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PROJECT COMPLETION  
REPORT - MART  
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BY

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## MANAGEMENT OF AGRICULTURAL RESEARCH AND TECHNOLOGY MART PROJECT

### 1. HISTORY OF PROJECT:

The Management of Agricultural Research and Technology (MART) Project was approved by ECNEC on 24.01.1985 at a total cost of Rs.447.00 million (US\$ 34.385 million) with GOP contribution of Rs.14.750 million in local currency/local cost. The project was approved for a period of sixty months (5 years) from 1984-85 to 1989-90 vide ECNEC letter No. ECNEC 18/1/85-MART. The United State Agency for International Development (USAID) provided Rs.432.250 (\$ 33.25) million grant in aid for this project. The project consisted of five components viz; (1) Research Management and Administration, (2) Information Transfer, (3) Training for Agricultural Research Net work, (4) Arid Zone Research and (5) Wheat and Maize Coordinated Program. Under each of these components the following elements were provided; Technical Assistance, Training, Commodities and others including; civil works and research studies etc. The Wheat & Maize Coordinated Program component commenced from August 9, 1984 from FEC while the other project components were started in March, 1985. The first annual budget was allocated in 1985-86.

In February, 1989 the project was reviewed by an external team of foreign experts. The team appreciated the achievements made under the project and also highlighted short falls and recommended that the project be extended to capitalized on the vast resource base developed at huge cost during the past five years in the form of excellent physical facilities and a large cadre of high level trained manpower in the provinces and federal research system to undertake meaningful research relevant to the needs of endusers and to complete the remaining work of the project under training, technical assistance, procurement of commodities and completion of civil works started under the project.

Following this recommendation USAID agreed to extend the project with some additional resources. The recommendation of mid term evaluation team of February, 1989 was discussed in the project coordination committee meeting held on 28.05.1990. In this meeting it was decided to extend the project upto August, 1994 with additional resources. Thereafter the project was revised at a total cost of Rs.837.865 (\$ 41.192) million with GOP contribution of Rs.34.000 (\$ 1.500 million) in local currency. The revised project was approved by ECNEC on 11.4.1992 vide letter No.ECNEC-2/M/92. The revised project consisted of three components viz; 1) Research Responsiveness, 2) Technology Development and Transfer and 3) Information dissemination. The original PC-I provided an annual

recurring cost of Rs.2.450 million for sustaining the infrastructure build, facilities created, activities started and staff recruited under the MART Project. Under the revised PC-I the recurring cost was increased to Rs.4.500 million.

The project activities of all the components will be completed viz; Technical Assistance , Training, Procurement of commodities, civil works and other research support by August, 1994 within the approved total cost under the revised project PC-I. Proposal for the transfer/conversion of the project to non-development side is made from year 1994-95.

## 2. OBJECTIVES:

The main objective of the project is to strengthen the capabilities and performance of the National Agricultural Research System in Pakistan to enable it to generate and disseminate relevant and improved technologies.

The other objectives are as follows:

- To increase the capacity to plan, manage and evaluate agricultural research needs and priorities at the national and provincial level.
- To strengthen the capability within the national agricultural research network to manage, account for and utilize financial resources.
- To establish long term institutional linkages between Pakistan national agricultural research network and selected commercial agribusiness firms.
- To establish a critical mass of research skills and managerial talent within the national agricultural research network.
- To institutionalize a multi-disciplinary Farming System Research (FSR) program.
- To institutionalize the capacity within the national agricultural research network to produce and disseminate new technologies responsive to the needs of client groups (farmers, agro-industry, extension, agricultural educators, research scientists, planners, and policy makers.
- To expand the in-service training capacity at the federal and provincial levels.

- To improve the capacity of the Arid Zone Research Institute(AZI) to plan and carry out effective research on agricultural problems applicable to the arid and high altitude areas of Balochistan and similar areas of Pakistan.
- To implement NARC Research Master Plan.
- To develop agricultural research master plans for selected provincial agricultural research institutes.
- To strengthen the libraries of selected provincial agricultural research institutions and establish a material audio-visual media resource library system at NARC and agricultural communication support cells in the provinces.
- To undertake and support actual research activities that are designed to identify and address the broader aspects of commercial agriculture, particularly those that move beyond production to processing and marketing.
- A MART funded agribusiness specialist/economist will work with Pakistani colleagues to develop a research program linked with FSR. Additional linkages with the Chamber of Commerce in each province as well as industrial and farmers group will be formulated. Studies/topics will be chosen that are of interest to private agribusiness, including market research and feasibility of product development. An explicit goal will be joint financing and collaboration in the studies with private sector groups.
- To undertake innovative research on problems of agricultural productivity with emphasis on stressed/water-logged/saline lands in all the provinces of Pakistan.

### 3. ACCOMPLISHMENTS:

#### i. Technical Assistance(T.A)

##### Long Term T.A:

There was provision of 728 person months of long term Technical Assistance under the various components of the revised project. Of this 719 person months have been availed.

### Short Term T.A:

The revised project also provided 224 person months of short term technical assistance. Of this only 153 person month have been availed for 104 consultancies.

### Local Technical Assistance:

Under the revised PC-1, 130 person months of local technical assistance are provided. Of this 119 person months have been availed.

## ii. Training:

### Long Term Training:

The revised PC-1 provided for 96 long term training facilities leading to M.Sc and Ph.D degrees. Of these 88 slots have been availed sofar and the remaining 9 could not be availed on account of non availability of suitable provincial candidates upto a fixed dead line. Out of 88 trainees 45 have returned and other are completing their degrees. The unused training slots were converted to short term training for the respective province.

### Short Term Training:

A total of 159 (595 person months) short term training facilities were provided in original PC-I. After the project amendment 20 more slots were added to the project making a total slots to 179 all of these slots have been availed. Six additional slots for Sindh Province were created through conversion of long term slots.

### Visits Abroad:

67 federal and provincial scientists participated in various conferences, workshops, seminars and visits in their fields of specialization on invitation from several international agencies and research organizations.

### Incountry Training:

The PC-I provided 205 incountry training courses for training of 4705 persons. Of these 143 courses have been held sofar, and a total of 4715 persons were trained in the various fields of agricultural research and management. Detailed report is given seperately.

## iii. Procurement of Commodities:

Several lots of lab and field equipments, Audio Visual equipment, computers, vehicles, agricultural machinery and library equipment were procured under the MART project. Total value of

these commodities is US\$ 6.958 Million, details are given below:

**Lab & Field Equipment:**

Lab. and field equipment worth \$ 3.81 million were supplied to the provincial agricultural research institutes and agricultural universities under the MART Project. Equipment for AZRI worth US\$ 490.518 were procured and distributed.

**A.V Equipment:**

Sophisticated video and audio production, recording and editing equipment worth US\$ 219,021 has been procured and distributed to all Provincial Agriculture Communication Support Cells and A.V Studio of NARC.

**Other Equipment:**

In the second phase of procurement, specialized equipment were procured to cover the needs of the weak sectors identified in the revised project. The details of these equipment is as given below:

**Center for Advance Molecular Biology, Univ. of the Punjab:**

An IFB was floated for the equipments suggested by CAMB, it includes highly sophisticated equipment like DNA Synthesizer, Ultracentrifuge(80,000 RPM) HPLC and a generator etc. The equipment has already been delivered to Director, CAMB, University of Punjab, Lahore. Total value of the equipment is US\$ 433,215.20

**High Protein and Full Fat Soybean meal:**

USAID earmarked 100,000 dollars for feeding trails of Soybean meal with the help of American Soybean Association. An IFB floated for the purpose, different varieties of Soybean meal have already been provided to ASA, the feeding trails at three places i.e. Karachi, Lahore and Islamabad were conducted. Total value of Soybean received is US\$ 85,000 rest of the petty items were being purchased locally.

**Fully Built Drills for CIMMYT:**

CIMMYT proposed to purchase special type of fully built drills from New Zealand. USAID provided a special waiver for import of 10 drills valuing US\$ 78,443.20. In addition 10 other partially assembled drills were also imported and locally assembled, some parts were manufactured/procured locally.

#### **Library Strengthening Equipment:**

For strengthening of 21 libraries of agricultural research institutes and universities in the research system, library equipment and reference material worth US\$ 1.000 million were procured and distributed.

#### **A.V. Equipment:**

Audio Visual equipment procured through open bidding vide RFQ.No.Pak-0468/PARC/91-39. Total cost of this equipment is US\$ 0.330 million. The equipment has been distributed to NARC AV unit and Provincial Agricultural Communication Support Cells.

#### **ARI, Sariab Equipment:**

Laboratory equipment for Agri. Research Institute Sariab, Quetta amounting to US\$ 125,283.00 was procured and delivered at ARI, Quetta.

#### **NARC Spar Parts:**

Spare parts for existing equipment of NARC on single source basis amounting to US\$ 1,91,201 was procured.

#### **K&N Poultry Equipment:**

Procured equipment for Private Sector firm K&N Poultry Breeders amounting to US\$ 1,12,000. Another lot of equipment worth US\$ 80,000 was also procured.

#### **NARC Agriculture Machinery:**

Procured agricultural machinery including tractors for NARC amounting to US\$ 69,357.00

#### **iv. Computers:**

A total of 320 computers have been provided under the MART project for different federal and provincial agricultural research institutes and universities in the system. 50 computers worth US\$ 288,557 were provided in first phase and 270 computers worth US\$ 1.13 million procured in 2nd phase. Under this procurement 9 laptop and 10 desktop computers were also provided and a system of desktop publishing has been setup in the provincial Agri. Information Bureaus and PACSCs. 90 computers were allocated to Sindh Agriculture University, Tandojam.

Another 120 computers were procured for the University of Agriculture Faisalabad out of ACE MART component. Cost of these computers is US\$ 0.800 million. Distribution list attached as annexure-III.

v. Vehicles:

88 vehicles were supplied under the MART Project. These were distributed to the various provinces and components of the MART Project. Total cost of these vehicles is US\$ 539,500 million. Distribution list attached at annexure-IV.

vi. Civil Works:

**A.V Center and Training Institute:**

Fully furnished facilities of an Audio Visual Center and Training Institute have been constructed at NARC under the MART Project. The building is complete and fully functional except. Production of Audio and Video documentaries, interviews and radio programs has begun. Total cost of building is Rs.1,79,54,837.00, including HVAC cost of Rs.32,35,485.00. Covered area of the building is 26,900. Sq.ft

vii. Others:

**Establishment of Provincial Agri. Communication Support Cells:**

In all the four provinces under the provincial set-up Provincial Agricultural Communication Support Cells have been established. These cells are catering the needs of Provincial Research System for production of research documentaries and communication in collaboration with the Agriculture Research Institutes, Agricultural Universities, Extension Departments and Agri. Information Departments. These cells have been provided with latest production, recording, editing, duplicating and relay equipment. In addition they have been provided with vehicles, operational support, staff training and funds for renovations etc. The incharge of these cells participate in the meeting of TITC. These Cells are working in the close collaboration of AVC, NARC.

These units are located at 1) Ayub Agri. Research Institute, Faisalabad (2) Agri. Research Institute, Tandojam, (3) NWFP Agriculture University Peshawar (4) Deptt. of Agri. Information Lahore (5) Department of Agri. Extension Baluchistan and (6) NARC.

### **Strengthening of Agricultural Libraries:**

Under this program of the project 21 selected libraries of major agricultural research institutes, agriculture universities and colleges, have been equipped with latest library equipment (computer, microfiche, printer, readers etc.) and adequate number of core and current journals in the form of microforms and reference materials on CD-Rom (International Agricultural Bibliographic and Reference Database). All the libraries were also provided with specifically designed furniture which included computer table desks for photocopies and microfiche readers, printers, TV/VCR trolleys and revolving chairs. At some locations air conditioners were also provided. Library and research staff has also been provided training in the use of library and information system. Total cost of imported equipment is US\$ 1.00 million. A National Agriculture Information Database is in the process of completion. The international agriculture bibliographic and reference database on CD-Rom has been established and making arrangement for specialized subject group and individual reference needs has been made.

### **National Network of Agriculture Communicators:**

A national Technical Information Transfer Committee (TITC) composed of leading agricultural communicators from private organizations as well as Federal and Provincial Institutes has been formed. TITC meets at regular intervals. The function of this committee is to exchange information, recommend ways to improve agricultural communication among public and private sector end users and to coordinate agri-communication activities in country. Four corresponding Provincial Technical Information Transfer Committees, have also been established each including private sector representative as member. These committees, the PACSCs and NARC AV unit forms the base for a national network of agricultural communicators. The amended project is providing support for TITC meetings, a national level workshop each year and training to the PACSC staff and cooperating extension personnel.

### **NARC Master Research Plan & its implementation:**

An important component of the MART project is the development of NARC Master Research Plan to year 2000. This plan has been completed with the involvement of every scientist and all the programs working at NARC. The aim of the Master Research Plan is to convert NARC resources into useful projects which include such things as research results, technologies, information material and scientific expertise. The prime users of the Master Plan are Director General, his Directors, Program Leaders and NARC Scientists. It is also an important document for PARC especially the Executive Committee, Provincial Institutes and potential donor agencies. Now this plan is under implementation stage. Similar exercises is being done for Baluchistan province, AZRI and Punjab with assistance provided under the MART Project.

## Farming System Research:

Farming System Research is a rural community oriented interdisciplinary approach to increase agricultural productivity, income and quality of life. Scientists and farmers work together to verify and adopt experiment station technologies to specific ecological conditions. The distinct features of farming system research are its pragmatic approach, holistic perspective and farm orientation. FSR work was started in 1986 in Pakistan. PARC has organized several workshops. Scientists and extension officers, from all over the Pakistan trained through eleven FSR travelling seminars/courses. After these workshops various target areas representing contrary agro-ecological and socio-economic conditions and farming system were selected. These include Mansehra, Dohodial (NWFP), Shahkot, Proka, Chakwal, Gujarkhan Mandra (Punjab), Hala & Tando Mohammad Khan (Sindh) ARI (Kank Valley) Baluchistan and Fatehjang (NARC).

Under the amended project FSR is serving as a forum to promote the commercialization of proven technologies. A no-till wheat drill, hy-brid forage seeds are two examples of products already developed by FSR and commercialized by agri-business. FSR has also provided a chance for women participation through its women component and several training held for rural women who were motivated and trained to increase their family income through raising of poultry and better care of food grains etc.

Sofar FSR has validated 44 interventions, of these 26 have been adopted. The economic benefits of these interventions have been computed and found highly profitable. Some eight scripts, shots list, fact sheets and articals have been prepared and 9 fact sheets and leaf lets prepared.

The scientists have been introduced and enrolled to the FSR approach. Additionally demonstrated improvements have increased productivity and raised net farm income.

Under the revised project FSR is endeavoring to develop agriculture input-output models and develop strategies/methodologies for strengthening marketing ability of the grower and institutionalization of farming system research.

The institutionalization work has been completed in Baluchistan, other provinces are being encouraged to follow the example of Balochistan. NARC has already deputed 3 full time and one 50% time basis scientists to FSR. Operational funds for the years to come will be arranged out of non development budget on the conversion of the project. Sub-project wise detailed reports is prepared as a seperate volume.

## **Agribusiness Relations Directorate:**

PARC has established the Agri-business Relations Directorate to facilitate the transfer of know-how and commercialization of technologies generated in the agricultural research system of Pakistan under the collaborative research agreements. MART project has provided a long term local expert to ABRD for the purpose of compiling comprehensive information on agribusiness firms and activities as well as research information available for commercialization and catalytic funding for pilot production and market development. Some 22 agreements were executed with various private agri-business firms for transfer of various technologies. Other 54 technologies developed by the research system have been identified and are ready for transfer to private agri-business. The directorate is empowered to enter into agreement with private firms for joint research undertaking in which public sector research facilities address specific problems faced by private firms which also contribute to the joint research effort. Under the agribusiness directorate a visit of high level scientists and private sector agribusiness-men was arranged to different agricultural research institutes of USA to look into how they are linked with and address to the private sector research needs. As a follow up of the visit a long term strategy is being made for linking the research institutes with private sector agribusiness to address to their needs and problems.

## **Enhancing Research Undertaking of Private Sector Needs:**

A special program coordinated by PARC Training Directorate has been prepared to facilitate reentry of recent overseas graduates into the national system as well as to link research scientists with private agribusiness and formalizing their relationship with these firms.

## **Incentives for Responsiveness to Private Sector.**

Three types of incentives have been identified and are being offered to the scientists for further development under the project; a) credit for private sector linkages in employee evaluation, b) financial reward grants and honoraria, c) contact and opportunities. The administrative directive have already been issued by PARC and scientists have responded to these incentive positively and have started working in mutual interest and are earning name, fame and financial benefits as well and private sector problems and needs are being directly targeted by the research scientists.

## **Private Sector Dissemination:**

A special quarterly bulletin is issued "Technology Report" which is creating awareness of new research and scientific developments among the private sector agribusiness. Its circulation is being increased from 500 to 1000 so that it may

reach to maximum endusers. With more involvement of agribusiness in collaborative relationship, the dissemination to private sector will become demand driven. Planning has been completed to produce a quarterly newsletter of research and technical information, success stories of agribusiness research collaboration, interviews of collaborating scientists and agribusiness leaders and information about proven and farm tested technologies.

#### System Analyses:

The nation wide systems analyses were judged to be unworkable, a strategy was adopted to review analyze and make recommendations for improving smaller, discrete elements of the research system. Under this component, different reviews were made viz, (1) Review of National Coordinated Program, (2) the Management Review of NARC, (3) Review NARC Maintenance Organization, (4) the Review of the Soil Deptt. of UAF and (5) Review of the Plant Breeding and Genetics Deptt. of SAU and many others.

#### Arid Zone Research:

Arid Zone Research is one of the five components of the MART project. Under this component research activities of Arid Zone Research Institute(AZRI) were strengthened through technical assistance from ICARDA in the form of equipment, computers and vehicles supply of research operation funds and purchase of livestock & import of chemicals for research trials. The AZRI is responsible for research in the vast areas of dry land majority of which occur in the Balochistan. Under this support the following research agenda was set for AZRI.

- Improvement of livestock management.
- Improvement of rangeland management and rehabilitation.
- Commercialization of introduced germplasm of annual, perennial grasses and legumes, as well as range forage scrubs and tress.
- Improvement of forage and dual purpose crop agronomic strategies by water harvesting techniques.
- Evaluation of socio-economic aspects of sheep and goat production and associated forage and dual purpose crop production.
- Increasing the quality of hides .

The AZRI research products to date include drought tolerant four wing saltbush, 2 lines of high yielding drought resistant bread wheat, 2 varieties of bold seeded lentil, wooly pad vetch (*vicia villosa desicrop*), camel drawn seed drill and different techniques of water harvesting. The scientists are busy in large

scale adoption of these technologies and commercialization of AZRI's research products through the help of various provincial agencies and agribusiness activities.

#### Research Grant Program:

The competitive research grants program focusing on increased productivity of environmentally stressed lands of Pakistan with a total cost of \$ 3.00 million was started under revised PC-1 in 1990. This program is offering support to scientists in developing new technologies and refinement of existing technologies into marketable production which are environmentally sound and promote the sustainability of Pakistan Agriculture System. Grants are awarded through U.S National Academy of Science-Board of Science and Technology for International Development (NAS-BOSTID). All projects involve assistance from and collaboration with the very best US Scientists in their design, implementation and evaluation. Each project is visited by BOSTID staff. The equipment required by research project is directly supplied/arranged by BOSTID. A research grant committee including prestigious scientists of Pakistan & BOSTID examined all the proposals and awarded the grants on their evaluation. Some 27 grants have been awarded with total value of \$1,442,954.00 million and the equipment worth US\$ 125,255.42 million was also supplied. The research grants studies are under way and results will come in June, 1994 on the completion of the project. Detailed report is grant wise annexed separately.

#### Computerization of Accounting System:

MART has provided assistance in the form of computers, accessories, training to staff and technical assistance for software development for the computerization of PARC's accounting system and to remove the problems being faced currently in its effective use.

#### MART Contractors:

MART has engaged 3 major contractors during its life for the implementation of its various components and activities. These include; Winrock International, CIMMYT, ICARDA and BOSTID. CIMMYT was working on the Wheat and Maize Coordinated Program and has completed its work in 1990. Winrock International was assigned Research Management and Administration, Information Transfer and Training for Agricultural Research Network components and it has also completed its tasks. The ICARDA was engaged for Arid Zone Research and is still working on this component under a grant arrangement.+ BOSTID is providing assistance in implementation of studies on increasing productivity of stressed lands in Pakistan. Contract value of the MART project individual contractors are; Winrock International \$8,123,971, ICARDA \$ 4,505,316, CIMMYT \$ 3,300,910 and BOSTID \$ 3,000,000

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## **MART Research Planning Management and Marketing Group:**

Recently the MART project has constituted the MART Research Planning, Management and Marketing group. This group consists of one young scientist each from MART cooperating units. Purpose of this group is to provide management and planning support to their respective units. These scientist are working very closely with MART management in PARC and USAID. It is a model group of scientists working at NARC-PARC.

## **MART Consultant Reports:**

Under the three T.A contractors various consultants have produced more than 200 very valuable reports research papers, articals and status papers. These reports have been circulated to all major agri. libraries, and concerned scientists for their use and implementation of the recommendations of these reports. MART has also engaged a local consultant to review the reports of these consultants, summarize the recommendations and ascertain the status of implementation of the recommendations. -- This consultant's reports has been widely circulated among the planers, research managers and scientists.

## **Project Coordination & Control:**

For better coordination among MART PARC/NARC Units, cooperating provincial institutes, donor agency and other related agencies a Project Coordination Committee(PCC) was formulated since the inception of MART project. This committee is represented by provincial D.Gs of Agriculture Research. Vice Chancellors of Agri. Universities, representative of Provincial Planning & Development Departments and representative of GOP. This committee meets regularly to supervise the progress of the project and give policy guidelines on all project related issues. The MART project was also revised on the recommendation of the Project Coordination Committee.

From PARC side Chairman, PARC is the incharge of the project and Project Secretary is his key person to supervise the implementation work of the project with his team of a scientific officer and the support staff through a Project Implementation Unit. This unit works in direct supervision of Chairman, PARC and close Coordination with USAID, GOP and all cooperating provincial agencies.

## **Budgetary Position:**

Upto June, 1994 MART project has utilized Rs.804.693 million against a total allocation of Rs.837,865 million out of this total expenditure of Rs. 789.217 is FEC and Rs.15.476 is LC detailed yearwise allocation and utilization are given at Annex-I.

#### 4. INCREMENTAL STAFF:

In the revised PC-I, 44 staff positions of different scales have been provided for AVC and Training Institute at NARC (30 for AVC and 14 for Training Institute) of these 40 positions have been filled so far. The remaining staff positions will be filled soon. Scales and nomenclature of various posts were revised to make them suitable according to the requirements of the Audio Visual Communication Center and Training Institute.

Against a total provision of 44 positions in the revised PC-1 40 positions have been reflected in the budget with 25 positions in BPS 16-19 and 15 in the BPS-4 to BPS-15 upto June, 1992-93. Category wise detail is given below:

| <u>CATEGORY</u> | <u>PC-1</u> | <u>BUDGETED 1992-93</u> |
|-----------------|-------------|-------------------------|
| BPS-19          | 1           | 1                       |
| BPS-18          | 7           | 3                       |
| BPS-17          | 18          | 18                      |
| BPS-16          | 3           | 3                       |
| BPS-15          | 2           | 2                       |
| BPS-7           | 2           | 2                       |
| BPS-5           | 1           | 1                       |
| BPS-4           | 10          | 10                      |
|                 | -----       | -----                   |
| TOTAL:          | 44          | 40                      |

(Details of the in position staff is given at Annex-II)

#### 5. FACILITIES AVAILABLE WITH PROJECT:

On completion of the project following facilities would be available with the PARC/NARC as a part of MART Project.

