Science (Submitted)
- Mushtaq-ul-Hassan, M., M. Mahmood-ul-Hassan, M.A. Beg and A. A. Khan (1999). Reproduction and abundance of house share in the villages and farm houses of central Punjab (Pakistan). Pak. J. Zool. 31(30) 297-299.
- Mahmood-ul-Hassan, M., M.A. Beg and H. Ali (1999). Diet of the barn owl (*Tyto alba*) in central Punjab (Pakistan). Pak. J. Zool. (Submitted).
- Mustafa, S., A. Naeem, S. Murtaza, N. Rehana and H.Y. Samad (1999), Comparative sorption properties of metal (III) phosphates; Journal of Colloid and Interface Science 220. 63-74.
- Mustafa, S., A. Naeem, S.U. Nisa, S. Murtaza and M. Khalid (1999), The mechanism of alkali metal ion sorption by iron (III) phosphate. Reprinted from Adsorption Science & Technology 17(9), 715-729.
- Zaidi, J.H., R. Iqbal, F. Naeem, E. Richellson and B. Cusade (1999), Synthesis of the analogs of indole based mimetic of neurotensin for structure activity relationship studies. 10th National Chemistry Conference, held at Quaid-e-Azam University, Islamabad. October 28-30.
- Anwar, G., R. Ali and H.A. Shah (1995). Parametric interaction in a sinusoidal periodic piezoelectric semiconductor plasma. Presented at 5th National Symposium on Frontiers in Physics, Quaid-e-Azam University Islamabad, December, 26-28.
- Ali, R. and H. A. Shah (1997). Helicon solitons in a layered semiconductor plasma via Zakharov Equation. J. Phys. Condens. Matter 9:7583-7591.
- Ali, R. and H. A. Shah (1999) Model for electron heating in the solar wind. Bulletin of Pure and Applied Sciences (India), would appear in Vol. 18 D.
- Ali, R. and H.A. Shah, (1998). Density wave propagation in layered high-temperature superconducting plasma. J. Phys. Condens. Matter (Submitted).
- Durrani, R. and N. Ikram (1996) Universality in dislocation regeneration. J. Mat. Sci. Technol., 12, 185.
- R. Durrani, N. Ikram and T. Maqbool (1998). On adhesion and fracture. Australian Journal of Physics (Submitted).
- Durrani, R., N. Ikram and T. Maqbool (1998). The fracture strength of solids near the percolation threshold. Canadian Journal of Physics (Submitted)
- Ahmed, R. and N. Ikram (1998). A study of nonlinear equations in disordered structures. J. Nat. Sci. and Math. Lahore, Pakistan (Submitted).
- Ikram, N. A book entitled "Fractals" has been accepted for publication by the National Book Foundation, Islamabad.
- Mazhar, R. I. R. Durrani and N. Ikram (1998). Low temperature stability in nonperiodic structures. Bulgarian Journal of Physics, Sophia (Submitted).
- Mazhar, R., I.R. Durrani and N. Ikram (1998). Spiraling self avoiding walk and chaotic correlations. Bull. of Pure and Appl. Sci., Section D. Physics, India (Submitted).

- Mazhar, R., I.R. Durrani and N. Ikram (1998). Self organizing of magnetic domain patterns. Journal of Tech. Physics, Poland (Submitted).
- Hussain, N., I.R. Durrani and N. Ikram (1998). Fractional diffusion equation for transport phenomena in random media. Egyptian Physics, Cairo (Submitted).
- Hussain, N., I.R. Durrani and N. Ikram, (1998). Fluid propagation in fractal porous media. Indian J. of Theoretical Physics (Submitted).
- Mirza, I., S.H. Mirza, A.H. Khan, M. Rehman and S. Mirza (1998). Comparison of different identification techniques in diagnosis of *H.pylori* infection. Paper presented at 22nd Annual conference of PAP held at Multan. Abst.p.p.60.
- Awan, M.R., G. Akbar and M. (2000). Arshad Ethnobotanical importance of Cholistan Desert, Punjab, Pakistan. As a chapter for a book on Cholistan Desert being compiled by the Cholistan Institute of Desert Studies, Islamia University, Bahawalpur (Submitted).
- Awan, M.R. G. Akbar and M. Arshad (200). Preliminary studies on economically important plant species of cholistan desert presented in a Scientific Conference organized by Department of Botany, University of Peshawar (In press).

**GRANTS SANCTIONED FOR CONFERENCES, SEMINARS, SYMPOSIA ETC.
DURING YEAR 1999-2000**

<u>No.</u>	<u>EVENT</u>	<u>ORGANIZATION</u>	<u>AMOUNT</u>
1.	6 th International Symposium on Advanced Materials	Dr. A.Q. Khan Research Laboratories, Rawalpindi.	25,000/-
2.	12 th All Pakistan Statistical Association/Conference	Pakistan Statistical Association (PAS), Lahore.	15,000/-
3.	2 nd National Conference of Plant Pathology.	Pakistan Phyto-pathological Society, University of Agriculture, Faisalabad.	20,000/-
4.	Science Day 99. Holding of Science Model Competition, Science Quiz & Essay Competition.	National Museum of Science & Technology, Lahore.	32,400/-
5.	10 th National Chemistry Conference	Department of Chemistry, Quaid-i-Azam University, Islamabad.	25,000/-
6.	Seminar on Packing & Food Machinery in China.	COMSATS, Islamabad.	30,000/-
7.	Sequence Stratigraphy & Clastic System Workshop.	National Centre of Excellence in Geology, University of Peshawar, Peshawar.	20,000/-
8.	8 th International Symposium on Natural Product Chemistry.	HEJ. Research Institute of Chemistry, University of Karachi, Karachi.	30,000/-
9.	International Seminar on Prospects of Saline Agriculture.	Pakistan Academy of Sciences.	25,000/-
10.	International Conference on Technology & Development in the new Millennium.	University of Karachi, Karachi.	30,000/-
11.	20 th Pakistan Congress of Zoology	University of Sindh, Jamshoro.	35,000/-
12.	7 th Biennial Conference of Pakistan.	Department of Physiology, University of Karachi.	25,000/-
13.	3 rd Biennial Conference of Pakistan Society for Microbiology, Lahore.	Department of Microbiology, University of Karachi, Karachi.	20,000/-
14.	First Regional (Sindh-Balochistan) Workshop in Bio-Organic Chemistry.	University of Sindh, Jamshoro.	15,000/-
15.	International Symposium on Modern Aquaculture and Fisheries.	Pakistan Fisheries Society, Lahore.	25,000/-
16.	9 th Congress of Asian & Oceanian Biochemists & Molecular Biologists (FAOBMB)	Pakistan Society for Biochemistry & Molecular Biology, Lahore.	25,000/-
		TOTAL:-	3,97,400/-