1. Audio Visual Center: A fully furnished, air conditioned and equipped with latest, audio visual equipment and a full fledged studio at NARC.
2. Fully furnished building of extended training institute equipped with latest training equipment.
3. Fully furnished computer training lab with a training facility of 40 persons at a time.
4. Computer repair and maintenance workshop equipped with repair tools, diagnostic instruments necessary spares and trained staff.

5. Some 65 computers with all peripheral equipment for the whole NARC/PARC sub-system. Total of 450 computers in the whole research system.
6. Vehicle and most modern lab, field and Audio Visual equipment worth more than \$ 1.00 million.
7. A total of 40 persons in positions, who are highly qualified and selected after a long selection process. These personnel are of high professional skills and are working as full team for indoor, outdoor production of video and audio programs and training of scientists & researchers.
8. A total of 88 persons imparted degree training (Ph.D and M.Sc) from American Universities.
9. A total of 159 persons trained from international institutions in the field of their work for short term.
10. More than 200 reports prepared by different foreign and local consultant under long term and short term T.A.
11. A more strengthened AZRI with vehicles, equipment, computers, training and operational funding support in collaboration with ICARDA.
12. Five provincial agricultural communication support cells with modern A.V equipment, trained staff, vehicles and seed money for operation/renovation of cells.
13. 21 major agriculture libraries strengthened through supply of library equipment, and reference material on CD-Rom.
14. A fully funded and equipped farming system research program at NARC and in all provinces.
16. Approximately 5000 scientists, researchers research managers, planner, policy maker, field staff and technicians locally trained.

6. REASON FOR CONVERSION TO CURRENT EXPENDITURE AND DETAILED JUSTIFICATION:

It was agreed upon by the Government of Pakistan and USAID that at the time of termination of the project, it will be converted into non-development side or current expenditure of PARC, Govt. of Pakistan.

The main objectives of the MART project to construct Audio Visual center, Audio visual studio, training institute and others allied facilities at NARC, farming system research program and recruitment of staf, provision of equipment vehicles and computers, manpower training and technical assistance have been completed. Since agricultural research, production of audio visual documentaries, interviews TV program , training of scientists and staff for the better performance of agricultural research and communication of the knowledge and transfer of technologies will be a continuous process in Pakistan. It is, therefore necessary that manpower recruited and trained in the project shall continue to function to capitalize on the vast resources, to generate technologies and dissemination of knowledge for increasing the agricultural production in Pakistan.

As contained in the objectives of the project that main purpose was to strengthen the capabilities and performance of the National Agricultural Research System in Pakistan to enable it generate and disseminate relevant and improved agri. technologies to the farmers. In order to make best use of these capabilities so developed under the MART project for proper dissemination of knowledge and technologies absorption of the highly experienced qualified and trained staff, appointed after a lengthy process of selection, o regular basis on current budget side is highly imperative. These staff has also been trained with lot of investment from local and foreign institutes and universities.

7. BUDGET ESTIMATES FOR THE YEAR 1994-95:

Estimated expenditure during the financial year 1994-95 is detailed below:

| <u>Components</u>  | <u>Rs. in Million</u> |
|--|-----------------------|
| - Salaries and benefits officers and staff.              | 2.500                 |
| - Maintenance of building.                               | 0.100                 |
| - Maintenance of equipment computer and office machines. | 0.200                 |
| - Farming system res. studies.                           | 0.500                 |
| - Consumable stores & spare.                             | 0.300                 |
| - Vehicles running cost & maintenance.                   | 0.200                 |
| - Utilities.   | 0.300                 |
| - Communication, TA/DA.                                  | 0.200                 |
| - Others expenses.                                       | 0.200                 |
| Total:   | 4.500                 |

#### 8. MINIMUM STAFF REQUIREMENT:

The following staff already recruited under the MART project is required to continue the activities on completion of the development project to be transferred to non-development side w.e.f August, 1994 or June, 1994.

| <u>CATEGORY</u> | <u>PC-1</u> | <u>BUDGETED</u><br><u>1992-93</u> | <u>REQUIRED</u> |
|-----------------|-------------|-----------------------------------|-----------------|
| BPS-19          | 1           | 1                                 | 1               |
| BPS-18          | 7           | 3                                 | 7               |
| BPS-17          | 18          | 18                                | 18              |
| BPS-16          | 3           | 3                                 | 3               |
| BPS-15          | 2           | 2                                 | 2               |
| BPS-7           | 2           | 2                                 | 2               |
| BPS-5           | 1           | 1                                 | 1               |
| BPS-4           | 10          | 10                                | 10              |
|                 | -----       | -----                             | -----           |
| TOTAL:          | 44          | 40                                | 44              |

(Details of the in-position staff is given at Annex-II)

#### 9. JUSTIFICATION OF POSTS TO BE TRANSFERRED TO NON-DEVELOPMENT:

The major reason for the transfer of the positions created/filled under MART project from development to non-development side is to capitalize on the vast resource base developed at huge cost during the past 10 years in the form of excellent physical facilities and high level trained manpower to undertake meaningful research and dissemination of relevant technologies.

The second justification for the creation of these posts is that there was a provision of recurring cost of Rs.4.500 million under the revised PC-1 for this purpose which will be required for the establishment and operation.

The third justification for these posts is that NARC AV center and the staff is catering to the needs of PTV, PTV2, NTM, Radio Pakistan and information bureaus for programs interviews, documentaries related Agri. Research Training Institute is catering to on the job incountry short training of scientist, researchers, research managers, policy makers, Agriculture library staff and others in the agriculture research system. These institutes are addressing to the changing needs of both the scientists and farmers.

## i) Yearwise allocation and expenditure upto 30.06.1994.

| Year    | ADP Allocation | Expenditure         |
|---------|----------------|---------------------|
|         | FEC+LC         | FEC+LC              |
| 1985-86 | 39.589         | 21.607              |
| 1986-87 | 57.000         | 59.698              |
| 1987-88 | 99.747         | 100.889             |
| 1988-89 | 82.470         | 107.209             |
| 1989-90 | 71.000         | 93.725              |
| 1990-91 | 79.846         | 114.173             |
| 1991-92 | 44.000         | 57.901              |
| 1992-93 | 55.675         | 73.952              |
| 1993-94 | 17.645         | 50.777              |
| 1994-95 | 22.000         | (Exp. not reported) |
|         | <hr/>          | <hr/>               |
| Total:  | 568.972        | 679.931             |
| FEC     | 551.898        | 617.472             |

Total Expenditure upto 30.06.1993

(Rs. in million)

|                   |         |               |
|-------------------|---------|---------------|
| MART Total        | 679.931 |               |
| MART FEC          | 617.472 |               |
| MART LC           | 15.476  |               |
| MART/ACE + CIMMYT | 124.762 | (6.692 \$)    |
|                   |         | 5.942 + 0.750 |
|                   | <hr/>   |               |
|                   | 804.693 |               |

Note: FEC figures are based on financial reports provided by USAID from time to time.

## STAFF POSITION OF AUDIO VISUAL COMMUNICATION, NARC

| NAME OF POST              | BPS | NO. OF POST FOR THE |   |   | NAME OF EMPLOYEE          | DATE OF BIRTH | PRESENT POSTING | NATURE OF APPT. | DATE OF APPT. | QUALIFICATION        | DOMICILE (DIST) | SPECIALIZATION            | SOURCE OF SALARY |
|---------------------------|-----|---------------------|---|---|---------------------------|---------------|-----------------|-----------------|---------------|----------------------|-----------------|---------------------------|------------------|
|                           |     | S                   | F | V |                           |               |                 |                 |               |                      |                 |                           |                  |
| ✓ Director                | 19  | 1                   | 1 | 0 | Dr. Munammas Anwar Hassan | 6.4.42        | AVC             | Regular         | 1.9.87        | Ph.D (Communication) | Punjab (Kasur)  | Audio Visual              | MART             |
| ✓ Dy. Director            | 18  | 1                   | 0 | 1 | —                         | —             | —               | —               | —             | —                    | —               | —                         | —                |
| ✓ Dy. Director (P. Coord) | 18  | 1                   | 0 | 1 | —                         | —             | —               | —               | —             | —                    | —               | —                         | —                |
| ✓ Sr. Producer - Program  | 18  | 1                   | 0 | 1 | —                         | —             | —               | —               | —             | —                    | —               | —                         | —                |
| Producer                  | 17  | 2                   | 2 | 0 | Mr. Asghar Ali            | 15.3.57       | AVC             | Regular         | 3.11.90       | B.Sc Hons (Agri)     | Punjab (Lahore) | Agri. Production          | MART             |
|                           |     |                     |   |   | Mr. Anwarul Hassan        | 10.3.51       | AVC             | Regular         | 30.10.90      | Diploma (NCA)        | Sind            | Advertising Communication | MART             |
| Sr. Media Engineer        | 18  | 1                   | 1 | 0 | Mr. M. Niaz Khan          | 16.11.66      | AVC             | Contract        | 2.05.91       | B.Sc Engg.           | AJK             | Engg. Media               | MART             |
| Media Engineer            | 17  | 4                   | 4 | 0 | Mr. Akbar Ali Khan        | 21.9.45       | AVC             | Regular         | 27.12.87      | M.Sc (Ray)           | Punjab          | Electronic                | MART             |
|                           |     |                     |   |   | Mr. Munammas Radio        | 1.11.51       | AVC             | Regular         | 6.04.90       | Dip. Ass. Engg       | Punjab          | TV Programmer             | MART             |
|                           |     |                     |   |   | Mr. Haqiyun Nasadiq       | 17.10.55      | AVC             | Regular         | 29.04.90      | Dip. Ass. Engg       | AJK             | TV Engineer               | MART             |
|                           |     |                     |   |   | Mr. K. Nawaz              | 14.04.65      | AVC             | Contract        | 15.08.93      | M.Sc                 | NWFF            | Engg.                     | MART             |
| Sr. Cameraman             | 18  | 1                   | 1 | 0 | Mr. Javid Iqbal           | 05.11.59      | AVC             | Contract        | 02.05.92      | B.Sc. Elect.         | Punjab          | Electronic                | MART             |
| Cameraman                 | 17  | 2                   | 2 | 0 | Agna M. Ashraf            | 14.08.50      | AVC             | Regular         | 7.6.90        | B.A                  | Punjab          | Cinematography            | MART             |
|                           |     |                     |   |   | Mr. Bilisnad Khan         | —             | AVC             | Adnoc           | 7.6.90        | M.Sc (Phy)           | Punjab          | Electronic                | MART             |
| Sr. Scriptwriter          | 18  | 1                   | 0 | 1 | —                         | —             | —               | —               | —             | —                    | —               | —                         | —                |
| Scriptwriter              | 17  | 2                   | 2 | 0 | Mrs. Sarwat Atique        | —             | AVC             | Contract        | —             | —                    | —               | —                         | MART             |
|                           |     |                     |   |   | Mrs. Perveen Nissa        | 20.11.43      | AVC             | Contract        | 8.2.93        | M.A Eng. Urdu        | NWFF            | Scriptwriter              | MART             |
| Graphic Artist            | 17  | 1                   | 1 | 0 | Miss. Anjum Ayub          | —             | AVC             | Regular         | 3.12.87       | Fine Arts            | Punjab          | Graphic                   | MART             |
| Computer Designer         | 17  | 1                   | 1 | 0 | Mrs. Jamila Saniq         | 1.9.60        | AVC             | Contract        | 26.1.92       | B.A                  | Federal         | Set Designer              | MART             |
| Stenographer              | 15  | 2                   | 2 | 0 | Monammas Mustafa          | 1.3.51        | AVC             | Regular         | 20.6.83       | B.A                  | Punjab          | Typing/Shorthand          | MART             |
|                           |     |                     |   |   | Mr. Feroz Akhtar          | 6.9.65        | AVC             | Regular         | 17.11.85      | B.A                  | Punjab          | —                         | MART             |
| Asstt. Director           | 17  | 1                   | 1 | 0 | Mr. Javid Iqbal           | 12.2.63       | AVC             | Contract        | 5.9.91        | M.Sc                 | Punjab          | —                         | MART             |
| Asstt. Mec. Store Officer | 16  | 1                   | 1 | 0 | Mr. Hasan Sajjad          | —             | AVC             | Adnoc           | 3.4.91        | —                    | —               | Technician                | MART             |
| Jr. Asstt-II              | 05  | 1                   | 1 | 0 | Mr. Monammas Iqbal        | 20.2.68       | AVC             | Regular         | 6.11.86       | F.A                  | NWFF            | Typing                    | MART             |
| Production Asstt.         | 04  | 3                   | 3 | 0 | Mr. Moeen Uddin           | 1.1.63        | AVC             | Regular         | 23.9.90       | Metric               | Punjab          | Production                | MART             |
|                           |     |                     |   |   | Mr. Zafar Iqbal           | —             | AVC             | —               | —             | Metric               | —               | Production                | MART             |
|                           |     |                     |   |   | Mr. M. Asnraf             | —             | AVC             | —               | —             | —                    | —               | —                         | MART             |
| Driver                    | 04  | 3                   | 3 | 0 | Mr. Masood Khan           | —             | AVC             | Regular         | 13.7.91       | —                    | NWFF            | Driving                   | MART             |
|                           |     |                     |   |   | Mr. Masood Khan           | 15-5-59       | AVC             | Regular         | 21.7.91       | 15-9-85 Middle       | AJK             | —                         | MART             |
|                           |     |                     |   |   | Mr. M. Rasnid             | —             | AVC             | Regular         | —             | —                    | —               | —                         | MART             |

Sub-Total: 30 28 4

STAFF POSITION OF TRAINING INSTITUTE, MARC

| NAME OF POST       | BPS | NO. OF POST FOR THE as per revised PC-I |   |   | NAME OF EMPLOYEE WITH N.I.C | DATE OF BIRTH | PRESENT POSTING | NATURE OF APPT. | DATE OF APPT. | QUALIFICATION | DOMICILE (DIST) | SPECIALIZATION       | SOURCE OF SALARY |
|--------------------|-----|---|---|---|-----------------------------|---------------|-----------------|-----------------|---------------|---------------|-----------------|----------------------|------------------|
|                    |     | S                                       | F | V |                             |               |                 |                 |               |               |                 |                      |                  |
| Dy. Director       | 18  | 1                                       | 1 | 0 | Andrew Mc Millen            | 26.8.69       | T.I             | Contract        | 29.8.93       | M.B.A         | Punjab          | Financial Management | MART             |
| Scientific Officer | 17  | 3                                       | 3 | 0 | Mr. Zafar Sultan            | 25.8.60       | T.I             | Regular         | 29.4.86       | M.Sc          | Punjab          | Stat.(M.Sc)          | MART             |
| i) English (1)     |     |   |   |   | Mr. Javid Naseem            | 14.8.61       | T.I             | Regular         | 9.8.87        | M.Sc          | Sino            | Stat.(M.Sc)          | MART             |
| ii) Evaluation (2) |     |   |   |   | Mr. Amir-Saieem             | 11.3.67       | T.I             | Contract        | 14.5.92       | MBA           | Punjab          | MBA                  | MART             |
| Training Officer   | 17  | 2                                       | 2 | 0 | S. Anwar Masud              | 01.7.47       | T.I             | Regular         | 02.7.88       | M.Sc          | Punjab          | Entomology           | MART             |
|                    |     |   |   |   | Mr. Anjad Tufail            |               | T.I             | Contract        | 35.5.92       | M.Sc          |                 | Physiology           | MART             |
| Asstt. Admn        | 16  | 2                                       | 2 | 0 | Mr. Tassadaq Hussain        | 14.6.64       | T.I             | Regular         | 02.7.87       | M.A           | Punjab          | Political Scie.      | MART             |
|                    |     |   |   |   | Mr. Abouli Majid            | 1.12.55       | T.I             | Regular         | 11.6.90       | B.A           | Punjab          | Clerical             | MART             |
| Jr. Asstt-I        | 07  | 2                                       | 2 | 0 | Mr. Khizar Hayyat           | 1.1.60        | Asstt.          | Regular         | 18.9.82       | Matric        | Punjab          | -oo-                 | MART             |
|                    |     |   |   |   | Mr. Snaukat Ali             |               |                 |                 |               |               |                 |                      |                  |
| Driver             | 05  | 4                                       | 4 | 0 | Mr. Sabir Hussain           | 2.8.60        | Trpt.           | Regular         | 4.9.86        | Middle        | MWFF            | Driver               | MART             |
|                    |     |   |   |   | Mr. Sher Muhammad           |               | -oo-            | Regular         | -oo-          | -oo-          | -oo-            | -oo-                 | MART             |
|                    |     |   |   |   | Mr. Snaukat Hussain         |               | -oo-            | Regular         | -oo-          | -oo-          | -oo-            | -oo-                 | MART             |
|                    |     |   |   |   | Mr. Tasieem Gul             |               | -oo-            | Regular         | -oo-          | -oo-          | -oo-            | -oo-                 | MART             |

Sub-Total: 14 14 0

Grand-Total: 44 40 4

**DISTRIBUTION OF COMPUTERS ALONGWITH PERIPHERALS & SOFTWARE****DESK TOP PUBLISHING/COMPUTER GRAPHICS (10)**

| <u>S.No.</u>  | <u>INSTITUTIONS/AGENCY</u>                        | <u>LOCATION/PROVINCE</u> | <u>NO.OF COMPUTERS</u> |
|---------------|---|--------------------------|------------------------|
| 1.            | National Training Computer Lab.                   | NARC                     | 01                     |
| 2.            | Audio Visual Communication Unit<br>(with scanner) | NARC                     | 01                     |
| 3.            | Directorate of Publication<br>(with scanner)      | PARC                     | 01                     |
| 4.            | Ayub Agri.Res.Institute(PACS Cell)                | Faisalabad               | 01                     |
| 5.            | Bur. of Agri. Information(PACS Cell)              | Lahore                   | 01                     |
| 6.            | Department of Agri.Information                    | Hyderabad                | 01                     |
| 7.            | Cotton Research Institute,                        | Multan                   | 01                     |
| 8.            | Director Bur. of Agri.Information                 | Peshawar                 | 01                     |
| 9.            | NWFP Agri. University(PACS Cell)                  | Peshawar                 | 01                     |
| 10.           | Department of Agriculture(PACS Cell)              | Quetta                   | 01                     |
| <b>Total:</b> |   |                          | <b>10</b>              |

**LAP TOP (9)**

|               |                                    |            |           |
|---------------|------------------------------------|------------|-----------|
| 1.            | Chairman Chambers                  | PARC       | 01        |
| 2.            | FSR Project, UAF                   | Faisalabad | 01        |
| 3.            | Agri.Communication Support Cell    | Lahore     | 01        |
| 4.            | Agri.Communication Support Cell    | Tandojam   | 01        |
| 5.            | FSR Project, SAU                   | Tandojam   | 01        |
| 6.            | Agri.Communication Support Cell    | Faisalabad | 01        |
| 7.            | FSR Project, NWFP Agri. University | Peshawar   | 01        |
| 8.            | Agri.Communication Support Cell    | Quetta     | 01        |
| 9.            | FSR Project, Agri.Res.Institute    | Quetta     | 01        |
| <b>Total:</b> |                                    |            | <b>09</b> |

**DISTRIBUTION OF COMPUTERS ALONGWITH PERIPHERALS & SOFTWARE**  
**(GENERAL PURPOSE - 151)**

**P.A.R.C**

| <u>S.No.</u> | <u>UNIT/PLACE</u>                       | <u>NO. OF COMPUTERS</u> |
|--------------|---|-------------------------|
| 01.          | Chairman Chamber, PARC                  | 01                      |
| 02.          | Directorate of Planning, PARC           | 01                      |
| 03.          | Social Sciences Division, PARC          | 01                      |
| 04.          | Directorate of P.Admn, PARC             | 01                      |
| 05.          | Project Implementation Unit, MART, PARC | 01                      |
| 06.          | Crop Sciences Division, PARC            | 01                      |
| 07.          | Animal Sciences Division, PARC          | 01                      |
| 08.          | Natural Resources Division, PARC        | 02                      |
| 09.          | Directorate of Training, PARC           | 01                      |
| 10.          | Directorate of Civil Works, PARC        | 01                      |
| 11.          | Procurement Office(SPO), PARC           | 01                      |
| 12.          | Computer Section                        | 01                      |
| 13.          | Secretary Office                        | 01                      |
| 14.          | Directorate of Coordination             | 01                      |
| 15.          | BOSTID Program                          | 01                      |
| 16.          | Regional Liaison Office, Lahore         | 01                      |
| Sub-Total:   |   | 17                      |

**N.A.R.C**

|            |   |    |
|------------|---|----|
| 1.         | D.G, NARC                               | 01 |
| 2.         | Director Admn, NARC                     | 01 |
| 3.         | Land Resources Institute, NARC          | 01 |
| 4.         | Soil Mineralogy XRD, Dr. Saleem Akhtar  | 01 |
| 5.         | Directorate of Crop Sciences Institute, | 01 |
| 6.         | Feed Technology Centre, NARC            | 01 |
| 7.         | Animal Farm Centre, NARC                | 01 |
| 8.         | Soil Fertility                          | 01 |
| 9.         | Food Technology Centre, NARC            | 01 |
| 10.        | Directorate of SIU/Library, NARC        | 01 |
| 11.        | Entomology Research Lab. NARC           | 01 |
| 12.        | CDRI, NARC                              | 01 |
| 13.        | FO&S, NARC                              | 01 |
| 14.        | Central Store NARC                      | 01 |
| 15.        | Directorate of ASI                      | 01 |
| 16.        | Cereals Crops, NARC                     | 01 |
| 17.        | Oil Seeds Program                       | 01 |
| 18.        | Food legumes, NARC                      | 01 |
| 19.        | Fodder/Sugarcane Program, NARC          | 01 |
| 20.        | Monitoring & Evaluation Cell            | 01 |
| 21.        | Tissue Culture Lab.                     | 01 |
| 22.        | Technical Information Transfer          | 01 |
| 23.        | Applied Micrology Program               | 01 |
| 24.        | Computer Training Lab.                  | 10 |
| 25.        | LEMRO, Unit                             | 01 |
| 26.        | Computer & Stat Section                 | 01 |
| Sub-Total: |   | 35 |

# PROVINCIAL:

## PUNJAB

|     |   |    |
|-----|---|----|
| 01. | Poultry Res. Institute, Rawalpindi  | 01 |
| 02. | Barani Agri. College, Rawalpindi  | 01 |
| 03. | Barani Agri. Res. Institute, Chakwal  | 02 |
| 04. | Ayub Agri. Res. Institute, Faisalabad<br>(With one each; Laser printer, LCD and OHP)        | 18 |
| 05. | D.G Res. Livestock & Dairy Development, Lahore<br>(D.G Livestock Ext. 3 and D.G Research 7) | 10 |
| 06. | Secretary Agriculture, Lahore   | 01 |
| 07. | Secretary Livestock, Lahore   | 01 |
| 08. | Fodder Res. Institute, Sargoda  | 02 |
| 09. | D.G Fisheries, Lahore   | 01 |
| 10. | Cotton Res. Institute, Multan   | 02 |
| 11. | Agri. Mech. Res. Institute, Multan  | 02 |
| 12. | Livestock Production Res. Institute, Bahadarnagar   | 02 |
| 13. | Rice Res. Institute, Kala Shah Kaku, Lahore   | 01 |
| 14. | Coordinating Unit, RRI, KSK, Lahore   | 01 |
| 15. | Maize & Millet Res. Institute, Yousafwala   | 02 |
| 16. | NIAB, Faisalabad  | 01 |
| 17. | Farmer Association, Lahore  | 01 |

SUB-TOTAL 49

## SIND

|     |   |    |
|-----|---|----|
| 01. | Agri. Res. Institute, Tandojam<br>(With one each; Laser printer, LCD and OHP) | 09 |
| 02. | Secretary Agri. Sind Karachi  | 01 |
| 03. | Secretary Livestock, Sind   | 01 |
| 04. | Rice Res. Institute Dokri   | 02 |
| 05. | Horticultural Res. Institute Mirpurkhas                                       | 02 |
| 06. | Chief Agri. P&DD, Karachi   | 02 |
| 07. | Vice President PCC, Sind  | 01 |
| 08. | PARC Tropical Agri. Res. Institute  | 02 |
| 09. | SAZARI, Thatta  | 01 |
| 10. | AZRI, Umer Kot, Sind  | 01 |
| 11. | Sind Agri. University Tandojam  | 80 |

SUB-TOTAL: 102

## N.W.F.P

|     |  |    |
|-----|--|----|
| 01. | Secretary, Livestock, Peshawar             | 01 |
| 02. | Agri. Res. Institute, Tarnab               | 02 |
| 03. | Agri. Res. Institute, D.I Khan             | 02 |
| 04. | Sugarcane Res. Institute, Mardan           | 02 |
| 05. | CCRI, Pirsabak                             | 02 |
| 06. | Agri. Communication Support Cell, Peshawar | 01 |
| 07. | Gomal University, D.I. Khan                | 02 |
| 08. | Tea Research Station, Mansehra             | 01 |

SUB-TOTAL: 13

A.J.K

01. Univ of College of Agri. Rawalakot AJK. 01

**BALUCHISTAN**

01. Agri.Res. Institute, Quetta 06  
(with one laser printer one LCD display and one projector).

02. Secretary Agri. Baluchistan, Quetta 01

03. Secretary Livestock, Quetta 01

04. Livestock Directorate, Quetta 02

05. AZRI, Quetta 03

06. PARC Coordinating Unit, Quetta 01

**SUB-TOTAL:** 14

Agricultural Data Collection Project 20

**TOTAL:** 251

**S U M M A R Y:**

**Phase-I**  
**General Purpose :** 50  
=====

**Grand Total:** 50

**Phase-II**

**Lap Top :** 09  
**Desktop :** 10  
**General Purpose :** 251  
=====

**Total :** 270

**Grand Total :** 320



## HART PROJECT VEHICLES - DISTRIBUTION DETAILS

| S.NO.                               | VEHICLE DESCRIPTION                | ENGINE #   | FRAME #       | BRGD #   | INSTITUTE/DEPTT                     | RECEIVED BY                 | AUTHORIZED BY                               | QUANTITY |
|-------------------------------------|------------------------------------|------------|---------------|----------|-------------------------------------|-----------------------------|---|----------|
| <b>Punjab Province</b>              |                                    |            |               |          |                                     |                             |   |          |
| 1.                                  | Toyota Hi-Ace, 15 seater Van.      | 2L-1033588 | LN61B-0002860 | FDX-2624 | AARI, Faisalabad                    | Mushtaq Ali<br>A/Res.Ofcr.  | Dr.Manzoor<br>D.G.AARI                      | 1        |
| 2.                                  | Toyota Hi-Lux Pick Double Cab.     | 2L-1026999 | LN56-0035549  | SGB-5099 | Fodder Res.Instt                    | -do-                        | -do-  | 1        |
| 3.                                  | -do-                               | 2L-1028181 | LN56-0035896  | FDX-371  | AARI, Faisalabad                    | -do-                        | -do-  | 1        |
| 4.                                  | -do-                               | 2L-1029370 | LN56-0036208  | FDX-644  | -do-                                | -do-                        | -do-  | 1        |
| 5.                                  | -do-                               | 2L-1031021 | LN56-0036517  | FDX-1710 | -do-                                | -do-                        | -do-  | 1        |
| 6.                                  | Toyota Coaster Bus                 | 3B-0723609 | BB20-0009596  | FDX-1870 | -do-                                | -do-                        | -do-  | 1        |
| 7.                                  | Toyota Hi-Lux Pick ups Double cab. | 2L-1024552 | LN56-0034840  | LHN-3017 | Pb.Econ.Res.Instt.<br>Lahore.       | R. Haider<br>Admn Officer   | Dr. M. Jameel<br>Dir. PERI.                 | 1        |
| 8.                                  | -do-                               | 2L-1024946 | LN56-0036061  | RIN-1628 | Livestock Res.Stn.<br>Khari Attock. | Fazal Karim<br>Head Clerk   | Nawazish Ali<br>Dy. Director.               | 1        |
| 9.                                  | -do-                               | 2L-1029152 | LN56-0036062  | SAB-4781 | Rice Res.Instt<br>Kala Shah Kaku    | Ismat Ali<br>Asstt.Agrnmt   | D.G.RRI KSK                                 | 1        |
| 10.                                 | -do-                               | 2L-1032883 | LN56-0036999  | SAB-4782 | -do-                                | -do-                        | -do-  | 1        |
| 11.                                 | Toyota Hi-Ace 15                   | 2L-1030888 | LN61B-0002007 | SAB-4703 | -do-                                | -do-                        | -do-  | 1        |
| 12.                                 | Toyota Hi-Lux Pick-up              | 2L-1033745 | LN56-0037189  |          | Agri.Univ.<br>Faisalabad            | Farzand Ali<br>P.A          | H.Arshad Ch.<br>Treasurer                   | 1        |
| 13.                                 | -do-                               | 2L-1032000 | LN56-0037166  | LHN-3628 | Pb.Fratry,W.Life<br>& Fish.Deptt.   | Sarfraz<br>Haider A.D       | J.S.Govt.of<br>Punjab Fish-<br>eries Deptt. | 1        |
| 14.                                 | Toyota Station Wagon               | 4K-8553068 | KE70-8204585  | LHR-3319 | Punjab Agri.<br>P&DD Lahore         | H.Afzal Shah<br>Chief Agri. | H.Afzal Shah<br>Chief Agri.                 | 1        |
| Total:                              |                                    |            |               |          |                                     |                             |   | 14       |
| <b>North West Frontier Province</b> |                                    |            |               |          |                                     |                             |   |          |
| 01.                                 | Toyota Coaster Bus                 | 3B-0723338 | BB20-0009537  | --       | NWFP Agri.Uni.                      | Abdul Qayyum                | Pro.Noorul<br>Islan                         | 1        |
| 02.                                 | Toyota Hi-Lux Pick-up Double Cab   | 2L-1033882 | LN56-0037300  | PRH-6880 | NWFP Vet. Res.<br>Instt.            | Dr.Muzarub<br>S.R.Officer   | Dr.M.Y.Ansari<br>Director                   | 1        |
| 03.                                 | Toyota Hi-Ace Van                  | 2L-1030683 | LN61B-0002803 | PRH-6623 | Ag. Res.Wing<br>Tarnab              | G.Sarwar<br>Dir.Res.        | M.Siddique<br>DG, Tarnab                    | 1        |
| 04.                                 | Toyota Hi-Lux                      | 2L-1026222 | LN56-0035401  | DNB-3186 | -do-                                | -do-                        | -do-  | 1        |
| Total:                              |                                    |            |               |          |                                     |                             |   | 04       |

Sind Province

|   |             |                |         |                         |                                  |                   |   |
|---|-------------|----------------|---------|-------------------------|----------------------------------|-------------------|---|
| 01. Toyot Hi-Lux                                  | 2L-1033295  | LN56-0037574   | GS-6122 | Agr.Univ.<br>Tandojam   | Ahmad Khan                       | Munir A.Qazi      | 1 |
| 02. -do-  | 2L-1027099  | LN56-0037531   | GS-6123 | -do-                    | -do-                             | -do-              | 1 |
| 03. Toyota Hi-Lux                                 | 2L-1033688  | LN61B-0002857  | GS-6127 | Sind Ag.Deptt.<br>(ARI) | Abdul Samad,<br>S.O              | -do-              | 1 |
| 04. Toyota Hi-Ace                                 | 2L-1035318  | LN56-0037652   | GS-6122 | -do-                    | -do-                             | -do-              | 1 |
| 05. -do-  | 2L-1037120  | LN56-0037818   | --      | W.Life & Forest         | A.R.Kharal, D.S                  | -do-              | 1 |
| 06. Toyota Landcruiser                            | 3B-0727916  | BJ60-016244    | 332-896 | P&DD                    | Fazal Ahmad<br>Nizamani          | -do-              | 1 |
| 07. Toyota Coaster Bus<br>(Transferred from PARC) | 3B-0723836  | BB20-009591    | --      | ARI, Tandojam           |                                  | -do-              | 1 |
| 08. Pajero Station Wagon                          | 4D56-BQ7996 | CLO49VJJ400305 |         | FSR, SAV,<br>Tandojam   | Amarlal Wadhvani<br>Liaison Off. | Chairman,<br>PARC | 1 |

Total: 08

A.Z.R.I

|                                   |            |               |          |              |                        |                                      |   |
|-----------------------------------|------------|---------------|----------|--------------|------------------------|--------------------------------------|---|
| 01. Toyota Corona<br>4 door Sedan | 4A-0518311 | AT151-0051866 | QAD--635 | AZRI, Quetta | Zafaruddin<br>Director | Dr.Amir<br>Mohammad<br>Chairman,PARC | 1 |
| 02. Toyota Hi-Lux                 | 2L-1021926 | LN56-0034530  | QAD-630  | -do-         | -do-                   | -do-                                 | 1 |
| 03. -do-                          | 2L-1021285 | LN56-0034402  | QAD-625  | -do-         | -do-                   | -do-                                 | 1 |
| 04. -do-                          | 2L-1022954 | LN56-0034511  | QAD-628  | -do-         | -do-                   | -do-                                 | 1 |
| 05. -do-                          | 2L-1024001 | LN56-0034796  | QAD-624  | -do-         | -do-                   | -do-                                 | 1 |
| 06. -do-                          | 2L-1024822 | LN56-0034839  | QAD-627  | -do-         | -do-                   | -do-                                 | 1 |
| 07. -do-                          | 2L-1025406 | LN56-0035026  | QAD-634  | -do-         | -do-                   | -do-                                 | 1 |
| 08. -do-                          | 2L-1025821 | LN56-0035400  | QAD-632  | -do-         | -do-                   | -do-                                 | 1 |
| 09. -do-                          | 2L-1033846 | LN56-0037534  | QAD-631  | -do-         | -do-                   | -do-                                 | 1 |
| 10. -do-                          | 2L-1039382 | LN56-0037530  | QAD-629  | -do-         | -do-                   | -do-                                 | 1 |
| 11. Toyota Land Cruiser           | 3B-0726742 | BJ60-016180   | QAD-384  | -do-         | ICARDA Advisor         | USAID Ibd                            | 1 |
| 12. -do-                          | 3B-0726968 | BJ60-016194   | QAD-385  | -do-         | -do-                   | -do-                                 | 1 |
| 13. -do-                          | 3B-0727254 | BJ60-016209   | QAD-386  | -do-         | -do-                   | -do-                                 | 1 |

|     |       |            |             |         |      |      |      |           |
|-----|-------|------------|-------------|---------|------|------|------|-----------|
| 14. | -do-  | 3B-0727347 | BJ60-016213 | QAD-387 | -do- | -do- | -do- | 1         |
| 15. | -do-  | 3B-0727565 | BJ60-016225 | QAD-388 | -do- | -do- | -do- | 1         |
| 16. | Truck | --         | --          | --      | -do- | -do- | -do- | 1         |
|     |       |            |             |         |      |      |      | -----     |
|     |       |            |             |         |      |      |      | Total: 16 |

Baluchistan

|     |               |            |               |  |           |             |                   |           |
|-----|---------------|------------|---------------|--|-----------|-------------|-------------------|-----------|
| 01. | Toyota Hi-Lux | 2L-1037076 | LN56-0037817  |  | Ag.Deptt. | M.Riaz Khan | D.G. Agri. Deptt. | 1         |
| 02. | Toyota Hi-Ace | 2L-1035002 | LN61B-0002897 |  | -do-      | -do-        | -do-              | 1         |
|     |               |            |               |  |           |             |                   | -----     |
|     |               |            |               |  |           |             |                   | Total: 02 |

CINMYT

|     |                  |             |                |          |                 |             |             |           |
|-----|------------------|-------------|----------------|----------|-----------------|-------------|-------------|-----------|
| 01. | Land Cruiser     | 3B-0727941  | BJ60-016245    | IDA-9721 | CINMYT, Ibd. -- | Mr. Anthony | Dr. Byerlee | 1         |
| 02. | -do-             | 3B-0728836  | BJ60-016292    | IDA-9722 | -do-            | -do-        | -do-        | 1         |
| 03. | -do-             | 3B-0728537  | BJ60-016276    | IDA-9723 | -do-            | -do-        | -do-        | 1         |
| 04. | Toyota Crown     | 4A-0531629  | AT151-005349   | IDA-9801 | -do-            | -do-        | -do-        | 1         |
| 05. | Toyota Hi-Lux    | 2L-1032380  | LN56-0036830   | IDA-9802 | -do-            | -do-        | -do-        | 1         |
| 06. | Mitsubishi D.Cab | 4D56-BG7534 | CNJK140HP00189 | IDB-4683 | -do-            | Peter Hobbs | Peter Hobbs | 1         |
| 07. | -do-             | 4D56-BG7817 | CNJK140HP00191 | IDB-4684 | -do-            | -do-        | -do-        | 1         |
| 08. | -do-             | 4D56-BG8224 | CNJK140HP00196 | IDB-4685 | -do-            | -do-        | -do-        | 1         |
|     |                  |             |                |          |                 |             |             | -----     |
|     |                  |             |                |          |                 |             |             | Total: 08 |

USAID/Winrock

|     |                              |            |               |           |               |              |             |           |
|-----|------------------------------|------------|---------------|-----------|---------------|--------------|-------------|-----------|
| 01. | Toyota Crona<br>4-door Sedan | 4A-0537962 | AT151-0053900 | AD-64-382 | USAID W/House | Mr. Sher Ali | DW Butchart | 1         |
| 02. | -do-                         | 4A-0540013 | AT151-0054003 | AD-64-380 | -do-          | -do-         | -do-        | 1         |
| 03. | -do-                         | 4A-0540471 | AT151-0054095 | AD-64-381 | -do-          | -do-         | -do-        | 1         |
| 04. | -do-                         | 4A-0519535 | AT151-0052021 | AD-64-378 | -do-          | -do-         | -do-        | 1         |
| 05. | -do-                         | 4A-0522376 | AT151-0052376 | AD-64-379 | -do-          | -do-         | -do-        | 1         |
|     |                              |            |               |           |               |              |             | -----     |
|     |                              |            |               |           |               |              |             | Total: 05 |

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PARC/NARC

| 01. Toyota Corona<br>5-door Station Wagon | 4K-6551199  | KE70-6204504   | IDA-9759 | PARC       | Transport<br>PARC, Pool | Transport<br>Officer | 1  |
|---|-------------|----------------|----------|------------|-------------------------|----------------------|----|
| 02. Toyota Corona Car                     | 4A-0524167  | AT151-0052585  | IDA-9844 | -do-       | -do-                    | -do-                 | 1  |
| 03. -do-                                  | 4A-0532965  | AT151-0053422  | IDA-2761 | -do-       | -do-                    | -do-                 | 1  |
| 04. -do-                                  | 4A-0531593  | AT151-0053251  | IDA-3718 | -do-       | -do-                    | -do-                 | 1  |
| 05. -do-                                  | 4A-0531462  | AT151-0053229  | IDA-3719 | -do-       | -do-                    | -do-                 | 1  |
| 06. -do-                                  | 4A-0533265  | AT151-0053496  | IDA-9841 | -do-       | -do-                    | -do-                 | 1  |
| 07. -do-                                  | 4A-0532610  | AT151-0053371  | IDA-9843 | -do-       | -do-                    | -do-                 | 1  |
| 08. -do-                                  | 4A-0526510  | AT151-0052741  | IDA-9645 | -do-       | -do-                    | -do-                 | 1  |
| 09. Toyota Land Cruiser                   | 3B-0728357  | BJ60-016266    | IDA-9612 | -do-       | -do-                    | -do-                 | 1  |
| 10. Toyota Costar Bus                     | 3B-0725588  | BB20-0009717   | IDB-2710 | NARC, Pool | Trg. Instt. NARC        | M.S. Khan Rana       | 1  |
| 11. Toyota Hi-Lux Pickup                  | 2L-1028751  | LN56-0036238   | IDB-2008 | -do-       | -do-                    | -do-                 | 1  |
| 12. Pajero Station Wagon                  | 4D56-BQ8152 | CL409VJJ400808 |          | -do-       | Inf. Transfer           | Dr. Anwar<br>Hassan  | 1  |
| 13. -do-                                  | 4D56-BQ6296 | GL049VJJ400314 |          | -do-       | FSR, Program            | Dr. A. Hajeed        | 1  |
|   |             |                |          |            |                         | Total:               | 13 |
|   |             |                |          |            |                         | Grand Total:         | 70 |

ADDITIONAL VEHICLES PROCURED UNDER REVISED MART PROJECT

| S.NO   | TYPE OF VEHICLE        | ARRIVED:<br>YES/NO | ALLOCATED FOR<br>UNIT/INSTITUTE                                |
|--------|------------------------|--------------------|--|
| 1.     | Pajero                 | Y                  | James Barnett<br>Hyderabad                                     |
| 2.     | Pajero                 | Y                  | Taki Izuno<br>Lahore   |
| 3.     | Pajero                 | Y                  | Dr. Bill C Wright<br>Islamabad                                 |
| 4.     | Toyota Double Cab      | Y                  | FSR, Quetta ARI  |
| 5.     | -do-                   | Y                  | FSR, ARI, NWFP   |
| 6.     | -do-                   | Y                  | NARC, FSR Program  |
| 7.     | -do-                   | Y                  | NARC, AERU   |
| 8.     | -do-                   | Y                  | NARC, AVC Unit   |
| 9.     | -do-                   | Y                  | AVC Unit, Faisalabad *   |
| 10.    | <del>Pajero</del> -do- | Y                  | AZRI, Quetta   |
| 11.    | Double Pick-up         | Y                  | AZRI, Quetta   |
| 12.    | -do-                   | Y                  | ARI, Quetta *  |
| 13.    | Toyota Hiace           | Y                  | T.I, NARC *  |
| 14.    | -do-                   | Y                  | T.I, NARC *  |
| 15-18. | Suzuki Vans(4 pieces)  | Y                  | Provincial AV Unit<br>Lahore, Tandojam,<br>Quetta & Faisalabad |

\* As per decision of meeting of pre CDWP held on 15.10.1991

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AUDIO VISUAL  
COMMUNICATION, NARC

NATIONAL AGRICULTURAL RESEARCH CENTRE  
(Directorate of AV Communications)

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AUDIO-VISUAL COMMUNICATIONS

In Pakistan, a considerable amount of improved agricultural technology is being generated by agricultural universities and research institutes. Information concerning these technologies must be disseminated in ways which respond to the needs of client groups and which ensures that the information transferred is not only better understood and acceptable to the target audiences but will be properly and effectively utilized by them. Appreciating the role of communication technology in effective and efficient dissemination of information, Pakistan Agricultural Research Council with technical and financial assistance of USAID, has established the Directorate of Audio-Visual Communications at its National Agricultural Research Centre, Islamabad.

Objectives

- \* Design and produce various types of audio-visual materials and documentaries/programmes dealing with achievements made in agriculture.
- \* Organize the telecast and broadcast of the audio and video programmes produced by AV Communications.
- \* Undertake research in communication methodology and organize training programmes in information transfer and agricultural communications.
- \* Provide day to day services to PARC/NARC scientists regarding the design, production and utilization of audio-visual communication materials.
- \* Develop coordination with provincial audio-visual centres and provide technical guidance in planning and production of audio and video materials.

## Facilities

A modern building for AV Communications Directorate and Training Institute has been constructed at National Agricultural Research Centre, Islamabad. The AV section of the building includes the following facilities:

- \* Audio and video production studios, control rooms and editing and dubbing rooms with professional video cameras, recorders and mixers and editing and control room equipments.
- \* Art, design and computer graphic rooms with sophisticated computer facilities for producing colour slides, overhead transparencies, graphics and video material.
- \* Portable electronic field recording, production and projection equipment.
- \* Photograph laboratory, projection room, multi-purpose room, workshop and offices.
- \* Two vehicles to carryout field recording and projection activities.

## Achievements

### a) Production and telecast of video documentaries/programmes.

- \* 35 video documentaries/programmes dealing with different agricultural topics have been produced. These documentaries/programmes are shown on PTV-2 and STN on regular basis. (List of documentaries/programmes produced and telecast enclosed).

In this whole region we are the pioneer in producing scientific documentaries/programmes in the field of agriculture.

- \* Documentaries/programmes produced by AV Communications, NARC have been supplied to different international, national and provincial organizations for their use.

### b) Production of Publicity Telops

- \* A number of publicity telops dealing with cotton virus have been developed, produced and shown on PTV and STN.

### c) PARC Radio Service

- \* Radio programmes containing interviews/talks of agricultural scientists are produced by AVC and broadcast from different stations of Radio Pakistan. (List of programmes produced and broadcast enclosed).

d) Training Programmes

\* As listed below training programmes regarding developing effective communication approaches, script writing and producing audio-visual material and documentaries have been conducted for national and provincial agricultural communicators:

1. Fundamentals of Agricultural Photography.
2. Advanced Agricultural Photography.
3. Video Production and Editing Techniques.
4. Advanced Video Production and Editing Techniques.
5. Planning and Making Presentation of Graphics.
6. Computer Graphic Production.
7. Planning, Writing and Producing Audio-Visual Programmes.

e) Provincial Agricultural Communication Support Cells(PACSC)

With the objective of developing an infrastructure for the use of audio-visual technology in agricultural information transfer throughout the country, as given below, five Provincial Agricultural Communication Support Cells (PACSC) have been established in all the four provinces. These cells have been provided necessary equipment and software, transport facility, staff training and financial assistance to meet their needs. The cells are now in operation:

Punjab: Directorate General of Agriculture, Lahore

Punjab: Ayub Agri. Research Institute, Faisalabad

NWFP: NWFP Agri. University Peshawar

Sindh: Agri. Research Institute, Tandojam

Baluchistan: Directorate General of Agriculture, Quetta.

f) Technical Information Transfer Committee (TITC)

To promote and maintain national level coordination of the information transfer activities, a Technical Information Transfer Committee (TITC) based on the nominations of provincial governments, agricultural universities and research institutes, Pakistan Television, Radio Pakistan, Press and PARC/NARC, has been established. Meeting of this committee is held every year with the participation of representatives from all the four provinces and different media agencies in which important decisions are taken. We have already held 5 meetings of TITC.

g) Central Media Library

A central media library containing audio and video programmes produced by AVC and acquired from other national and international agencies, and related literature has been established at AVC building, NARC. The objective is to make this facility available to our scientists and researchers, information transfer bureaus and other people interested to improve their agricultural knowledge.

h) Computer Graphic Production

A computer graphic workstation involving the use of highly sophisticated equipment has been established at AVC unit to provide services of colour slides, overhead transparencies and paper graphics both for video production purposes and for general use.

## Future Thrust

- \* Exploration of more possibilities of making effective and innovative use of audio-visual media for educating farmers regarding new development taking place and new technology being generated in the field of agriculture.
- \* Production of video documentaries and discussion programmes on the pattern of National geography programmes dealing with agricultural research and achievements.
- \* Telecast of video documentaries and programmes on PTV2 and STN on regular basis.
- \* Supply of documentaries and programmes to provincial agricultural information units for the use and to put in the market for sale to public.
- \* Production of radio programmes and illustrated talks dealing with agricultural issues and their broadcast on national hookup and from regional stations to be continued.
- \* Research in the field of agricultural communications including study of target audiences, developing strategies for effective communication and making good presentation of the message.
- \* Close coordination with media organizations both at national and international level to broaden our scope of activities and exchange of programmes with them.
- \* Training programmes in different areas of communications for agricultural communicators working in provincial and national organizations.
- \* Improvement of production facilities including acquiring latest media equipment and training of our production staff.

NATIONAL AGRICULTURAL RESEARCH CENTRE  
(DIRECTORATE OF AV COMMUNICATIONS)

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DOCUMENTARIES/PROGRAMMES ALREADY COMPLETED

| <u>S.No.</u> | <u>Title</u>                                | <u>Language</u> | <u>Duration</u> |
|--------------|---|-----------------|-----------------|
| 1.           | Welcome to NARC                             | English         | 15.50 Min.      |
| 2.           | Sugarcane                                   | Urdu            | 21.28 "         |
| 3.           | Urea-Treated Fodder                         | Urdu            | 16.11 "         |
| 4.           | Research for Prosperity                     | Urdu            | 13.20 "         |
| 5.           | Welcome to NARC                             | Urdu            | 15.50 "         |
| 6.           | Soil Erosion                                | Urdu            | 16.06 "         |
| 7.           | Peach Cultivation                           | Urdu            | 17.40 "         |
| 8.           | Buffalo Management                          | Urdu            | 20.00 "         |
| 9.           | Rice-Nursery Growing for<br>Transplantation | Urdu            | 13.00 "         |
| 10.          | Sprinkler Irrigation System                 | Urdu            | 11.39 "         |
| 11.          | Drip Irrigation                             | Urdu            | 10.07 "         |
| 12.          | Burning of Pesticides                       | Urdu            | 11.26 "         |
| 13.          | Scientists-Farmers Dialogue<br>at Chakwal   | Urdu            | -               |
| 14.          | Off-Season Vegetables                       | Urdu            | 28.08 "         |
| 15.          | Canola Oil                                  | Urdu            | 11.23 "         |
| 16.          | Buffalo-From Experts<br>Point of View       | Urdu            | 20.18 "         |
| 17.          | Wheat-Preparation of Land                   | Urdu            | 14.22 "         |
| 18.          | Agricultural Sustainability                 | Urdu            | 19.45 "         |
| 19.          | Bio-Pesticides                              | Urdu            | 28.00 "         |

|     |                                       |         |        |
|-----|---------------------------------------|---------|--------|
| 20. | Wheat - Improved Varieties            | Urdu    | 10.00" |
| 21. | Tissue Culture                        | Urdu    | 10.00" |
| 22. | Cotton Virus<br>(Preventive Measures) | Urdu    | 21.00" |
| 23. | Cotton Virus<br>(Research Aspects)    | Urdu    | 25.00" |
| 24. | Soybean - Cash Crop                   | Urdu    | 22.00" |
| 25. | Migratory Beekeeping                  | English | 27.00" |
| 26. | Role of Women in Agriculture          | Urdu    | 11.00" |
| 27. | Pesticides and Environment            | Urdu    | 24.40" |
| 28. | Wheat Cultivation<br>(Discussion)     | Urdu    | 22.00" |
| 29. | Effects of Draught on<br>agriculture  | Urdu    | 25.00" |
| 30. | Mott Grass                            | Urdu    | 16.00" |
| 31. | Balance Use of Fertilizer             | Urdu    | 26.00" |
| 32. | Cotton Leaf Curl Virus                | Urdu    | 12.00" |

MART TERMINATION REPORT  
NARC TRAINING INSTITUTE

INTRODUCTION

Scientists, skilled technicians, and productive farmers constitute a valuable human resource, for national development. The agricultural knowledge is advancing at a rapid pace that even the trained manpower needs to be retrained, so that gap between the known and new information is narrowed down. The Pakistani farmers, majority of whom are not literate need concerted efforts to train them for continuity of good farms out.

A significant event, designed to accelerate human resource development in the country was the establishment of the Training Institute at NARC. NARC Training Institute is playing an important role in training and development of agricultural scientists, research managers, extensionists, educationists and farmers.

OBJECTIVES

The Training Institute was established to supplement the national and provincial efforts to improve manpower competencies especially in areas which severely constrain agricultural productivity. The following are its broad objectives:

- i) To assess the manpower requirements in various specializations of agricultural sciences at national level to help plan the training programme that is responsive to the national needs.
- ii) To provide opportunities in acquiring knowledge and skills in improved agricultural production technologies, management and communication.
- iii) To develop expertise in problem identification and in developing alternate strategies to solve problems of food, feed and fiber production, processing and marketing.
- iv) To strengthen the linkages between farmers, extensionists and research workers through providing and environment conducive for dialogue, planning and implementing the projects that aim to accelerate the transfer of technology for increased productivity.
- v) To keep track of trainees for evaluating the effectiveness and relevance of the training in their practical life with the purpose to continually improve the curricula and contents of training courses to make these more applicable in the working environment of the trainees.

## SPECIFIC OBJECTIVES OF MART PROJECT

- Physical expansion of the NARC Training Institute facility.
- Development and initial implementation of tailored incountry training courses.
- Training of NARC and Provincial Training faculty staff

## ACHIEVEMENT AND CONSTRAINTS

### A Physical Expansions

The physical facilities of the Institute has been strengthened by building, furnishing and equipping following facilities;

|    | <u>Facility</u>   | <u>Nos</u> | <u>Capacity (Persons)</u>                       |
|----|-------------------|------------|---|
| 1) | Multipurpose Hall | 1          | 100   |
| 2) | Lecture Hall      | 1          | 500   |
| 3) | Lecture Room      | 1          | 20 - 35   |
| 4) | Instructional Lab | 1          | 18  |
| 5) | Dry and Wet Lab.  | 1          | 20 - 35   |
| 6) | Computer Lab      | 2*         | 18/each *space for one lab was already existed. |
| 7) | Office            | 4          |   |

### B. Training Activities

The Institute has adopted a very systematic approach to organize courses, right from the need assessment of the trainees till the evaluation of courses. Teaching methods, course contents and training material is very carefully selected with reference to target audience. Teaching methods in agriculture training courses generally involve lectures, field visits, laboratory experiments, group discussions, brain storming sessions and case studies etc. During the course, each trainee not only have the chance to share his experiences but also benefits from the fellow trainees.

The MART Project has contributed a lot to strengthen training activities. Since its inception the institute has successfully taken up the job of imparting technical training to the scientists engaged in various disciplines of

agriculture. These courses were suitable not only to our needs but also met the requirements of friendly countries in Asia and Africa. Experience has shown that such a mutual cooperation among developing countries is tremendously helpful in solving problems of similar nature in their respective countries. Training Institute is now serving as regional forum to discuss major issues of agriculture in developing countries. Since 1985 the institute has organized 103 training events and trained/participate 2554 persons under MART Project. Detail is given in Annex-I.

#### C. Training of Trainers

Most of the staff trained in basic and scientific disciplines have been inducted in to the Training Institute and whatsoever, credit of potential in HRD is due to their self-learning and or experience of the past working. It is vital to improve the training skills of Training Institute staff specially in the following areas.

- Training Need Assessment,
- Survey and Evaluation Methods,
- Curriculum Development,
- Teaching Methods & Techniques,
- Preparation of Instructional Materials,
- Advance Communication Methods & Techniques,
- Human Resource Development.

Several long term trainings were provisioned for the training institute staff under MART (PC-1 page 50). Unfortunately, none of that has ever been awarded to them.

It was also important to identify and trained training coordinators from different provincial agricultural research establishments. This activity should have been started at the initial stages of the project which could have enable provincial authorities to utilize their full share for organize in-country training courses. Though later on, the training coordinators were identified from National Agricultural Research System and the group was also provided a comprehensive short term training in-land and abroad but it was quite late which left little impact on the proper utilization of funds allocated for in-country short term training courses.

#### D. Impact of Training Activities

We strongly feel that a follow up study must be conducted to see the impact of training activities. Unfortunately no funds have been provided for such activity under MART project.

However, the Institute is trying to arrange funds to conduct impact study at some later stage.

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INCOUNTRY SHORT COURSES HELD UNDER THE MART PROJECT

| S.NO.  | TITLE  | DURATION   | VENUS        | PARTICIPANTS |     |     |
|--------|--|------------|--------------|--------------|-----|-----|
|        |  |            |              | T            | F   | P   |
| 01.    | Orchard Management Course for Progressive Orchardists      | (2-weeks)  | NARC Federal | 27           | 21  | 06  |
| 02.    | MSTAT computer course                                      | (2-weeks)  | NARC Federal | 31           | 18  | 13  |
| 03.    | TOEFL English Language                                     | (1-weeks)  | NARC Federal | 09           | 03  | 06  |
| 04.    | National course on Technology Transfer.                    | (4-weeks)  | NARC Federal | 35           | 03  | 32  |
| 05.    | Plant Diseases diagnosis of Fruit Trees                    | (1-weeks)  | NARC Federal | 25           | --  | 25  |
| 06.    | Biometry course  | (2-weeks)  | NARC Federal | 24           | 08  | 16  |
| 07.    | Vertebrate Pest Management                                 | (3-weeks)  | NARC Federal | 20           | 04  | 16  |
| 08.    | Testing and Evaluation of Farm Machinery                   | (2-weeks)  | NARC Federal | 25           | 05  | 20  |
| 09.    | National Weed Sciences Workshop                            | (5-Days)   | NARC Federal | 60           | 30  | 30  |
| 10.    | On-Farm Research with Farming System Perspective Workshop. | (8-Days)   | NARC Federal | 28           | 10  | 18  |
| 11.    | FSR Data Handling workshop                                 | (1-weeks)  | NARC Federal | 25           | 07  | 18  |
| 12.    | Wheat Travelling Seminar(Part I&II,1986)                   | (2-weeks)  | NARC Federal | 76           | 30  | 46  |
| 13.    | Wheat Travelling Seminar (Part I&II,1987)                  | (2-weeks)  | NARC Federal | 50           | 20  | 30  |
| 14.    | Seminar on Research Proposal Preparation                   | (7-days)   | NARC Federal | 30           | 10  | 20  |
| 15.    | Workshop on the Role of Rural Women.                       | (3- Days)  | NARC Federal | 42           | 11  | 31  |
| 16.    | Agri. Science Writing Course.                              | (3- weeks) | NARC Federal | 25           | 05  | 20  |
| Total: |  |            |              | 532          | 185 | 347 |

|        |  |           |              |                      |    |    |
|--------|--|-----------|--------------|----------------------|----|----|
| 17.    | Ranged Management of Fodder Production.  | (2-Weeks) | NARC Federal | 16                   | 04 | 12 |
| 18.    | Plant Diseases Diagnoses.  | (2-Weeks) | NARC Federal | 20                   | 05 | 15 |
| 19.    | Integrated Pest Management.  | (11-Days) | NARC Federal | 16                   | 04 | 12 |
| 20.    | Vertebrate Pest Management Course.   | (3-Weeks) | NARC Federal | 25                   | 08 | 17 |
| 21.    | Computer Modeling in Rice Pest Management.                                       | (2-Weeks) | NARC Federal | 10                   | 01 | 09 |
| 22.    | 6th National Seminar on Rice Research and Production.                            | (5-days)  | NARC Federal | 70                   | 18 | 52 |
| 23.    | Farm Machinery Design & Development.   | (10-days) | NARC Federal | 15                   | 02 | 13 |
| 24.    | Managing Soil Water Resources for Sustained Agriculture.                         | (12-days) | NARC Federal | 24                   | 04 | 20 |
| 25.    | Agricultural Libraries Workshop/Conference.                                      | (5-days)  | NARC Federal | 29                   | 11 | 18 |
| 26.    | Mushroom Cultivation Training Course.  | (10-days) | NARC Federal | 25                   | -- | 25 |
| 27.    | Graphics Workshop.   | (15-days) | NARC Federal | 30                   | 08 | 22 |
| 28.    | Short Course on Computer Modeling in Pest Management.                            | (09-days) | NARC Federal | 10                   | 01 | 09 |
| 29.    | Fifth International Course on Biological Control of Pest Management.             | (5-Weeks) | NARC Federal | 10                   | -- | 10 |
| 30.    | Symposium on Dev. of NARC Master Plan.   | (03-days) | NARC Federal | 100                  | 78 | 22 |
| 31.    | FSR Microcomputer Trg. & Data Analysis Course.                                   | (2-weeks) | NARC Federal | 22                   | 14 | 08 |
| 32.    | Training Course in Improved Weed Management                                      | (3-weeks) | NARC Federal | 30                   | 08 | 22 |
| 33.    | In-country Training for Agri./Livestock Res. Staff of B-tan in Res. Methodology. | (4-weeks) | NARC Federal | 25                   | -- | 25 |
| Total: |  |           |              | -----<br>477 166 311 |    |    |

43

|     |   |           |              |                    |    |    |
|-----|---|-----------|--------------|--------------------|----|----|
| 34. | National Seminar/Workshop on Sugarcane Production.                | (03-days) | NARC Federal | 60                 | 10 | 50 |
| 35. | Training in Research Management.                                  | (12-days) | NARC Federal | 28                 | 08 | 20 |
| 36. | International Course on Soil Res. Management.                     | (12-days) | NARC Federal | 24                 | 07 | 17 |
| 37. | Sugarcane Traveling Seminar.                                      | (12-days) | NARC Federal | 15                 | 05 | 10 |
| 38. | Use of Biotechnology in Bovine Reproduction Res. Management.      | (6-days)  | NARC Federal | 12                 | -- | 12 |
| 39. | Range Management and Forage Production.                           | (15-days) | NARC Federal | 18                 | 05 | 13 |
| 40. | Statistical procedures and Computer in Agri. Res.                 | (3-Weeks) | NARC Federal | 18                 | 03 | 15 |
| 41. | Sampling and Analytical Techniques.                               | (12-days) | NARC Federal | 20                 | 06 | 14 |
| 42. | Repair Maintenance Management of Res. Equipment.                  | (5-days)  | NARC Federal | 10                 | -- | 10 |
| 43. | Computer Training Lab. Program.                                   | (1-Year)  | NARC Federal | 60                 | 40 | 20 |
| 44. | Vertebrate Pest Management.                                       | (2-Weeks) | NARC Federal | 25                 | 06 | 19 |
| 45. | Information Transfer Course on Fundamentals of Agri. Photography. | (4-days)  | NARC Federal | 35                 | 10 | 25 |
| 46. | Video Production and Editing Techniques.                          | (5-days)  | NARC Federal | 35                 | 10 | 25 |
| 47. | Management of House Hold and Ornamental Pests.                    | (4-days)  | NARC Federal | 20                 | 20 | -- |
| 48. | Modern Library Methods & Techniques.                              | (5-days)  | NARC Federal | 31                 | 12 | 19 |
| 49. | Identification of Cloned Genes in Plants.                         | (15-days) | NARC Federal | 16                 | 01 | 15 |
| 50. | National Workshop on Integrated Pest Management.                  | (3-days)  | NARC Federal | 33                 | 14 | 19 |
|     |   |           |              | Total: 460 157 303 |    |    |

|        |   |   |     |    |     |
|--------|---|---|-----|----|-----|
| 51.    | Training Course on<br>Vertebrate Pest Management.                                   | (2-days) NARC Federal                       | 20  | 02 | 18  |
| 52.    | Training course on<br>Decision Tools for Pest Management.                           | (2-Weeks) NARC Federal                      | 20  | 02 | 18  |
| 53.    | Advance Video Production<br>Course.   | (6-days) NARC Federal                       | 25  | 10 | 15  |
| 54.    | Advance Video Production<br>Course.   | (06-days) NARC Federal                      | 25  | 10 | 15  |
| 55.    | Introductory Computer<br>Graphics Course.   | (12-days) NARC Federal                      | 25  | 10 | 15  |
| 56.    | Training of Training<br>Coordinator-I.  | (06-days) NARC Federal                      | 25  | 10 | 15  |
| 57.    | Experiment Station<br>Management.   | (1-Month) NARC Federal                      | 22  | 04 | 18  |
| 58.    | National Workshop on<br>Plant Biotechnology.  | (03-days) NARC Federal                      | 81  | -- | 81  |
| 59.    | Statistical Procedure<br>and Computer Application.                                  | (03-days) NARC Federal                      | 18  | 03 | 15  |
| 60.    | Training of Training<br>Coordinator-II.   | (4-Weeks) NARC Federal                      | 20  | 03 | 17  |
| 61.    | Training Course on<br>Research Planning.  | (2-Weeks) NARC Federal                      | 26  | 04 | 22  |
| 62.    | Training Course on Soil<br>Research Management.                                     | (12-days) NARC Federal                      | 25  | 05 | 20  |
| 63.    | Training Course on Weed<br>Management.  | (06-days) NARC Federal                      | 23  | -- | 23  |
| 64.    | Advance Course on Samp-<br>ling Analytical Tech. Soil<br>Testing and Plant Analysis | (12-days) NARC Federal                      | 20  | 04 | 16  |
| 65.    | Training Workshop on<br>MSTAT-C.  | (01-Week) NARC Federal<br>20-26 Jan., 1991. | 18  | 08 | 10  |
| 66.    | SPSS PC+Clinic  | (01-Week) NARC Federal<br>4-10 Aug., 1991.  | 08  | 08 | --  |
| 67.    | Wordperfect 5.1   | (01-Week) NARC Federal<br>9-14 March, 1991. | 16  | 16 | --  |
| Total: |   |   | 417 | 99 | 318 |

45

|     |   |   |     |     |     |
|-----|---|---|-----|-----|-----|
| 68. | Wordperfect 5.1   | (01-Week) NARC Federal<br>23-28 March, 1991               | 16  | 16  | --  |
| 69. | An Introduction to<br>Window Application<br>and Utility Software. | (10-days) NARC Federal<br>30, March to 9, April,<br>1991. | 09  | 09  | --  |
| 70. | An Introduction to<br>Window Application<br>and Utility Software. | (10-days) NARC Federal<br>18-28 March, 1991.              | 11  | 11  | --  |
| 71. | Wordperfect 5.1   | (01-Week) NARC Federal<br>16-21 Feb., 1991.               | 40  | 15  | 25  |
| 72. | Library Automation<br>under INMAGIC Software.                     | (2-Weeks) NARC Federal<br>14-26 Sep. 1991.                | 18  | 02  | 16  |
| 73. | MSTAT and Interpretation<br>of Cereal Research Data.              | (2-Weeks) NARC Federal<br>15-27 Feb., 1991.               | 16  | 04  | 12  |
| 74. | Enrichment Preservation<br>of Crop Residues.                      | (01-Week) NARC Federal<br>11-16 oct. 1991.                | 12  | --  | 12  |
| 75. | Supply of Green Fodder<br>Through out the year.                   | (02-days) NARC Federal<br>16-17 Feb; 1991.                | 25  | --  | 25  |
| 76. | Farmers Training in<br>Livestock Production<br>Techniques.        | (01-Week) NARC Federal<br>23-29 March, 1991.              | 24  | --  | 24  |
| 77. | Livestock Production<br>Practices.                                | (2-Weeks) NARC Federal<br>2-16 March, 1991.               | 12  | 08  | 04  |
| 78. | Farmers Training in<br>Animal Health.                             | (1-Month) NARC Federal<br>1-30 Nov; 1991.                 | 04  | --  | 04  |
| 79. | Eighth National Bee<br>Keeping Course.                            | (01-Week) NARC Federal<br>23-28 April, 1991.              | 60  | 25  | 35  |
| 80. | Third Natonal Training<br>Course on Plant Nemat-<br>ology.        | (2-Weeks) NARC Federal<br>23 Nov. to 2 Dec; 1992.         | 15  | --  | 15  |
| 81. | Vertebrate Pest Manage-<br>ment.                                  | (2-Weeks) NARC Federal<br>26 Sep. to 8 Oct; 1992.         | 22  | 09  | 13  |
| 82. | Internation Database on<br>CD-ROM.                                | (2-Weeks) NARC Federal<br>10-22 Aug; 1992.                | 17  | 16  | 01  |
| 83. | International Database<br>on CD-ROM.                              | (2-Weeks) NARC Federal<br>19-31 Dec; 1992.                | 31  | 30  | 01  |
| 84. | Agriculture Policy<br>Analysis and Techniques.                    | (3-Weeks) NARC Federal<br>4-23 Jan; 1992.                 | 15  | 04  | 11  |
|     |   | Total:  | 347 | 149 | 198 |

|     |  |  |    |    |    |
|-----|--|--|----|----|----|
| 85. | Dairy Training Course for Women.   | (01-Week) NARC Federal<br>18-23 April, 1992.       | 30 | -- | 30 |
| 86. | Computer Graphic and Slide Transparency Production Through Computer.               | (2-Weeks) NARC Federal<br>23 May to 4 June, 1992.  | 20 | 10 | 10 |
| 87. | Statistical Procedures & Computer Application in Agriculture Research.             | (2-Weeks) NARC Federal                             | 23 | 13 | 10 |
| 88. | Farming System Research Travelling Workshop.                                       | (04-days) NARC Federal<br>10-13 May, 1992.         | 24 | -- | 24 |
| 89. | Computer Repair and Maintenance Course.  | (3-Weeks) NARC Federal<br>31 July to 19 Aug; 1993. | 10 | 04 | 06 |
| 90. | Lateral Thinking in Management.  | (01-Week) NARC Federal<br>3-12 May, 1993.          | 25 | 22 | 03 |
| 91. | Repair and Maintenance of Farm Machinery for Oilseed Crops.                        | (01-Week) NARC Federal<br>12-17 June, 1993.        | 10 | 03 | 07 |
| 92. | Database on CD-ROM.  | (02-days) NARC Federal<br>13-14 Dec. 1993          | 14 | 14 | -- |
| 93. | Database on CD-ROM.  | (02-days) NARC Federal<br>15-16 Dec. 1991          | 19 | 19 | -- |
| 94. | Database on CD-ROM.  | (02-days) NARC Federal<br>17-18 Dec. 1993          | 16 | 16 | -- |
| 95. | Database on CD-ROM.  | (02-days) NARC Federal<br>20-21 Dec. 1993          | 15 | 15 | -- |
| 96. | An Orientation to ACER 386 System Diagnosis and Preventive Measure HW/SW Problems. | (01-Week) NARC Federal<br>8-13 Jan; 1994.          | 18 | -- | 18 |
| 97. | An Orientation to ACER 386 System Diagnosis and Preventive Measure HW/SW Problems. | (01-Week) NARC Federal<br>15-20 Jan; 1994          | 18 | 10 | 08 |
| 98. | An Orientation to ACER 386 System Diagnosis and Preventive Measure HW/SW Problems. | (01-Week) NARC Federal<br>19-24 Feb; 1994.         | 18 | 17 | 01 |

Total: 260 143 117

|      |   |   |    |    |    |
|------|---|---|----|----|----|
| 99.  | An Orientation to ACER<br>386 System Diagnosis and<br>Preventive Measure HW/SW<br>Problems. | (01-Week) NARC Federal<br>26 Feb. to 3 Marc, 1994.  | 18 | 17 | 01 |
| 100. | System Analysis and<br>Design.  | (2-Weeks) NARC Federal<br>29 Jan. to 10 Feb; 1994.  | 14 | 10 | 04 |
| 101. | Computer Mediated<br>Communications.  | (2-days) NARC Federal<br>26-27 March, 1994          | 14 | 12 | 02 |
| 102. | Computer Graphic and<br>Desk Top Publishing.  | (2-Weeks) NARC Federal<br>2-14 April, 1994.         | 08 | 03 | 05 |
| 103. | Computer Course of<br>Multimedia Application.   | (3-Weeks) NARC Federal<br>30 April to 19 May, 1994. | 07 | 03 | 04 |
|      |   | Total:  | 61 | 45 | 16 |

|                        |             |
|------------------------|-------------|
| Federal Participants   | 944         |
| Provinces Participants | 1610        |
| Total:                 | <u>2554</u> |

This is the list of courses and workshops conducted at and by the Training Institute, NARC. There are several other courses, workshops, seminars and conferences conducted at and by the provincial agencies/institutes and also by the farming system research program. Total number of participants of all these activities comes to 5000 approx. who benefited from this in-country training program of MARP project.

**BOSTID - MART  
RESEARCH GRANTS**

# LIST OF BOSTID GRANTEES INSTITUTE WISE

| Project No. & Title  | Name of P.I.,<br>(Co-P.I. & Head)                          | Gran                      | Telex/Fax                          | Off.                                 | Phone              | Res.                  |
|--|--|---------------------------|------------------------------------|--------------------------------------|--------------------|-----------------------|
| University of Agriculture, Faisalabad  | Dr. N. Rafiq Khan<br>Vice Chancellor                       | AGRIVARSITY<br>FAISALABAD | Fax-27846                          | 33499<br>25911-19                    |                    | 33707                 |
| PAK-SS-PB-2<br>Conjunctive Use of Water from good and poor Quality Sources to extend Irrigated Area and Reduce Disposal Problem in Salt-affected Soils             | Dr. Tahir Hussain (P.I.)<br>Mr. M. Yaseen (Co-P.I.)        | AGRIVARSITY<br>FAISALABAD | 43483 BILAL PK<br>Fax-613507/27846 | 614335<br>Ext. 391                   |                    | 47151/<br>49842       |
| PAK-CS-PB-6<br>Tolerance of Wheat to Salinity and Hypoxia.   | Dr. Riaz H. Qureshi (P.I.)<br>Dr. M. Aslam Aslam (Co-P.I.) | AGRIVARSITY<br>FAISALABAD | Fax-27846                          | 25911-9/331/<br>622430(Co-PI 457)    |                    | 40265<br>41668-Co-PI  |
| PAK-CS-PB-10<br>Genetic Improvement of Sunflower Crop for Production under Saline Conditions.  | Dr. Medhet K. Hussain (P.I.)<br>Dr. Nazir Ahmad (Co-P.I.)  | AGRIVARSITY<br>FAISALABAD | Fax-27846<br>"                     | 25911-9/320                          |                    | 45505<br>30814-Co-PI  |
| Nuclear Institute for Agri. & Biology (NIAB) Jhang Road, Faisalabad  | Dr. S.M. Mujtaba Naqvi<br>Director                         |                           | 43356 NIAB PK                      |                                      |                    |                       |
| PAK-CS-PB-7<br>Production and evaluation of salt tolerant germplasm derived through intergeneric crosses between wheat (Triticum aestivum and Aegilops cylindrica. | Dr. Shafqat Farooq(P.I.)<br>Mr. Tariq Mahmood(Co-P.I.)     | NIAB<br>FAISALABAD        | 43356 NIAB PK<br>Fax-619724        | 24210                                |                    | 620693                |
| National Institute for Biotechnology & Genetic Engineering (NIBGE), P.O. Box 577 Faisalabad  | Dr. Kauser A. Malik<br>Director                            | NIBGE<br>FAISALABAD       | 43356 NIAB PK<br>Fax-611964        | 628186                               |                    | 626812                |
| PAK-CS-PB-19<br>Contribution of biological nitrogen fixation to rice grown on salt-affected soils.   | Dr. Kauser A. Malik (P.I.)<br>Mr. Sikander Ali (Co-P.I.)   | NIBGE<br>FAISALABAD       | 43356 NIAB PK<br>Fax-611964        | 628186                               |                    | 626812<br>42274-Co-PI |
| PAK-CS-PB-20<br>Development of protoplast technology for the genetic manipulation of indica rice.  | Dr. Yusuf Zafar (P.I.)<br>Dr. Abdul Wajid (Co-P.I.)        | NIBGE<br>FAISALABAD       | 43356 NIAB PK<br>Fax-611964        | 628186<br>615260                     |                    | 620694                |
| National Centre of Excellence in Molecular Biology, Univ. of the Punjab, Canal Bank Road, Thokar Niaz Baig, Lahore   | Dr. Riazuddin<br>Director                                  |                           |                                    | 44140 SHSS PK<br>Fax-864155 & 864635 | 5221219            |                       |
| PAK-CS-PB-1<br>Transfer of BT Toxin Genes to Chickpeas for Pod Borer Resistance  | Prof. S. Riazuddin (P.I.)                                  |                           |                                    | 44140 SHSS PK<br>Fax-864155 & 864635 | 5221219            |                       |
| PAK-CS-PB-8<br>Construction of a Linkage Map(s) and Identification of Disease Resistant Gene(s) in Brassica  | Dr. Tayyab Hussain, (P.I.)<br>Mr. Saeed Ahmad (Co-P.I.)    |                           |                                    | 44140 SHSS PK<br>Fax-864155          | 5221219<br>5221235 |                       |

|              |  |   |                             |  |                                     |                    |
|--------------|--|---|-----------------------------|--|-------------------------------------|--------------------|
|              | National Agricultural Research Centre<br>(NARC), PARC, Park Road, Islamabad  | Dr. Zafar Altaf<br>Chairman                                   | AGRESCOUNCIL<br>ISLAMABAD   | 5604 PARC PK<br>Fax-812968               | 823966<br>822514                    | 281373             |
| PAK-AS-PB-9  | Etiology, Pathogenesis and Control<br>of Hydropericardium Syndrome (HPS)<br>in Poultry                                       | Dr. Ashiq H. Cheema (P.I.)<br>Dr. Khalid Naeem (Co-P.I.)      | AGRESCOUNCIL<br>ISLAMABAD   | 5604 PARC PK<br>Fax-812968               | 240323<br>240813                    | 240491             |
| PAK-SS-PB-11 | Development of Resource Management<br>Strategies to Paise Productivity of<br>Eroded Areas and Watersheds.                    | Dr. Shahid Ahmad (P.I.)<br>Mr. M. Aslam (Co-P.I.)             | AGRESCOUNCIL<br>ISLAMABAD   | 5604 PARC PK<br>Fax-812968               | 240148/82005340<br>82005364         | 813667             |
| PAK-CS-PB-14 | Bio-Control of Chickpea pod-borer<br>Research Project.   | Dr. Bashir A. Malik (P.I.)<br>Mr. Khaliq Ahmad (Co-P.I.)      | AGRESCOUNCIL<br>ISLAMABAD   | 5604 PARC PK<br>Fax-812968               | 240468                              |                    |
| PAK-SS-PB-16 | Potassium Ammonium Dynamics in<br>Relation to Soil Mineralogy and<br>Implication for Fertility Management.                   | Dr. M. Salim Akhtar (P.I.)<br>Mr. Akhtar Ali (Co-P.I.)        | AGRESCOUNCIL<br>ISLAMABAD   | 5604 PARC PK<br>Fax-812968               | 82005308                            |                    |
| PAK-CS-PB-26 | Manipulation of Koh Sulaiman range-<br>lands to improve productivity of<br>local livestock.                                  | Dr. M. Fatah Ullah Khan (P.I.)<br>Dr. Iqbal Nutkani (Co-P.I.) | AGRESCOUNCIL<br>ISLAMABAD   | 5604 PARC PK<br>Fax-241495               | 240576<br>240813<br>240989          |                    |
|              | Arid Zone Research Institute,<br>P.O. Box 63, Brewery Road, Quetta   | Dr. Zafar Altaf<br>Chairman                                   | AGRESCOUNCIL<br>ISLAMABAD   | 5604 PARC PK<br>Fax-812968               | 823966<br>822514                    | 281373             |
| PAK-SS-BL-3  | Use of Water-harvesting to Enhance<br>Crop Production in Arid and Semi-<br>Arid Areas of Highland Balochistan                | Mr. Zahid Ali, P.I.)<br>Mr. R.N. Babar (Co-P.I.)              | AZRI, QUETTA<br>BALOCHISTAN | 78236 ICARDA PK<br>Fax-73248             | 75006<br>73248                      | 71721              |
| PAK-AS-BL-4  | Can the Productivity of Sheep be<br>Increased by Using Better Management<br>of Indigenous Breeds in Highland<br>Balochistan. | Dr. Shahid Rafique (P.I.)<br>Mr. Inam-ul-Haq (Co-P.I.)        | AZRI, QUETTA<br>BALOCHISTAN | 78236 ICARDA PK<br>Fax-73248             | 77913<br>75006                      |                    |
|              | Biosaline Research Labs.,<br>University of Karachi, Karachi  | Prof. Dr. S. I. Ahmad,<br>Vice Chancellor                     |                             |  |                                     |                    |
| PAK-CS-SD-13 | Selection of Mesquite for Production<br>of grazable biomass and fuelwood in<br>stressed land.                                | Dr. Rafiq Ahmad (P.I.)<br>Mr. Shoaib Ismail (Co-P.I.)         |                             | 28095 HEJRI PK<br>Fax-4963373<br>4963124 | 479001-2265<br>-do-                 | 6643947<br>4930463 |
|              | Tropical Agri. Res. Institute,<br>Karachi University Campus, Karachi   | Dr. Zafar Altaf<br>Chairman                                   | AGRESCOUNCIL<br>ISLAMABAD   | 5604 PARC PK<br>Fax-812968               | 823966<br>822514                    | 281373             |
| PAK-CS-SD-17 | Insect Pest Management in Stored<br>grain and rice crop with botanical<br>products.  | Dr. Noor Ullah (P.I.)<br>Dr. Atta-ur-Rehman (Co-P.I.)         | AGRESCOUNCIL<br>KARACHI     | Fax-466896<br>467887                     | 474081-4<br>473382<br>473375/470007 | 435105-Co-PI       |

|              |  |   |                         |                            |                 |                                       |                         |
|--------------|--|---|-------------------------|----------------------------|-----------------|---------------------------------------|-------------------------|
|              | Wheat Research Institute<br>Tandojam, Sindh  | Dr. M. Iftikhar Afzal,<br>Vice President  | RUIPAR                  | 25992 RUPAR                |                 |                                       |                         |
| PAK-CS-SD-5  | Development of an Integrated Pest Management System in Cotton in Sindh.  | Dr. Ahmed Ali Baloch (P.I.)<br>Mr. Ali M. Kadroo (Co-P.I.)  | RUIPAR                  | 25992 RUPAR<br>Fax-5685682 | (02234)456<br>" | (02234)609<br>02234/286               |                         |
|              | Wheat Research Institute<br>Tandojam, Sindh.   | Dr. M. I. Bhatti, DG(Research),<br>Agricultural Research, Banglow No.16-B, Liaqat Road, Civil Line Hyderabad. |                         |                            |                 |                                       |                         |
| PAD-CS-SD-15 | Development of Wheat and Barley Varieties with Production Technology for Moisture Deficient and Saline Soils in Sindh. | Mr. M. Ismail Nemon, (P.I.)   |                         |                            |                 | 02233/396<br>02233/289                |                         |
|              | NWFP Agri. University, Peshawar  | Mr. Basit Ali Shah<br>Vice Chancellor   | AGRIVARSITY<br>PESHAWAR |                            |                 | 40230-39                              |                         |
| PAK-SS-NW-21 | Developing a fertility management strategy for eroded lands.   | Dr. Amanullah Bhatti (P.I.)<br>Dr. Muhammad Jamal Khan(Co-P.I.)   | AGRIVARSITY<br>PESHAWAR |                            |                 | 0529/40230-9/277<br>211               |                         |
| PAK-CS-NW-22 | Crop management practices for improving crop productivity and soil fertility on marginal lands.                        | Dr. Mir Hatan (P.I.)<br>Prof. Sherin K.(Co-P.I.)  | AGRIVARSITY<br>PESHAWAR |                            |                 | 0529/40230-9/226<br>283               | 40866<br>40619-Co-PI    |
| PAK-CS-NW-23 | Control strategies for Maydis leaf blight of maize in the North West Frontier Province of Pakistan.                    | Dr. Shabeer Ahmad (P.I.)<br>Dr. M. Saleem (Co-P.I.)   | AGRIVARSITY<br>PESHAWAR |                            |                 | 0529/40230-9/316<br>(05231)2521-Co-PI |                         |
|              | Gomal University, D.I. Khan  | Prof. Dr. M. Ismail Fhattak,<br>Vice Chancellor   | GOMALVARSITY<br>DI KHAN | Fax-4673                   |                 | 0529/4673<br>0529/9279                | 5139<br>4924            |
| PAK-CS-NW-12 | Integrated Insect Pest Management Technology for Muskmelons in Stressed Lands  | Dr. G.A. Miara (P.I.)<br>Dr. Said Mir Khan(Co-P.I.)   |                         | Fax-4673                   |                 | 0529/9260<br>0529/9279                | 4357<br>4924            |
| PAK-CS-NW-25 | Selection of cotton varieties tolerant to salinity.  | Dr. Akhtar Nawaz Khan (P.I.)<br>Dr. Hamid Ullah Khan(Co-P.I.)   | GOMALVARSITY<br>DI KHAN | Fax-0529/4673              |                 | 0529/4395                             | 9270-Co-PI<br>-<br>3895 |
| PAK-CS-NW-27 | Development and Transfer of Farming System for Rod-kohi area.  | Dr. Hamid Ullah Khan (P.I.)<br>Dr. Inayatullah Awan(Co-P.I.)<br>Eng. M. Azam Khan (Co-P.I.)                   | GOMALVARSITY<br>DI KHAN | Fax-0529/710004            |                 | 0529/4395<br>0529/4395<br>0529/4395   | 3895<br>-<br>3465       |

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Total 25 Projects  
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Dated: 20-5-1993

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# LIST OF BOSTID GRANTEE'S BUDGET

| Project No. | Title  | Name and address of P.I.<br>& (Co-P.I.).  | Total Budget | NAS Budget | Grantee Budget |
|-------------|--|---|--------------|------------|----------------|
| PAK-CS-PB-1 | Transfer of BT Toxin Genes to Chickpeas for Pod Borer Resistance   | Prof. S. Riazuddin (P.I.)<br>Director,<br>National Centre of Excellence in Molecular Biology,<br>Univ. of Punjab, Canal Bank Road,<br>Thokar Niaz Baig, Lahore.                       | \$ 83,814    | \$ 52,358  | \$ 31,456      |
| PAK-SS-PB-2 | Conjunctive Use of Water from good and poor Quality Sources to extend Irrigated Area and Reduce Disposal Problem in Salt-affected Soils                              | Dr. Tahir Hussain (P.I.)<br>Mr. M. Yaseen (Co-P.I.)<br>Deptt. Soil Sciences, Uni. of Agriculture,<br>FAISALABAD.  | \$ 76,769    | \$ 41,441  | \$ 35,328      |
| PAK-SS-BL-3 | Use of Water-harvesting to Enhance Crop Production in Arid and Semi-Arid Areas of Highland Balochistan   | Mr. Zahid Ali Qureshi, (P.I.)<br>Mr. R.N. Babar (Co-P.I.)<br>AZRI-PARC, P.O.Box-63, Quetta.   | \$ 69,460    | \$ 20,600  | \$ 48,860      |
| PAK-AS-BL-4 | Can the Productivity of Sheep be Increased by Using Better Management of Indigenous Breeds in Highland Balochistan   | Dr. Shahid Rafique (P.I.)<br>Mr. Inan-ul-Haq (Co-P.I.)<br>AZRI-PARC, P.O.Box-63, Quetta.  | \$ 75,500    | \$ 26,100  | \$ 49,400      |
| PAK-CS-SD-5 | Development of an Integrated Pest Management System in Cotton in Sindh.  | Dr. Ahmed Ali Baloch (P.I.)<br>Mr. Ali M. Kalroo (Co-P.I.)<br>Cotton Research Institute,<br>Sakrand, Nawabshah, SIND.   | \$ 55,470    | \$ 19,700  | \$ 35,770      |
| PAK-CS-PB-6 | Tolerance of wheat to Salinity and Hypoxia.  | Dr. Riaz H. Qureshi (P.I.)<br>Dr. M. Aslam Aslam (Co-P.I.)<br>Deptt. of Soil Sciences, UAF,<br>FAISALABAD.  | \$ 81,516    | \$ 33,000  | \$ 48,516      |
| PAK-CS-PB-7 | Production and evaluation of salt tolerant germplasm derived through intergeneric crosses between wheat ( <i>Triticum aestivum</i> and <i>Aegilops cylindrica</i> ). | Dr. Shafqat Farooq (P.I.)<br>Mr. Tariq Mahmood (Co-P.I.)<br>NIAB, P.O.Box-128, Jhang Road,<br>FAISALABAD.   | \$ 56,700    | \$ 54,100  | \$ 2,600       |
| PAK-CS-PB-8 | Construction of a Linkage Map(s) and Identification of Disease Resistant Gene(s) in Brassica   | Dr. Tayyab Hussain, (P.I.)<br>Mr. Saeed Ahmad (Co-P.I.)<br>National Centre of Excellence in Molecular Biology,<br>University of Punjab, Canal Bank Road,<br>Thokar Niaz Baig, Lahore. | \$ 81,160    | \$ 60,347  | \$ 20,813      |
| PAK-AS-PB-9 | Etiology, Pathogenicity and Control of Hydropericardium Syndrome (HPS) in Poultry  | Dr. Ashiq H. Cheema (P.I.)<br>Dr. Khalid Naeem (Co-P.I.)<br>ASI, NAEC, ISLAMABAD.   | \$ 72,350    | \$ 57,640  | \$ 14,710      |

|              |  |  |           |           |           |
|--------------|--|--|-----------|-----------|-----------|
| PAK-CS-PB-10 | Genetic Improvement of Sunflower Crop for Production under saline Conditions   | Dr. Medhet K. Hussain (P.I.)<br>Dr. Nazir Ahmad (Co-P.I.)<br>Deptt. Plant Breeding & Genetics,<br>University of Agriculture, FAISALABAD.                 | \$ 63,420 | \$ 36,320 | \$ 32,100 |
| PAK-SS-PB-11 | Development of Resource Management Strategies to Raise Productivity of Eroded Areas and Watersheds.                    | Dr. Shahid Ahmad (P.I.)<br>Mr. M. Aslam (Co-P.I.)<br>Water Resources, NARC, ISLAMABAD.   | \$ 63,100 | \$ 39,000 | \$ 24,100 |
| PAK-CS-NW-12 | Development and Transfer of Integrated Insect Pest Management Technology for Muskmelons in Stressed Lands              | Dr. G.A. Miana (P.I.)<br>Dr. Said Mir Khan (Co-P.I.)<br>Faculty of Chemistry,<br>Gomal University, D.I.Khan.   | \$ 82,520 | \$ 57,748 | \$ 24,772 |
| PAK-CS-SD-13 | Selection of Mesquite for Production of grazable biomass and fuelwood in stressed land.                                | Dr. Rafiq Ahmad (P.I.)<br>Mr. Shoaib Ismail (Co-P.I.)<br>Biosaline Res. Laboratories,<br>Deptt. of Botany, Uni. of Karachi,<br>FARACHI.                  | \$ 71,700 | \$ 39,510 | \$ 32,190 |
| PAK-CS-PB-14 | Bio-Control of Chickpea pod-borer Research Project.  | Dr. Bashir A. Malik (P.I.)<br>Mr. Khalique Ahmad (Co-P.I.)<br>Pulses, NARC, ISLAMABAD.   | \$ 58,560 | \$ 23,410 | \$ 35,150 |
| PAK-CS-SD-15 | Development of Wheat and Barley Varieties with Production Technology for Moisture Deficient and Saline Soils in Sindh. | Mr. M. Ismail Memon, (P.I.)<br>Director,<br>Wheat Research Institute,<br>Tandojam, Sindh.  | \$ 17,900 | NIL       | \$ 17,900 |
| PAK-SS-FB-16 | Potassium Ammonium Dynamics in Relation to Soil Mineralogy and Implication for Fertility Management.                   | Dr. M. Salim Akhtar (P.I.)<br>Mr. Akhtar Ali (Co-P.I.)<br>Soil Min/Chem Lab., LRS, NRI,<br>NARC, ISLAMABAD.  | \$ 70,700 | \$ 43,900 | \$ 26,800 |
| PAK-CS-SD-17 | Insect Pest Management in Stored grain and rice crop with botanical products   | Dr. Noor Ullah (P.I.)<br>Dr. Atta-ur-Rehman (Co-P.I.)<br>Grain Storage Research Laboratory,<br>TARI-PARC, P.O.Box-8401,<br>Karachi Uni. Campus, KARACHI. | \$ 60,400 | \$ 36,000 | \$ 24,400 |
| PAK-CS-PB-19 | Contribution of biological nitrogen fixation to rice grown on salt-affected soils.                                     | Dr. Kauser A. Malik (P.I.)<br>Mr. Sikander Ali (Co-P.I.)<br>NIBGE, Jhang Road, P.O.Box-577,<br>FAISALABAD.   | \$ 81,450 | \$ 65,700 | \$ 15,750 |

|                    |   |  |              |                     |                    |
|--------------------|---|--|--------------|---------------------|--------------------|
| PAF-CS-PB-20       | Development of protoplast technology for the genetic manipulation of indica rice                    | Dr. Yusuf Zafar (P.I.)<br>Dr. Abdul Wajid (Co-P.I.)<br>NIPGE, Jhang Road, P.O.Box-577,<br>FAISALABAD.      | \$ 68,900    | \$ 63,500           | \$ 5,400           |
| PAF-SS-NW-21       | Developing fertility management strategy for eroded lands.  | Dr. Amanullah Bhatti (P.I.)<br>Dr. Muhammad Janil (Co-P.I.)<br>NWFP Agri. University, PESHAWAR.            | \$ 23,240    | NIL                 | \$ 23,240          |
| PAF-CS-NW-22       | Crop management practices for improving crop productivity and soil fertility on marginal lands.     | Dr. Mir Hatam (P.I.)<br>Prof. Sherin K. (Co-P.I.)<br>NWFP Agri. University, PESHAWAR.                      | \$ 23,925    | NIL                 | \$ 23,925          |
| PAF-CS-NW-23       | Control strategies for Maydis Leaf Blight of Maize in the North West Frontier Province of Pakistan. | Dr. Shabeer Ahmad (P.I.)<br>Dr. M. Saleem (Co-P.I.)<br>NWFP Agri. University, PESHAWAR.                    | \$ 24,100    | NIL                 | \$ 24,100          |
| PAF-CS-NW-25       | Selection of cotton varieties tolerant to salinity.   | Dr. Akhtar Nawaz Khan (P.I.)<br>Dr. Harid Ullah Khan (Co-P.I.)<br>Gomal University, D.I.Khan,<br>PESHAWAR. | \$ 24,700    | \$ 6,638            | \$ 18,062          |
| PAF-CS-PB-26       | Manipulation of Koh Sulaiman range-lands to improve productivity of local livestock.                | Dr. M. Fatah Ullah Khan (P.I.)<br>Dr. Iqbal Nutkani (Co-P.I.)<br>(NARC) but implementing in NWFP.          | \$ 26,600    | NIL                 | \$ 26,600          |
| PAF-CS-NW-27       | Development and Transfer of Farming Systems for the Red-Fohi area.                                  | Dr. Hanid Ullah Khan (P.I.)<br>Dr. Inayatullah (Co-P.I.)<br>Gomal University, D.I.Khan,<br>PESHAWAR.       | \$ 24,000    | NIL                 | \$ 24,000          |
| <u>25 Projects</u> |   |  | <b>TOTAL</b> | <b>\$ 1,442,954</b> | <b>US\$ 777012</b> |
|                    |   |  |              |                     | <b>US\$ 665942</b> |

Dated: 22-11-1993

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# GRANTEE EXPENDITURE REPORT (1st Year)

Payment/Release No.

| Grant No.     | Approved Budget                          | Payment/Release No. |                    |                     |                    | Total amount Released | Balance Budget   |
|---------------|--|---------------------|--------------------|---------------------|--------------------|-----------------------|------------------|
|               |  | 1-Quarter           | 2nd                | 3rd                 | 4th                |                       |                  |
|               | Quarter Period:                          | 01-4-92 to 30-6-92  | 01-7-92 to 30-9-92 | 1-10-92 to 31-12-92 | 1-03-93 to 31-5-93 | Upto 4th Quarter      |                  |
| CS-PB-1       | \$31,456                                 | \$3,149             | \$2,049            | \$2,049             | \$8,102            | \$15,349              | \$16,107         |
| SS-PB-2       | \$31,676                                 | \$5,241             | \$8,000            | \$4,142             | \$3,338            | \$20,721              | \$10,955         |
| SS-BL-3       | \$48,860                                 | \$4,075             | \$5,355            | \$7,989             | \$7,991            | \$25,410              | \$23,450         |
| AS-BL-4       | \$49,400                                 | \$4,675             | \$8,740            | \$7,879             | \$7,756            | \$29,050              | \$20,350         |
| CS-SD-5       | \$35,770                                 | \$2,969             | \$4,655            | \$4,655             | \$4,656            | \$16,935              | \$18,835         |
| CS-PB-6       | \$48,516                                 | \$3,457             | \$11,019           | \$7,418             | \$7,420            | \$29,314              | \$19,202         |
| CS-PB-7       | Grantee budget transferred to NAS funds. |                     |                    |                     |                    |                       |                  |
| CS-PB-8       | \$20,813                                 | \$3,753             | \$1,967            | \$2,241             | \$2,239            | \$10,200              | \$10,613         |
| AS-PB-9       | \$14,710                                 | \$1,653             | \$1,859            | \$1,859             | \$1,859            | \$ 7,230              | \$ 7,480         |
| CS-PB-10      | \$32,100                                 | \$3,290             | \$4,922            | \$4,599             | \$4,601            | \$17,421              | \$14,688         |
| SS-PB-11      | \$24,100                                 | \$2,763             | \$2,762            | \$2,763             | \$2,762            | \$11,050              | \$13,050         |
| CS-NW-12      | \$24,772                                 | \$3,560             | \$2,435            | \$3,278             | \$3,091            | \$12,364              | \$12,408         |
| CS-SD-13      | \$32,190                                 | \$3,705             | \$5,072            | \$5,072             | Next               | \$13,849              | \$18,341         |
| CS-PB-14      | \$35,150                                 | \$2,946             | \$4,670            | \$5,004             | \$5,005            | \$17,625              | \$17,525         |
| CS-SD-15      | \$17,900                                 | \$2,225             | \$2,225            | \$2,225             |                    | \$ 6,675              | \$11,225         |
| SS-PB-16      | \$26,800                                 | \$3,500             | \$3,200            | \$3,200             | \$3,200            | \$13,100              | \$13,700         |
| CS-SD-17      | \$24,400                                 | \$2,750             | \$2,750            | \$2,750             | \$2,750            | \$11,000              | \$13,400         |
| CS-PB-19      | \$15,750                                 | \$1,962             | \$1,962            | \$1,963             | \$1,963            | \$ 7,850              | \$ 7,900         |
| CS-PB-20      | \$5,400                                  | \$1,036             | \$1,036            | \$1,786             | \$ 287             | \$ 4,145              | \$1,255          |
| SS-NW-21      | \$23,240                                 | \$2,980             | \$2,980            | \$2,980             | \$2,980            | \$11,920              | \$11,320         |
| CS-NW-22      | \$23,925                                 | \$3,129             | \$3,828            | \$2,778             | \$2,778            | \$12,513              | \$11,411         |
| CS-NW-23      | \$24,100                                 | \$3,270             | \$4,470            | \$2,670             | \$2,670            | \$13,080              | \$11,020         |
| CS-NW-25      | \$18,062                                 | \$2,214             | \$2,213            | \$2,213             | \$2,215            | \$ 8,855              | \$ 9,207         |
| CS-PB-26      | \$26,600                                 | \$4,075             | \$4,075            | \$4,075             | \$4,075            | \$16,300              | \$10,300         |
| CS-NW-27      | \$24,000                                 | \$3,297             | \$4,929            | \$2,457             | \$2,503            | \$13,186              | \$10,814         |
| <b>TOTAL:</b> | <b>\$659,690</b>                         | <b>\$75,674</b>     | <b>\$97,173</b>    | <b>\$88,045</b>     | <b>\$84,241</b>    | <b>\$345,133</b>      | <b>\$314,556</b> |

Prepared date: 23-11-93

# GRANTEE EXPENDITURE REPORT (Ist Year)

## Payment/Release No.

| Grant No.     | 1-Quarter 2nd 3rd 4th                          |                            |                          |                         | Total amount<br>Released<br>Upto 4th<br>Quarter of II Year | Balance<br>Budget | Last/Total<br>Payments<br>sent. |
|---------------|--|----------------------------|--------------------------|-------------------------|--|-------------------|---------------------------------|
|               | Quarter<br>Period:<br>01-6-93<br>to<br>31-8-93 | 01-09-93<br>to<br>30-11-93 | 1-12-93<br>to<br>28-2-94 | 1.3.94<br>to<br>31.5.94 |  |                   |                                 |
| CS-PB-1       | Next   | \$8,054                    | Next                     | \$7,702                 | \$ 27,605  | \$ NIL            | 8                               |
| SS-PB-2       | Next   | \$5,478                    | \$2,739                  | \$2,739                 | \$ 31,676  | \$ NIL            | 8                               |
| SS-BL-3       | \$7,817  |                            |                          |                         | \$ 33,227  | \$ 15,633         | 5                               |
| AS-BL-4       | \$5,088  | \$5,087                    | \$5,087                  | \$5,088                 | \$ 49,400  | \$ NIL            | 8                               |
| CS-SD-5       | \$4,709  |                            |                          |                         | \$ 21,644  | \$ 14,126         | 5                               |
| CS-PB-6       | \$4,801  | Next                       | \$7,983                  |                         | \$ 42,098  | \$ 2,599          | 7                               |
| CS-PB-7       | Grantee budget transferred to NAS fund.        |                            |                          |                         |  |                   |                                 |
| CS-PB-8       | Next   | \$5,307                    | Next                     | \$9,442                 | \$ 24,949  | \$ NIL            | 8                               |
| AS-PB-9       | \$1,896  | Next                       | \$3,723                  |                         | \$ 12,849  | \$ 1,861          | 7                               |
| CS-PB-10      | \$3,666  | \$1,500                    | -                        | -                       | \$ 22,578  | \$ NIL            | 6                               |
| SS-PB-11      | \$3,262  | \$3,262                    | \$2,263                  |                         | \$ 19,837  | \$ 2,263          | 7                               |
| CS-NW-12      | \$3,102  |                            |                          |                         | \$ 15,466  | \$ 9,306          | 5                               |
| CS-SD-13      | \$8,388  | Next                       | Next                     | \$7,553                 | \$ 29,790  | \$ NIL            | 8                               |
| CS-PB-14      | \$4,381  | \$4,382                    | \$4,381                  | \$4,381                 | \$ 35,150  | \$ NIL            | 8                               |
| CS-SD-15      | -  |                            |                          |                         | \$ 6,675   | \$ 11,225         | 3                               |
| SS-PB-16      | \$3,375  | \$3,475                    | \$3,425                  | \$2,820                 | \$ 26,195  | \$ NIL            | 8                               |
| CS-SD-17      | -  |                            |                          |                         | \$ 11,000  | \$ 13,400         | 4                               |
| CS-PB-19      | \$1,976  | \$1,976                    | Next                     | \$3,948                 | \$ 15,750  | \$ NIL            | 8                               |
| CS-PB-20      | Next   | \$ 628                     |                          |                         | \$ 4,773   | \$ 627            | 6                               |
| SS-NW-21      | \$1,831  | Next                       | Next                     | \$5,489                 | \$ 19,240  | \$ NIL            | 8                               |
| CS-NW-22      | \$2,849  | \$2,849                    | Next                     | \$2,798                 | \$ 21,010  | \$ NIL            | 8                               |
| CS-NW-23      | \$2,755  | \$2,755                    | \$1,305                  | \$1,305                 | \$ 21,200  | \$ NIL            | 8                               |
| CS-NW-25      | \$2,301  | \$2,302                    | \$2,302                  | \$2,302                 | \$ 18,062  | \$ NIL            | 8                               |
| CS-PB-26      | \$2,575  | Next                       | \$3,219                  |                         | \$ 22,094  | \$ 1,606          | 7                               |
| CS-NW-27      | \$2,704  | \$2,704                    | \$2,704                  | \$2,702                 | \$ 24,000  | \$ NIL            | 8                               |
| <b>TOTAL:</b> | \$67,476                                       | \$49,759                   | \$39,131                 | \$58,268                | \$556,208  | \$72,646          |                                 |

Prepared Date: 31-5-1994

LIST OF EQUIPMENT RECEIVED BY GRANTEES UNDER EASTID PROGRAM

| <u>Grant No</u>                | <u>PI Name &amp; Address</u>  | <u>Items/Descriptions</u>    | <u>Quantity</u>   | <u>Value in US\$</u> | <u>Any Remarks</u> |             |  |
|--------------------------------|---|------------------------------|---|----------------------|--------------------|-------------|--|
| # 1                            | Prof. Fazle M. Khan/<br>Prof. S. Riazuddin,<br>National Centre of Excellence<br>in Molecular Biology,<br>University of the Punjab,<br>Canal Bank Road,<br>Thokar Niaz Baig, Lahore. | TYPE JA-14 FIXED ANGLE ROTOR | 1   | \$4380.00            |                    |             |  |
|                                |   | TYPE JA-10 FIXED ANGLE ROTOR | 1   | \$5840.00            |                    |             |  |
|                                |   | TYPE JA-20 FIXED ANGLE ROTOR | 1   | \$3260.00            |                    |             |  |
|                                |   | GLYCERIN CERTIFIED ACS       | 1   | \$ 365.10            |                    |             |  |
|                                |   | CENT BOTTLE FA 500ML         | 1   | \$ 101.50            |                    |             |  |
|                                |   | IMMERSION OIL                | 2   | \$ 16.38             |                    |             |  |
|                                |   | UTILITY BOX STYREN 125ML     | 2   | \$ 23.40             |                    |             |  |
|                                |   | UTILITY BOX STYREN 325ML     | 2   | \$ 31.20             |                    |             |  |
|                                |   | UTILITY BOX STYREN 500ML     | 3   | \$ 37.68             |                    |             |  |
|                                |   | GL FILTER PAPER C 9CM        | 1   | \$ 46.80             |                    |             |  |
|                                |   | BOTTLE W/ PP 4 OZ            | 1   | \$ 69.50             |                    |             |  |
|                                |   | BOTTLE W/ PP 8 OZ            | 1   | \$ 105.50            |                    |             |  |
|                                |   | BOTTLE W/ PP 16 OZ           | 1   | \$ 102.90            |                    |             |  |
|                                |   | RUBBER TUBE AMBER 2ML        | 1   | \$ 25.74             |                    |             |  |
|                                |   | PORTABLE PIPET AID           | 2   | \$ 369.72            |                    |             |  |
|                                |   | RETROFIT FILTER KIT          | 1   | \$ 40.00             |                    |             |  |
|                                |   | CULT DISH SUSP 60x15MM       | 3   | \$ 386.10            |                    |             |  |
|                                |   | G.V AMBIDEX MEDIUM           | 1   | \$ 91.00             |                    |             |  |
|                                |   | PIPET BASKET HDPE 23 1/2     | 1   | \$ 302.00            |                    |             |  |
|                                |   | PIPET JAR HDPE 61 2X2        | 1   | \$ 271.00            |                    |             |  |
|                                |   | CYTOFOX 989                  | 1   | \$ 107.00            |                    |             |  |
|                                |   | CULT DISH SUS 100X20MM       | 2   | \$ 561.60            |                    |             |  |
|                                |   | PIPET CLEANING SET D LPE     | 2   | \$ 355.68            |                    |             |  |
|                                |   | 25MM MEMBRANE FILTERS        | 1   | \$ 27.00             |                    |             |  |
|                                |   | 47MM MEMBRANE FILTERS        | 1   | \$ 50.00             |                    |             |  |
|                                |   | 25MM MEMBRANE FILTERS .22UM  | 1   | \$ 34.00             |                    |             |  |
|                                |   | 47MM MEMBRANE FILTERS .22UM  | 1   | \$ 50.00             |                    |             |  |
|                                |   | RACES ROUND 1000ML           | 1   | \$ 53.78             |                    |             |  |
|                                |   | GEN PURP CONTAINER           | 2   | \$ 64.74             |                    |             |  |
|                                |   | FILTER SYRINGE 25MM .45UM    | 4   | \$ 547.80            |                    |             |  |
|                                |   | FLEX COLUMN                  | 1   | \$ 9.35              |                    |             |  |
|                                |   | FLEX COLUMN 1.0X20           | 1   | \$ 9.35              |                    |             |  |
|                                |   | FLEX COLUMN 1.5X120          | 1   | \$ 45.40             |                    |             |  |
|                                |   | PIPET FILTER BLACK           | 6   | \$ 96.84             |                    |             |  |
|                                |   | PIPET PUMP QF REL BLU 2ML    | 1   | \$ 9.43              |                    |             |  |
|                                |   | PIPET PUMP QF REL GREEN      | 1   | \$ 9.75              |                    |             |  |
|                                |   | PIPET PUMP QF REL RED        | 1   | \$ 3.45              |                    |             |  |
|                                |   | STREATORLER II               | 2   | \$ 350.00            |                    |             |  |
|                                |   |                              |   | TOTAL VALUE          |                    | \$18,253.60 |  |
|                                |   | # 1                          | Prof. S. Riazuddin,<br>National Centre in Excellence<br>in Molecular Biology,<br>University of the Punjab,<br>Thokar Niaz Baig, Lahore. | *CASEIN PURIFIED     | 1                  | \$170.86    |  |
| *AMMONIUM PERSULFATE ACS REAGE | 1   |                              |   | \$ 11.20             |                    |             |  |
| *2 MERCAPTOETHANOL MOLECULAR   | 2   |                              |   | \$ 27.00             |                    |             |  |
| *FORMAMIDE                     | 1   |                              |   | \$ 13.10             |                    |             |  |
|                                |   | *CHLORAMPHENICOL PLANT CELL  | 1   | \$ 10.70             |                    |             |  |

|                                   |   |           |
|-----------------------------------|---|-----------|
| PARAFFIN MONOSULFATE FROM ST      | 1 | \$ 35.35  |
| TIMER ONE HOUR BIOLOGY REAGE      | 2 | \$ 30.20  |
| PARAFFIN MONOSULFATE              | 1 | \$ 30.40  |
| PARAFFIN MONOSULFATE ACID FREE    | 1 | \$ 8.90   |
| ROBIN & COOK'S PHENOL RE          | 1 | \$ 39.40  |
| QUINIC SULFATE TETRAHYDRATE       | 1 | \$ 31.95  |
| 0.5% METHYLENE BIS ACRYLAMIDE     | 1 | \$ 44.10  |
| ETHIDIUM BROMIDE                  | 1 | \$ 42.55  |
| METHYLENE CHLORIDE                | 1 | \$ 18.05  |
| ACRYLAMIDE MOLECULAR BIOLOGY      | 2 | \$357.70  |
| ETHIDIUM BROMIDE                  | 1 | \$ 42.55  |
| PARAFFIN MONOSULFATE ACID FREE    | 1 | \$ 23.60  |
| PARAFFIN MONOSULFATE CRYSTALLINE  | 1 | \$ 10.50  |
| GLYCEROL MONO-PROPIONALDEHYDE SPR | 1 | \$ 11.50  |
| 0.4% PARAFFIN MONOSULFATE ACID    | 1 | \$ 11.00  |
| PARAFFIN MONOSULFATE CELL CU      | 1 | \$ 37.60  |
| TOTAL VALUE                       |   | \$1008.71 |

|     |                          |                             |    |  |
|-----|--------------------------|-----------------------------|----|--|
| # 1 | Prof. (Dr.) S. Riazuddin | WOOD SHELF CABINET          | 1  |  |
|     |                          | EXPERIMENTAL CUP            | 1  |  |
|     |                          | WOOD CASE                   | 1  |  |
|     |                          | TIN PLATE                   | 1  |  |
|     |                          | GLASS TUBES                 | 2  |  |
|     |                          | TREE ASSY                   | 1  |  |
|     |                          | EXPERIMENTAL TUBE STANDS    | 1  |  |
|     |                          | FRANK PLANT SO SYSTEM       | 1  |  |
|     |                          | WOOD SHELF                  | 3  |  |
|     |                          | STANDARD SPACER ACCESSORIES | 1  |  |
|     |                          | MESH WOODEN BOX             | 1  |  |
|     |                          | METAL PLATES                | 18 |  |
|     |                          | BOLTS                       | 6  |  |
|     |                          | METAL PLATES                | 1  |  |
|     |                          | UNIVERSAL PLATE             | 1  |  |
|     |                          | 125ML ESTIMETER CLAMP       | 1  |  |
|     |                          | ESTIMETER CLAMP             | 1  |  |
|     |                          | 1 LITER ESTIMETER CLAMP     | 1  |  |

|     |  |                                |   |           |
|-----|--|--------------------------------|---|-----------|
| # 3 | Dr. Fahid Ali Qureshi,<br>AZRI-PARC, P.O. Box-63,<br>Brewery Road, Quetta. | BALANCE MODEL 62100            | 1 | \$188.33  |
|     |  | PROM-TIME WIDE RANGE 400-700NM | 3 | \$ 228.00 |
|     |  | TOTAL VALUE                    |   | \$1416.33 |

|     |   |                       |   |           |
|-----|---|-----------------------|---|-----------|
| # 4 | Dr. Shahid Rafique,<br>AZRI-PARC, P.O. Box-63,<br>Brewery Road, Quetta. | BALANCE MODEL NDS K   | 1 | \$861.43  |
|     |   | GRIDE FIBRE RRR 600ML | 1 | \$ 98.00  |
|     |   | GRIDE FIBRE APPARATUS | 1 | \$5263.64 |

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|     |   |  | TOTAL VALUE  | \$6227.07   |
|-----|---|--|--|---|
| # 4 | Dr. Shahid Fatique,<br>AGRI-PARK, P.O. P.V-63,<br>Growery Road, Quetta.                       | LABOR MODEL VT400 BRITISH<br>APARTS<br>LEAD SCALF<br>AA BATTERIES<br>TOOL SUPPLIES<br>LEAD SCALF   | 1<br>1<br>2<br>24<br>4<br>2                              | \$567.14<br>Value Included in Above Item.<br>\$ 545.50<br>Value included in above item.<br>\$292.94   |
|     |   |  | TOTAL VALUE:   | \$1,405.58  |
| # 6 | Dr. Niaz H. Qureshi,<br>Deptt. of Soil Sciences,<br>University of Agriculture,<br>Faisalabad. | ROTO TORQUE ROTATOR  | 1  | \$350.00  |
| # 6 | Dr. Niaz H. Qureshi,<br>Deptt. of Soil Sciences,<br>University of Agriculture,<br>Faisalabad. | MODIFIED EITAFY MICROTOME<br>INSTRUCTION MANUAL<br>STEEL KNIFE HOLDER<br>BLADE KNIVES FOR TUNGSTEN CARB<br>TUNGSTEN CARBIDE MICROTOME BLA<br>WHEELHOUSE PLS.<br>SCAPES<br>BLADES<br>CLAMPS 5/8<br>CLAMPS 7/8   | 1<br>1<br>1<br>1<br>1<br>50<br>50<br>30<br>20            | \$12,000.00<br>VALUE INCLUDED IN ABOVE ITEM<br>\$ 1,225.00<br>\$ 619.00<br>\$ 249.00<br>\$ 105.00<br>VALUE INCLUDED IN ABOVE ITEM 1         |
|     |   |  | TOTAL VALUE  | \$14,218.00   |
| # 6 | Dr. Niaz H. Qureshi,<br>Deptt. Soil Sciences,<br>University of Agriculture,<br>Faisalabad.    | MICROPSIN KIT<br>MICROPSIN EXP 6/06/04<br>MICROPSIN HARPER EXP 6/04<br>MICROPSIN ACTIVATOR   | 2<br>2<br>2<br>20  | \$288.00<br>VALUE INCLUDED IN LINE 1.<br>\$288.00   |
|     |   |  | TOTAL VALUE  | \$288.00  |
| # 7 | Dr. Shafiq Farooq,<br>SSO, NIAR,<br>Jhang Road,<br>Faisalabad.                                | GLASS BATH MICROT<br>AMMONIUM PERSULFATE<br>METH CELL CULTURE TESTED<br>SODIUM SULFATE PLANT CELL CUI<br>CASE BASK & SALT PRACTICAL G<br>METH INSECT CELL CULTURE<br>TRIFLUOROMETHYL SULFONYL FLUORIDE<br>SODIUM SULFATE SODIUM<br>D-B-ACETONE<br>METH HYDROCHLORIDE MOLECULA<br>D-SALT<br>METH HYDROCHLORIDE MOLECULA | 1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1 | \$ 16.95<br>\$ 9.95<br>\$ 10.45<br>\$ 18.60<br>\$ 24.15<br>\$ 36.65<br>\$ 33.80<br>\$ 52.00<br>\$ 30.60<br>\$ 48.90<br>\$ 10.40<br>\$ 59.15 |

|                                 |   |          |
|---------------------------------|---|----------|
| 'TRICHOPOACETIC ACID CRYSTALL   | 1 | \$ 44.65 |
| 'ACETIC ACID GLACIAL            | 1 | \$ 14.25 |
| 'DL-LACTIC ACID FREE ACID       | 1 | \$ 8.65  |
| 'N,N,N,N-TETRAMETHYL ETHYLENE   | 1 | \$ 41.40 |
| 'L-ASPARTIC ACID FREE ACID      | 1 | \$ 19.05 |
| 'SOLVONOL PAPER 506             | 1 |          |
| 'BRILLIANT BLUE G               | 1 | \$ 69.35 |
| 'METHYL GREEN                   | 1 | \$ 9.95  |
| 'N-1-NAPHTHYLETHYLENEDIAMINE DI | 1 | \$ 83.70 |
| 'DL-MALIC ACID FREE ACID        | 1 | \$ 7.85  |
| '5-SULFOSALICYLIC ACID DIHYDRA  | 1 | \$ 33.80 |
| 'DL-ISOLEUCINE 410 TRISODIUM    | 1 | \$ 44.30 |
| 'POTASSIUM IFFERONATE           | 1 | \$ 19.50 |
| 'ACETYLAMIDE FLUOROPHOSPHORUS   | 1 | \$ 85.80 |
| 'METHYLIC ACID FREE ACID PLAN   | 1 | \$ 20.10 |
| TOTAL VALUE                     |   | 1857.95  |

# 5 Dr. Fayal Hussain STEADFAST 2 \$350.00  
 National Centre of Excellence  
 in Molecular Biology  
 University of the Punjab,  
 Lahore Near Faig, Lahore.

# 9 Dr. Ashiq H. Channa F101 FILTER PAPER 10 \$261.00  
 ISI, MARG, FILTER TAPE 5 \$261.00  
 Islamabad TOTAL VALUE \$522.00

# 6 Dr. Ashiq H. Channa 'VICKEL 22' CHLORIDE HEXAHYDRAT 1 \$ 65.70  
 ISI, MARG, 'VICKEL 22' CHLORIDE HEXAHYDRAT 1 \$ 65.70  
 Islamabad, 'VITAMIN B12 1-250 4 \$ 84.12  
 '100% PURE L-ASCORBIC ACID ER 1 \$ 43.90  
 '100% PURE L-ASCORBIC ACID ER 1 \$ 17.70  
 '500MG PHENOLANTHRACENE PROTEIN 1 \$ 29.05  
 '25 G 17% TITRUM BUNCE 1 \$168.75  
 '10X1 CM 100% TITRUM SEALED 1 \$670.00  
 'PLATE TAPES VARIOUS 1 \$1145.00  
 TOTAL VALUE \$2289.92

# 10 Dr. Washeed Karil Hussain METER III COMPACT 1 \$360.00  
 Deptl. of Plant Breeding REFILAMENT IN FIBRE 1 \$ 60.00  
 & Genetics, PATTERNS 1 \$ 9.00  
 University of Agriculture, CENTRALISED TAPES & PASTISS 1 \$340.00  
 Faisalabad, AUTOKANSOMER 1 \$216.00  
 PIPETTE AND 10-SMT 1 \$ 82.00  
 PIPETTE AND 200-1000ML 1 \$ 82.00  
 TIPS 1-20ML 1 \$ 36.00

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|                       |   |           |
|-----------------------|---|-----------|
| TIPS 201-1000UL       | 1 | \$ 39.00  |
| CENTRIFUGE TUBE 1.5ML | 1 | \$ 36.00  |
| COMPRESSOR TANK       | 1 | \$519.00  |
| CHEMFETTE 11 10ML     | 1 | \$ 98.00  |
| INDICATOR RH TEMP     | 1 | \$ 67.00  |
| BATTERY AAA 1.5V      | 1 | \$ 10.00  |
| ADAPTER 10ML          | 6 | \$ 6.00   |
| CHLORINOMETER         | 1 | \$3069.00 |
| Total Value           |   | \$5029.93 |

|      |   |  |   |                               |
|------|---|--|---|-------------------------------|
| # 10 | Dr. Modhet Kamil Hussain,<br>Deptt. of Plant Breeding<br>& Genetics,<br>University of Agriculture,<br>Faisalabad. | SINGLE HEAD THRESHER FOR SUNFL<br>+DUST COVER+ | 1 | \$1,882.00                    |
|      |   | ISOTEMP CPU                                    | 1 | \$ 13.50                      |
|      |   | MODEL 655F SHELF                               | 1 | \$1,068.69                    |
|      |   | ADDITIONAL SHELVES                             | 3 | Value Included in Above Item. |
|      |   | CATALOG  | 1 | \$ 62.55                      |
|      |   |  |   | No Value Declared.            |
|      |   | TOTAL VALUE :                                  |   | \$ 2,966.74                   |

|      |  |                              |   |             |
|------|--|------------------------------|---|-------------|
| # 11 | Dr. Shahid Ahmad,<br>Director(WRRI),<br>NARC, Islamabad. | GENERAL HOME PIECE           | 1 |             |
|      |  | OPERATORS MANUAL             | 1 |             |
|      |  | SAFETY                       | 1 |             |
|      |  | AUGER 8"                     | 1 |             |
|      |  | AUGER 12"                    | 1 |             |
|      |  | SOFTWARE FOR UNIX COMPUTER   |   |             |
|      |  | SYSTEM ADMINISTRATORS GUIDE  |   |             |
|      |  | SERVER RELEASE 3.0 NOTES     |   |             |
|      |  | DESKTOP SERVER INSTALL GUIDE |   |             |
|      |  | SOFTWARE DISKETTE            |   |             |
|      |  | SOFTWARE DISKETTE            |   |             |
|      |  | TPX/SPX ADMINISTRATORS GUIDE |   |             |
|      |  | DESKTOP GRAPHICAL GUIDE      |   |             |
|      |  | SYSTEMS SOFTWARE FOLDER      |   |             |
|      |  | KEYBOARD                     |   |             |
|      |  | 8MB MEMORY UPGRADE           |   |             |
|      |  | CUPID BLANK PROCESSOR CARD   |   |             |
|      |  | TOTAL VALUE                  |   | \$18,140.00 |

|      |  |                          |   |                                 |
|------|--|--------------------------|---|---------------------------------|
| # 12 | Dr. G. A. Miana,<br>Faculty of Chemistry,<br>Gomal University,<br>D.I.Khan (NWFP). | INSECT OBSERVATION CASE  | 6 | (1ST SHIPMENT; DATED 24-8-1992) |
|      |  | INSECT SLEEVE CAGE       | 2 |                                 |
|      |  | INSECT PINS SIZE 000     | 5 |                                 |
|      |  | INSECT PINS SIZE 00      | 5 |                                 |
|      |  | INSECT PINS SIZE 5       | 5 |                                 |
|      |  | INSECT PINS SIZE 6       | 5 |                                 |
|      |  | INSECT PINS SIZE 7       | 5 |                                 |
|      |  | KILLSPRAY COMPRESS AIR S | 4 |                                 |
|      |  | CUELURE                  | 5 |                                 |
|      |  | METHYL ENGINE            | 5 |                                 |

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WHITE WESTINGHOUSE REFLUMINATOR 2

|                     |   |                                 |    |                          |
|---------------------|---|---------------------------------|----|--------------------------|
| # 12                | Dr. G. A. Miana,<br>Faculty of Chemistry,<br>Quaid University,<br>P.I.Khan (NPTP).                      | DRAWER INSECT                   | 12 | \$600.00                 |
|                     |   | INSECT PIN STANDPAD             | 24 | \$158.40                 |
|                     |   | PIN INSECT SIZE 0               | 5  | \$ 27.50                 |
|                     |   | PIN INSECT SIZE 1               | 5  | \$ 27.50                 |
|                     |   | PIN INSECT SIZE 2               | 5  | \$ 27.50                 |
|                     |   | PIN INSECT SIZE 3               | 5  | \$ 27.50                 |
|                     |   | PIN INSECT SIZE 4               | 5  | \$ 27.50                 |
|                     |   | SPRAYER SOL DELIVER             | 3  | \$247.35                 |
|                     |   | DRAWER INSECT                   | 12 | \$600.00                 |
|                     |   | SPRAYERS 3 GALLON               | 3  | \$111.30                 |
|                     |   | ENVIRONMENTAL CHAMBER           | 2  | \$5430.00                |
|                     |   | ENVIRONMENTAL CHAMBER           | 1  | \$2715.00                |
|                     |   | HPLC SYSTEM CONSISTING OF       | 1  | \$21916.50               |
|                     |   | COMPUTER W MONITOR              | 1  |                          |
|                     |   | PLUS MANUAL                     | 1  |                          |
|                     |   | PULS S/A SOFTWARE               | 1  |                          |
|                     |   | MOUSE                           | 1  |                          |
|                     |   | SPACE SAVER KEYBOARD            | 1  |                          |
|                     |   | MODEL 250 BINARY IC PUMP        | 1  |                          |
|                     |   | START UP KIT                    | 1  |                          |
|                     |   | MODEL 250 COMMUNICATION KIT     | 1  |                          |
|                     |   | SOLVENT SYSTEM KIT              | 1  |                          |
|                     |   | HARDWARE KIT                    | 1  |                          |
| 250UL SYRINGE       | 1   |                                 |    |                          |
| VALVE LABIO SENSING | 1   | VALUE INCLUDED IN ABOVE ITEM 1. |    |                          |
| SPECTROPHOTOMETRIC  | 1   | VALUE INCLUDED IN MAINLINE      |    |                          |
|                     | TOTAL VALUE   | \$31,916.05                     |    |                          |
| # 12                | Dr.G.A.Miana:   | ANALYTICAL BALANCE              | 1  | \$2,245.00               |
|                     |   | METAL WEIGHING PAN              | 1  | Value included in above. |
|                     |   | OPERATING MANUAL                | 1  |                          |
|                     |   | POWER CORD                      | 1  |                          |
| # 13                | Dr. Rafiq Ahmed,<br>Biosaline Research Lab.,<br>Deptt. of Botany,<br>University of Karachi,<br>Karachi. | AIRMAX 2 (WATER PLANT TESTER)   | 1  | \$1524.42                |
| # 13                | Dr. Rafiq Ahmed,<br>Biosaline Research Lab.,<br>Deptt. of Botany,<br>University of Karachi,<br>Karachi. | PORTABLE AREA METER             | 1  | \$6875.00                |
|                     |   | UTILITIES PROGRAM*              | 1  |                          |
|                     |   | DCE DTE CABLE*                  | 1  |                          |
|                     |   | FLAT HEAD SCREWDRIVER*          | 1  |                          |
|                     |   | 3/16 SCREWDRIVER*               | 1  |                          |
|                     |   | STRAP AND BUCKLE ASSY*          | 1  |                          |

|                    |   |
|--------------------|---|
| DACRON LINE*       | 1 |
| SPRING COIL*       | 1 |
| CORD END*          | 1 |
| PF GENDER CHARGER* | 1 |
| 2 AMP FUSES*       | 3 |
| 1/4 AMP FUSES*     | 3 |
| 1/2 AMP FUSES*     | 3 |

\* VALUE INCLUDED IN LINE ITEM 1.

|      |  |                        |   |           |
|------|--|------------------------|---|-----------|
| # 14 | Dr. Bashir A. Malik,<br>Pulses Programme,<br>NARC,<br>Islamabad. | WARING BLENDER 3 SPEED | 1 | \$1079.00 |
|------|--|------------------------|---|-----------|

|      |   |                          |    |           |
|------|---|--------------------------|----|-----------|
| # 17 | Dr. Ghulam Jilani,<br>Grain Storage Res. Lab.,<br>TARI-PARC, P.O. Box-8401,<br>Karachi University Campus,<br>Karachi. | FREEZE DRY SYSTEM        | 1  | \$3995.00 |
|      |   | FLASK FREEZE DRY 100ML   | 12 | \$ 616.68 |
|      |   | MULTI CELL DISRUPTER     | 1  | \$2590.00 |
|      |   | DISRUPT HORN             | 1  | \$ 255.00 |
|      |   | TAPERED 1/4 IN MICRO TIP | 1  | \$ 154.70 |
|      |   | ACID DIGESTION BOMB      | 1  | \$ 230.00 |
|      |   | ACID DIGESTION BOMB      | 5  | \$1150.00 |
|      |   | SPECTAPHOT               | 1  | \$ 130.05 |
|      |   | CONVECTER                | 1  | \$ 0.00   |
|      |   | TOTAL VALUE              |    | \$9121.43 |

|                          |  |                              |   |           |
|--------------------------|--|------------------------------|---|-----------|
| # 17                     | Drs. Ghulam Jilani/Noorullah,<br>Grain Storage Res. Lab.,<br>TARI-PARC, P.O. Box-8401,<br>Karachi University Campus,<br>Karachi. | SUPELCOSTL LC-SI 3UM 10G     | 1 | \$ 210.00 |
|                          |  | SUPELCOSTL LC-SI 5UM 10G     | 2 | \$ 190.00 |
|                          |  | SUPELCOSTL LC-CN 3UM 10G     | 1 | \$ 230.00 |
|                          |  | SUPELCOSTL LC-NH2 5UM 10G    | 1 | \$ 200.00 |
|                          |  | SUPELCOSTL LC-D101 5UM 10G   | 1 | \$ 195.00 |
|                          |  | SUPELCOSTL LC-18 5UM 10G     | 5 | \$1100.00 |
|                          |  | SUPELCOSTL LC-18 5UM 10G     | 5 | \$1000.00 |
|                          |  | SUPELCOSTL LC-8 3UM 10G      | 1 | \$ 230.00 |
|                          |  | SUPELCOSTL LC-8 3UM 10G      | 1 | \$ 195.00 |
|                          |  | SUPELCOSTL LC-PP 5UM 10G     | 1 | \$ 195.00 |
|                          |  | SUPELCOSTL LC-304 5UM 10G    | 1 | \$ 265.00 |
|                          |  | SUPELCOSTL LC-1 5UM 10 G     | 1 | \$ 200.00 |
|                          |  | SUPELCOSTL LC-8-DB 3UM 10G   | 1 | \$ 240.00 |
|                          |  | SUPELCOSTL LC-8-DB 5UM 10G   | 1 | \$ 210.00 |
|                          |  | SUPELCOSTL LC-18-PP 5UM 10 G | 1 | \$ 215.00 |
|                          |  | SUPELCOSTL LC-LC-HINT 5UM    | 1 | \$ 210.00 |
| SUPELCOSTL HISSP 5UM 10G | 1  | \$ 265.00                    |   |           |
| WELCH VACUUM PUMP        | 2  | \$3615.38                    |   |           |

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|                    |   |                               |
|--------------------|---|-------------------------------|
| VACUUM PUMP OIL    | 2 |                               |
| DEAD FRONT PLUG    | 2 |                               |
| O RING GASKETS     | 2 |                               |
| METAL CLAMPS       | 2 | Value Included in Line Item   |
| METAL TUBINGS      | 2 | 1.00 of PO 20270              |
| FREZZE DRY SYSTEM  | 1 | \$1914.81                     |
| RUBBER OUTLET HOSE | 1 | Value Included in Above Item. |
| ADAPTER            | 1 | Value Included in Line        |
| POWER CORD         | 1 | 2.00 of PO 20270              |
| TOTAL VALUE        |   | \$13,670.19                   |

|      |  |                                 |   |          |
|------|--|---------------------------------|---|----------|
| # 19 | Dr. Kausar A. Malik,<br>Director, NIPGE,<br>Jhang Road,<br>Faisalabad. | 'A NAIPHETHALFACETIC ACID FREE  | 1 | \$ 23.60 |
|      |  | '500 CHICINE PLANT CELL CULTURE | 1 | \$127.20 |
|      |  | 'THIMPTASAL                     | 1 | \$125.00 |
|      |  | 'MOPS, FREE ACID, MOLECULAR BI  | 1 | \$139.90 |
|      |  | TOTAL VALUE                     |   | \$485.60 |

|      |                     |                                |   |          |
|------|---------------------|--------------------------------|---|----------|
| # 19 | Dr. Kausar A. Malik | AMMONIA ADJUSTING ISA, 5M NAOH | 1 | \$ 10.90 |
|      |                     | 'DORAPAE N                     | 1 | \$420.00 |
|      |                     | TOTAL VALUE                    |   | \$430.90 |

|      |                     |                              |  |            |
|------|---------------------|------------------------------|--|------------|
| # 19 | Dr. Kausar A. Malik | USETTE AUTO                  |  |            |
|      |                     | LEPTORPE AMMONIA GAS SENS    |  |            |
|      |                     | AMMONIA MEMBRANES CAT#951204 |  |            |
|      |                     | LITR CUB PLASTIC             |  |            |
|      |                     | INTERNAL FILL SOLN           |  |            |
|      |                     | COMBINATION PLATFORM         |  |            |
|      |                     | TUBE PACK FCOMP FLAT         |  |            |
|      |                     | DISICER PRPC WHI             |  |            |
|      |                     | HI SCANJET IIC, MODEL C1757A |  |            |
|      |                     | POWER CORD                   |  |            |
|      |                     | HI PRINTER CABLE             |  |            |
|      |                     | PLOT FINISH USER'S GUIDE     |  |            |
|      |                     | CIRCUIT CARD                 |  |            |
|      |                     | DESKSCAN II REFERENCE GUIDE  |  |            |
|      |                     | DESK SCAN II DISK # 1        |  |            |
|      |                     | SCANJET ADAPTER PLUG         |  |            |
|      |                     | METALIC SIEVES AND HOLDERS   |  |            |
|      |                     | CYG SEED GROWTH 1000/CASE    |  |            |
|      |                     | UNIVERSAL KNIFE HOLDER       |  |            |
|      |                     | TOTAL VALUE                  |  | \$3,858.57 |

|      |                     |                             |   |  |
|------|---------------------|-----------------------------|---|--|
| # 19 | Dr. Kausar A. Malik | COMPUTER #/210 HARD DRIVE   | 1 |  |
|      |                     | MOUNTING SCREWS             | 8 |  |
|      |                     | INSTALLATION GUIDE          | 1 |  |
|      |                     | SERVICE MANUAL              | 1 |  |
|      |                     | INTERNAL CONNECTOR CABLE    | 1 |  |
|      |                     | KEYS FOR COMPUTER           | 2 |  |
|      |                     | CUSTOMER CARE PROGRAM GUIDE | 1 |  |

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|                                |   |            |
|--------------------------------|---|------------|
| WIN/POS 6.0                    | 1 |            |
| MICROSOFT MOUSE SV             | 1 |            |
| POWER CORD                     | 1 |            |
| AST PAD FOR MOUSE              | 1 |            |
| MOUSE USERS GUIDE              | 1 |            |
| AST. LICENSE AG. #3021229-003  | 1 |            |
| AST. LICENSE AG. #302154-001   | 1 |            |
| AST. INTERNATIONAL CUSTOMER SE | 1 |            |
| AST PREMIA COMPUTER USER'S GU  | 1 |            |
| AST 230402-COIL KEYBOARD       | 1 |            |
| POWER CORD                     | 1 |            |
| USER'S MANUAL                  | 1 |            |
| SERVICE MANUAL                 | 1 |            |
| SUPER VGA MONITOR              | 1 |            |
| INTERNAL DRIVE SLOT            | 1 |            |
| TOTAL VALUE                    |   | \$3,005.07 |

# 20 Dr. Yusuf Zafar,  
NIPGF, Jhang Road,  
P.O. Box-577,  
Faisalabad.

|                                  |   |           |
|----------------------------------|---|-----------|
| SHAKER ROTARY                    | 1 | \$2995.00 |
| FLASK CARRIER                    | 2 | \$ 820.00 |
| TIERING POSTS FOR SHAKER         | 1 | \$ 64.00  |
| MINIPL CGL UNIT #10 CMB          | 2 | \$ 452.00 |
| PACK # 2 SCREENS FOR CMB         | 2 | \$ 28.00  |
| 1.5 CMB 8 WFL BACKLESS           | 2 | \$ 40.00  |
| 12 WFL BACKLESS CMB              | 2 | \$ 40.00  |
| 16 WFL BACKLESS CMB              | 2 | \$ 40.00  |
| DC POWER SUPPLY                  | 2 | \$ 660.00 |
| SYRINGE 10ML REMOVABLE NEEDLE    | 2 | \$ 70.00  |
| SYRINGE 25ML REMOVABLE NEEDLE    | 2 | \$ 70.00  |
| SYRINGE 100ML REMOVABLE NEEDLE   | 2 | \$ 70.00  |
| PASTEUR PIPETS 5 1/4             | 3 | \$ 66.00  |
| PROPPER BUTE PIPET               | 4 | \$ 14.40  |
| PLASTIC FILTER HOLDER            | 4 | \$ 236.00 |
| ALL GLASS FILTER APPARATUS       | 1 | \$ 270.00 |
| FILTER FUNNEL 300ML SFAL         | 1 | \$ 68.00  |
| FILTER GLASS BASE & TUBULATED    | 1 | \$ 188.00 |
| FILTER GROUND JOINT FLASK        | 1 | \$ 106.00 |
| FILTER AMPLIFIED ALUMINUM SPRING | 1 | \$ 51.00  |
| MEMBRANE FILTER 47MM             | 1 | \$ 71.00  |
| MEMBRANE FILTER 47MM 45UM        | 1 | \$ 55.00  |
| MEMBRANE FILTER 47MM 22UM        | 4 | \$ 248.00 |
| TOTAL VALUE                      |   | \$6722.40 |

# 25 Dr. Akhtar Nawaz Khan,  
Faculty of Agriculture,  
Gomal University,  
D.I. Khan (NWFP).

|                         |   |            |
|-------------------------|---|------------|
| FLAME PHOTOMETER        | 1 | \$2,025.00 |
| MIXING CHAMBER          | 1 |            |
| THREADED NEBULIZER      | 1 |            |
| PLASTIC FUEL TUBING     | 2 |            |
| DRAIN TRAP CLIP         | 1 |            |
| NYLON TUBING 1/4 x .035 | 2 |            |
| TUBING FITTINGS         | 4 |            |
| ALLEN WRENCH            | 1 |            |

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|                             |             |                               |
|-----------------------------|-------------|-------------------------------|
| NEBULIZER                   | 3           |                               |
| NEBULIZER TUBING            | 1           | Value Included in Line Item   |
| DRAIN TRAP                  | 1           | 1.00 of po 202208             |
| POWER CORD                  | 1           |                               |
| ADAPTOR                     | 1           |                               |
| OPERATORS MANUAL            | 1           |                               |
| CALCIUM                     | 1           | \$ 99.00                      |
| NATURAL GAS REGULATOR       | 1           | \$ 99.00                      |
| PLASTIC TUBING              | 1           | Value Included in Line Item   |
| TUBING FITTINGS             | 2           | 3.00 of PO 202208             |
| AIR COMPRESSOR              | 1           | \$ 525.00                     |
| AUTO TRANSFORMER            | 1           | Value Included in Above Item. |
| AIR FILTER                  | 1           | \$ 99.00                      |
| SODIUM STANDARD SOLUTION    | 1           | \$ 28.80                      |
| POTASSIUM STANDARD SOLUTION | 1           | \$ 28.80                      |
| CALCIUM STANDARD SOLUTION   | 1           | \$ 28.80                      |
| AIR COMPRESSOR              | 2           | \$1050.00                     |
| BLACK PLASTIC TUBING        | 2           | Value Included In Line        |
| TUBE FITTINGS               | 4           | 1.00 of 202620                |
|                             |             |                               |
|                             | TOTAL VALUE | \$3,983.40                    |

# 25 Dr. Akhtar Nawaz Khan

COMP. PIGMT AIR CONDITIONER 1 \$ 499.00

PREPARED DATE: 03-01-1994

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Subject: GRANT NO.PAK-CS-PB-1

I. Scientific Progress

Major Achievements of Project No. 1 are,

- a) Four hundred and seventy six samples were collected from different ecological environments in Pakistan and used as source material to separate all *Spodoptera thuringiensis* isolates. 400 isolates were characterized for gene content by DNA hybridization, PCRs, ELISAs and SDS-PAGE.
- b) Rearing of *Heliothis armigera* was established under laboratory conditions and was maintained on artificial diet in the insectory for more than 20 generations without any adverse affects. Biotoxicity assays were developed against this target insect both with crude and purified proteins. Hundreds of crude bioassays were used to comparative bioassays and determination of LD50 values for 32 isolates. Several isolates were characterized to be more efficacious against *Heliothis* than the available reference strain, PPK 99-1. Three genes, CryIA(a), CryIA(c) and CryIVD were cloned from three different toxic isolates and characterized by PCRs and partial sequencing. Their expression in transgenic hosts is underway.
- c) Chickpea transformation studies were initiated with investigations into the ability of its various tissue explants to regenerate into fertile plants. The susceptibility of the regenerable tissue explants to different strains of *Agrobacterium tumefaciens* and *rhizogenes* were also studied. Zygotic embryogenesis of tissue of choice and conditions were optimized for transfer marker genes via *Agrobacterium* and herbicide gene using different promoter constructs. The results

expression studies with the biolistic gun method established the CMV promoter to have a 50-60% higher activity than the *win6* and actin promoters. When *Agrobacterium tumefaciens* was used to transfer marker genes into zygotic embryos and the regenerants analyzed for activity of GUS and neomycin phosphotransferase II genes, the lower parts of the stem showed expression in both genes with a frequency of 20%.

## 2. Problems Encountered

None

## 3. Achievements

- a) Construction of the biolistic gun and standardization of the biolistic gun technology in Pakistan. An extremely efficient and highly versatile vehicle for the introduction of foreign genes into diverse plant species and plant cells. This technology could provide exciting opportunities for modern agriculture in this country.
- b) A repository of *Bacillus thuringiensis* containing various combinations of insecticidal crystal proteins. At present, probably the best understood, and certainly the commercially most successful biological control agent.

## 4. Applications for Farmers/Agribusiness

### Extension Activities to date

Full-fledged plants have been obtained from *Chickpea* zygotic embryos transformed with marker genes.

### Future Extension

As part of our collaboration with USA labs, several constructs have been obtained that contain *CPV* genes with their codon usage modified for high expression in

plants. The major future objective would be transformation of Chickpea with the Bt genes.

5. Research Publications

None after the ones presented in Bhurban.

6. Research Presentations

None after the one presented at Bhurban.

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**CONJUNCTIVE USE OF WATER FROM GOOD- AND POOR-QUALITY SOURCES  
TO EXTEND IRRIGATED AREAS AND REDUCE THE DISPOSAL PROBLEMS IN  
THE SALT AFFECTED SOILS**

**Summary Report**

**Scientific Progress**

One of the major constraints on agricultural production in Pakistan, is the limited supply of quality water for surface irrigation. Strategies have been developed to overcome this problem. The theme is to apply first one or two irrigations with good quality water for seedling establishment, and subsequent with brackish water for rest of the growth period. Rotate this cycle for all the crops. This strategy produces as much yield as obtainable with good quality water alone and also lead to a less development of soil salinity / sodicity. Also brackish water can be used for growing relatively salt tolerant crops following by a sensitive crop using canal water.

**Problems Encountered**

The importance of this project lies in the fact that the river water supplies (good quality irrigation water) have been fully exploited and due to the short supply of this water, it's becoming impossible to increase the cropping intensity further as well as many million of acres can't be brought under cultivation due to non availability of river irrigation water. Therefore, it's extremely vital to develop an alternate source of irrigation water. The only possible source of water left is the groundwater. Sweet groundwater is already under use in some places, while majority of groundwater (80%) is brackish or unfit for irrigation.

**Achievements**

Field experiments were carried out to evaluate rice-wheat yields using brackish water for irrigation. The studies consisted of evaluating cyclic vs. blended canal and brackish tubewell water and the use of various chemical (gypsum, H<sub>2</sub>SO<sub>4</sub>, and HCl), and organic (poultry manure, green manure, pressmud) amendments for amelioration of brackish water. The results indicate that the cyclic (Seedling establishment with canal water and rest brackish groundwater) use strategy resulted in better yields than the use of blended canal and brackish waters. The addition of H<sub>2</sub>S resulted in higher yields, but differences among various chemicals were statistically nonsignificant. As regards the organic amendments, poultry manure gave better yields during the first season, while in the following seasons, the pressmud treatment showed significant superiority. From these studies, it can be concluded that brackish waters of various qualities can be successfully used for crop production under proper water management strategies. These experiments suggest that waters of high salinities and sodicities can be used with various management strategies. Our results show that such waters must not be blended with canal water rather these be used in a cyclic strategies i.e. crop establishment be made with canal water while brackish water be used for the rest of the crop growth period.

**Applications for the farmers**

As a consequence of our experiments, thousand of farmers who are now afraid to use brackish tubewell water would benefit from this strategy and it becomes possible to increase the cropping intensity as well as to bring under plough new lands.

Project Title:

**WATER HARVESTING TO ENHANCE CROP PRODUCTION IN  
THE DRYLANDS OF BALOCHISTAN.**

**ACHIEVEMENTS:**

During the last seven years of agricultural research in the drylands of Balochistan on the effect of water harvesting in increasing the per unit area crop production it has been found that (1:1 treatment), by leaving half of the total area for trapping runoff water and using it in the remaining half of the area increased the crop production and reduced the risk of crop failure in the unfavorable conditions of Balochistan.

Upland Balochistan is located on the fringes of monsoon area. The probability of receiving summer rainfall of more than 30mm is only 10%, due to which Winter crop sowing is almost not possible. Crops are usually planted in the spring season i.e. in January or February. Under the mean Winter season rainfall of 250mm it is very difficult to grow a cereal crop. The probability of exceeding 300mm to Winter rainfall is only 30%. It means farmers can get a good crop only three years out of ten.

Water harvesting treatments can increase available soil moisture to crop. Which increases the probability to success by 70%. Soil moisture plays a very important role in the proper growth of a crop. The main purpose of the AZRI's water harvesting technique was to increase soil moisture depth in the soil profile which could be available during the drier period of the cropping season. Water harvesting treatment increased the soil moisture in the cropped area by more than 80% comparing to the control treatment where no soil moisture conservation technique was used.

The increased soil moisture in the soil profile remained in place for a longer period of time and was used during the months of April and May when normally rains do not occur. Due to more available soil moisture the Winter wheat crop production almost doubled in the 1:1 treatment when analyzed considering only the cropped area and the production increased by 54% on total land area basis (Catchment + cropped area). The risk to crop failure also reduced by 50%. Labor and input charges also reduced by 50%.

**FUTURE RESEARCH NEEDS**

The concept of supplementary irrigation is getting very importance among the scientists working on rainfed agricultural research. Under the very erratic conditions of Balochistan where total annual rainfall is not only insufficient for crop growth but also is very badly distributed over the cropping season. During the months of April and May crop needs sufficient water at the very critical stages of crop growth. But during this period the probability of getting rainfall is very low as stated above.

In future studies it has been planned that the rainwater during the months of December, to March may be stored in underground simply dug reservoirs lined by polyethylene plastics and that water then can be redistributed over the cropped area during the months of April and May.

BOSTID GRANT (PAK-AS-BL-4)  
IMPROVED MANAGEMENT OF INDIGENOUS BREEDS  
OF SHEEP IN HIGHLAND BALOCHISTAN  
(Final report)

1. Scientific progress:

Following studies were conducted under the project:

- i) Production performance of Balochi and Harnai ewes in different body condition scores with varying levels of supplementation in highland Balochistan (Continued).
- ii) Assessing the fattening potential of Balochi and Harnai male lambs fed on different protein and energy rations under confinement (Completed).
- iii) Monitoring of on-farm performance of Balochi and Harnai sheep breeds and goats raised under traditional management in highland Balochistan (Continued).

2. Problems encountered:

There was not any specific problem which occurred during the project period except the late receipt of funds and equipments at some occasions.

3. Achievements:

i) There was a significant improvement ( $P < 0.10$ ) in the fertility of Balochi ewes at Zarchi station from 69 to 92% with provision of a medium level (500 g/h/d) of supplemental feed during breeding as a consequence of increase in their body condition score from 1.0-1.5 to 2.0-2.5. The ewes with body condition score 3.0-3.5 and provided with higher level (750 g/h/d) had a fertility of 88%. The results demonstrate a need for supplemental feeding to improve their body condition before breeding for having fertile and productive ewes since an infertile ewe has a value close to zero.

ii) No difference was observed in weight gain and feed efficiency of Balochi and Harnai lambs fed on two rations containing 12% and 17% Crude Protein. Non-Significant difference was also resulted in daily weight gain of male Balochi and Harnai lambs with low (23.5 Kg) and high (30.6 Kg) initial body weights when fed under confinement.

Higher Metabolizable Energy ration (2700 Kcal) proved to be better than low energy (2300 Kcal) ration for weight gain when fed to male lambs of Balochi and Harnai breed.

Male lambs of Balochi breed proved to be better in terms of weight gain as compared to Harnai breed when fed under confinement.

#### 4 Applications for farmers/Agribusiness :

o Provision of supplemental feeding to Balochi ewes during breeding is essential to improve their body condition score upto a minimum of 2.0-2.5. It allows fertility to exceed 90% and would result in a substantial improvement in flock productivity.

o Male lambs of Balochi breed, 8-10 months of age with body weights below 23.5 Kg may be preferred for intensive fattening and may be fed rations containing 12% Crude Protein.

o Male lambs of Balochi and Harnai breeds, 4-5 months old may be fed on high energy rations (2700 Kcal) for better gains.

o Whenever there is a choice between Balochi and Harnai breeds, Balochi male lambs may be preferred for rearing under intensive feedlot for better body weight gain.

#### 5 Research publications:

(Other than those presented at the conference in Bhurban)

Monitoring of on-farm performance of Balochi and Harnai sheep breeds and goats raised under traditional management in highland Balochistan (Under process).

#### 6 Research presentations:

(At the Bhurban conference)

i) Production performance of Balochi and Harnai ewes in different body condition scores with varying levels of supplementation in highland Balochistan.

ii) Assessing the fattening potential of Balochi and Harnai male lambs fed on different protein and energy rations under confinement.

DEVELOPMENT OF INTEGRATED PEST MANAGEMENT IN COTTON  
IN SINDH, PAKISTAN.

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By  
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and  
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**ABSTRACT:** Studies on development of integrated pest management in cotton crop in Sindh, Pakistan were carried out. The results are summarized as under :-

The cotton agro-eco-system and its components were discussed in detail. In integrated pest management different components of pest control were studied. The results indicated that hairy varieties were resistant to jassid but some what susceptible to thrips and whitefly. Where as nectariless glabrous and high gossypoll content varieties were resistant to boll worm complex. Varieties CRIS-9, NIAB-78 and CIM-135 could be used in IPM Programme. The optimum sowing date for CRIS-9 in lower to Central Sindh is from 25th april to 15th of May, in upper Sindh it may be from 1st of May to 25th of May. The sowing period should be limited upto three weeks. Excessive irrigation and stress during boll formation may be avoided. First irrigation should be delayed as much as possible and the subsequent irrigations should be given with two weeks interval. Excessive fertilizer increase vegetative growth and encourage insect pests to develop. The alternate host plants particularly Okra and other Malvacious plants should be eradicated. The left over bolls should be destroyed by grazing the crop and the ginning waste should also be burned out. For biological control about 22 species of predators and 15 parasites were collected from Sindh on cotton crop. Whitefly may be parasitized upto 34%, when the parasitization level is above 15% the crop need not to be sprayed. The active period of natural enemies starts from August and continued upto September. When the population of natural enemies exceeds 24700/ha the level of bollworm damage suppressed. Maximum number of natural enemies i.e. 1,16,090/ha were recorded during 1st week of August. In off cotton season most of these natural enemies were recorded on Barseem, wheat, maize, brassica and akk plants. In microbial control different strains of Bacillus thuringiensis gave acceptable control to B. armigera. Different pesticides were recommended for cotton pest control. It was also observed that the pesticides of high potential and broad spectrum do reduce the level of natural enemies upto 24.5%. So from 50-90 days of crop age, use of such pesticides may be avoided. Use of sex pheromones may also play a possitive roll in IPM Programme.

If all the components of IPM discussed over here are well integrated we can easily save 2-3 pesticide applications. In our IPM Programme we sprayed crop only for three times and got maximum return.

Subject: GRANT NO.PAK-CS-PB-B

1. Scientific Progress

Under the project #B, sixty two local isolates of *B. thuringiensis* and two isolates of *N. anisopliae* (V200 and V245) were tested in biotoxicity assays against *B. brassicae*. Five *B. thuringiensis* isolates INS2.13, NMS.2, INS2.19, CH5.3 and MR1.7, appeared promising and gave more than 70% mortality at protein concentrations of 800ug/ml. Both fungal isolates were found to be virulent against the target insect. Isolate V200 showed higher pathogenicity and gave an LT50 value of 4 days at  $1 \times 10^6$  conidia/ml in comparison with an LT50 value of 6 days in case of isolate V245.

Conditions for *Agrobacterium*-mediated transformation of *Brassica napus* have been optimized. Effect of age of seedlings, composition of media for shoot regeneration, time of co-cultivation and virulence of disarmed strains were studied. Ten strains of *A. tumefaciens* compared on three explants of Brassica to obtain efficient transformation. *A. tumefaciens* strain 608.(pK11105) exhibited 80% transformation efficiency on cotyledonary leaves and apex of *B. napus* cv. Salam. Moreover, a disarmed strain of *A. tumefaciens* C50 resulted in higher transformation rate as compared to virulent strain on *B. napus* cv. Westar.

The highlight of these results is the identification of the *B. thuringiensis* isolates which can be used against aphids. These isolates are unique in that they are toxic against Homoptera (Aphididae) insects. An extension of this work should be large scale growth of these bacteria and spray of Bt formulation. This formulation can be used as a biocontrol against brassica aphids.

2. Problems Encountered

None

3. Achievements

- i) Identification of 5 locally isolated *Bacillus thuringiensis* toxic against aphids (*Brevicoryne brassicae*).
- ii) Two virulent fungal isolates of *Metarhizium anisopliae* were checked for their toxicity against aphids (*Brevicoryne brassicae*).
- iii) Conditions for *Agrobacterium* mediated transformation have been optimized.

4. Applications for Farmers/Agribusiness

Extension activities to date

None

Future extension ( be specific)

- i) Large scale preparation of *Bacillus thuringiensis* and fungus *Metarhizium anisopliae* formulations for spraying on *Brassica* as biocontrol agent against aphids.
- ii) Transformation of *Brassica napus* with *Bacillus thuringiensis* and other genes of interest.

5. Research Publications

None

6. Research Presentations

One oral presentation and two posters were presented at Bhurban.

FINAL REPORT

Ref: BOSTID Grant # PAK.AS.PB-9.

Project Title: ETIOLOGY PATHOGENESIS AND CONTROL OF HYDROPERICARDIUM SYNDROME (HPS) IN POULTRY.

1. Scientific Progress:

The objectives envisaged at the start of the project included isolation, characterization of the HPS-associated pathogen, study of its pathogenesis and development of improved vaccine. After the concentration of the adenovirus, the virus is being processed for propagation in cell culture. Apart from various below mentioned achievements, attempts are underway to evaluate molecular characteristics of the virus. Facilities have been generated through the grant in this regard and work is underway to find out answers to the yet unresolved issues related to HPS.

2. Problems Encountered:

The major problem during research work was the nonavailability of the proper tools/equipments to undertake work on tissue culture and viral pathogenesis. This was in fact resolved one year after the start of the project. Non-availability of SPF-eggs during early stage of the project also delayed our later experiments; which were also eventually arranged later on. Another problem encountered during work was nonavailability of proper computer package for data analysis. The DMP software was arranged during the 2nd half of the 2 year.

3. Achievements:

An avian adenovirus of type-1 group has been isolated and characterized on the basis of its physical and biological properties. The virus has been successfully propagated in SPF chicks and also grown in organ cultures.

In another study with the help of pathogenesis studies it has been concluded that the lymphoid organs of the birds, were found as virus predilection site which resulted in transient immunosuppression in the birds. On the basis of this information new vaccine schedule has been developed.

An improved vaccine has been developed using cell free preparation of the antigenous vaccine prepared from liver homogenate. The new vaccine has longer shelf life, it

can be stored in freezer and can be dispensed with ease.

Based on the information generated from these studies, new experiments have been designed to evaluate the use of heterotypic vaccines with the help of biotechnology techniques by using the related avian adenoviruses.

An epidemiological study on the kinetics of lateral spread of aetiological agents of HPS yielded information on their latent period and the rate of spread. This information will be helpful in investigation of field outbreaks and in designing future preventive measures against HPS.

Two M.Phil students have completed their research work under this project and one Ph.D student is still conducting research-work in the area of HPS.

#### 4. Application for Farmers/Agribusiness.

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The results regarding immunosuppressive nature of the isolated virus has helped in suggesting amendments in the existing vaccine schedule being used by the farmers. The improved vaccine would need to be introduced through agribusiness cell of PARC to the interested vaccine manufacturers in the country. Mass scale vaccine production of vaccine using pure virus would require successful propagation of the agent in cell culture and/or embryo. Research efforts are still underway in this regard.

#### 5. Research Publications.

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1. Akhtar, S. 1994: A study on lateral spread of etiological agent(s) of hydropericardium syndrome in broiler chickens (submitted to Vet. Record).
2. Naeem, K., B. Panigrahy and M. Hussain, 1994. Isolation and biological characterization of an avian adenovirus involved in hydropericardium syndrome in poultry (Submitted to Av. Dis.).
3. Naeem, K., T. Niazi, S. Malik, A.H. Cheema, 1994. Immunosuppressive potential and pathogenicity of an avian adenovirus isolate involved in hydropericardium syndrome in broilers (Submitted to Av. Dis)

6. Seminars Presented.

1. K. Naeem. 1994.

Immunosuppressive potential and pathogenicity of an avian adenovirus isolate involved in hydropericardium syndrome in broilers.

2. S. Akhtar. 1994.

A study on lateral spread of etiologic agent(s) of hydropericardium syndrome in broiler chickens.

3. T. Niazi. 1994.

Tissue tropism of HPS-associated avian adenovirus PARC-1 isolate and pathognomic changes in infected lymphoid organs.

## Summary of Achievement of BOSTID Research Program Pak-PB-CS-10

### Genetic improvement of sunflower for productions on saline soils.

The problem of environmental stress is affecting stability of crop production seriously. The research program was planned towards solution for stressed lands by utilizing breeding and physiological techniques.

#### Summary of achievements

##### I. Standardization of experimental techniques

i) The saline field environment is very variable both horizontally and vertically. By extensive field sampling, compartments of lower and higher salinity were identified and lay out of field experiment was planned by adjusting replications according to these compartments.

ii) Experiments under controlled saline environment were conducted by constructing raised cemented beds 60 cm high lined with polyethylene. The salinity was artificially produced from non saline soils by using a mixture of NaCl, Na<sub>2</sub>SO<sub>4</sub>, CaCl<sub>2</sub> and MgSO<sub>4</sub> salts in the ratio of 5:9:5:1. The inclusion of non-saline controlled treatment over all genotypes is highly desirable for evaluation of potential yield comparisons.

iii) Evaluation of genotypes for salinity tolerance at seedling stage was made in 8 x 20 cm size polyethylene bags filled with sand and soil in the ratio 3:1. Salinity levels were created by using NaCl and CaCl<sub>2</sub> in 1:1 ratio. The seedling growth parameters were measured 21 days after sowing. Canal water was applied when required.

##### II. Breeding Experiments: Evaluation of sunflower genotypes for salinity tolerance

i) Three hundred sunflower cultivars/lines were evaluated for salinity tolerance under green house at seedling stage. Those showing salinity tolerance were later tested under saline field conditions. Both intervarietal and intra varietal differences for salt tolerance in growth and yield potential were identified. A salt tolerant sunflower population was developed. Plan for population improvement of sunflower for salinity tolerance is submitted.

##### ii) Selection criteria:

Seed germination under saline and non-saline condition was used as a criteria for selection. Seedling dry matter as an expression of total growth was another criteria for selection. Higher shoot growth and succulence appearance was another visual criteria for selection. Under field condition, head diameter, seed filling and seed yield were considered as important criteria for selection for salt tolerance.

iii) The relationship of different seedling parameter with yield and yield component were determined. Selection of genotype with better shoot growth, higher dry matter and fresh weight appeared to produced high yielding plants under saline condition. Oil content was related with higher seed weight and head dia meter.

### III. Physiological Experiments: Physiogenetic Mechanism for salt tolerance in sunflower

Experiments were conducted to determine ion accumulation pattern in sensitive and tolerant sunflower genotypes. Tolerant sunflower lines decreased sodium and increased potassium in thus had a better potassium to sodium ratio. While sensitive line had a higher level of chloride and sodium.

**DEVELOPMENT OF RESOURCE MANAGEMENT STRATEGIES  
TO RAISE PRODUCTIVITY OF ERODED AREAS AND WATERSHEDS  
(PAK-SS-PB-11)**

### **1. SCIENTIFIC PROGRESS**

The project was aimed to develop and test management strategies for eroded areas and watersheds. Computer models were used and field tested in the Pothwar plateau. The ultimate goal was to raise income of small farmers by developing more profitable farming systems. Three studies were conducted during the project period.

The first study was aimed to document the effect of Sodium Carbonate, compaction and bio-plastic (sandwich of soil and organic layers) treatments on seepage reduction in earthen ponds. A field facility and methodology was developed to test the treatments at NARC. Sixteen small ponds were built at NARC and used to record seepage data.

The second study was aimed to develop database for runoff from small watersheds in degraded scrub forests. The five years (1988-93) rainfall and runoff data were used to develop a database named as "HYDROBASE". This database can be used for prediction of runoff by watershed management programmes. The replicability, reproducibility and reliability for other locations yet to be verified.

The third study was aimed to develop Geographic Information System facility for spatial database, analysis and decision support information.

### **2. PROBLEMS ENCOUNTERED**

The problems encountered in field studies were due to heterogeneity in soil structure which was taken care during the study period. The installation of GIS-GRASS package could not be completed due to problems related to un-compatibility of hardware and software. The ARC-INFO software provided by UNEP is a professional software of GIS and team is now learning its usage. Some of the hardware items are still to be shipped to Pakistan.

### **3. ACHIEVEMENTS**

After 350 days since initial wetting, the mean cumulative seepage rates were 5, 7.1, 2.5 and 3.0  $\text{cm}^2$  for the control, Sodium Carbonate, compaction and bio-plastic treatments, respectively. The compaction and bioplastic treatments resulted in about 70% reduction in seepage rate.

Based on the promising results of seepage experiment at NARC, the study has been extended to farmers fields for testing in real-life situation.

A "HYDROBASE" formulation in Dbase IV has been developed for rainfall and runoff analysis of small watersheds in degraded scrub forests. This model will be used as a training module for practical soil conservationists in the Punjab Province.

The GIS and Remote sensing facility has been used to diagnose most sensitive locations in the catchment area of the Shahpur dam for watershed management planning when financial resources are limited and phasewise implementation of interventions is required.

The development agencies have asked to provide training in seepage control, runoff predictions, and GIS and image processing based on project work. Module development is in progress.

#### **4. APPLICATIONS FOR FARMERS/AGRIBUSINESS**

The seepage control in small earthen ponds activity has been expanded to four farmers' ponds in Fatehjang to further evaluate the seepage rate in farmers framework. The Soil Conservation Directorate is also collaborating as a potential user. Construction has been completed and all the ponds received water during July, 1994. Seepage study will be initiated during October, 1994.

The collaboration with local plastic industry helped to produce black PE film of 250 micron with UV stabilizers. The plastic lining will help to eliminate seepage. One pond has been lined with this film.

The black PE film is needed for deserts and arid lands. Collaboration with plastic industry will be expanded to produce better quality films. Large scale field testing will be organized in collaboration with Punjab OFWM Programme to provide cost-effective lining of tanks.

#### **5. RESEARCH PUBLICATIONS**

The publications in final stage of preparation are:

- Runoff from small watersheds in degraded scrub forests
- Integrated catchment and command area development of Shahpur dam

The training modules prepared are:

- Predicting design runoff. (Dr. Shahid Ahmad)
- Application and design of structures (Dr. Shahid Ahmad)

#### **6. RESEARCH PRESENTATIONS**

The GIS and Remote Sensing work on Shahpur dam was presented during the National Conference on "On-Farm Water Management" as a poster paper. The training modules will be presented in July in fortnightly critique seminars organized by ABAD and WRII-NARC. Based on the review made by the participants and users, the authors will modify the training modules.

"Final Report, Project No.PAK.CS.NW-12"

INTEGRATED PEST MANAGEMENT OF MUSKMELON

I. Scientific Progress

1. The population Dynamics of Bactocera cucurbitae (Dacus cucurbitas) and B. dorsalis (D. dorsalis) were studied.
2. Chemical control trials against these pests were conducted. Best results were obtained with the application of Dipterex + molasses.
3. Natural pesticide from Azadirachta indica (Neem), Peganum harmelh (Harmal), flowers of Nerium indicum (Kaner) were also tested against pests of Melon. Only neem extracts were found to be effective.

II. Problems Encountered

Some of the plant extracts were found to be phytotoxic . Formulations are being prepared, using different emulsifiers.

III. Achievements.

Pests on muskmelon can be conveniently controlled using Dipterex + molesses and neem extracts.

IV. Application for Farmers/Agribusiness

- Dipterex + molesses can be used to control pests of muskmelon. This news was published in a local daily for farmers information.
- Natural pesticides from Neem and other plants are to be studied further for control of different pests.

V. Research Publications

A paper will be published in Economic Entomology, if possible.

VI. Research Presentation

The results were presented at Bhurban.



(PROF. DR. G.A. MIANA)

## PROGRESS REPORT OF BOSTID GRANT #13

1. **SCIENTIFIC PROGRESS:**

Information on seed germination, seedling emergence and screening of both exotic and local species/provenances of *Prosopis* was studied under various salinity regimes in pots and field conditions. In addition, isolation, purification and inoculation of *Prosopis* with *Rhizobium* sp. was also carried out in the project.

2. **PROBLEMS ENCOUNTERED**

We came across rodent problem in the beginning of our field trials and some of our plantation was destroyed. However, with management strategies, this problem was controlled.

3. **ACHIEVEMENTS**

List of achievements and future plan of work is enclosed.

4. **APPLICATION FOR FARMERS/AGRIBUSINESS**

1. Residents of coastal areas are burning valuable mangrove plantations growing by the side of shore. Due to non-availability of good quality water, no other plantation is available for providing fuelwood to these people. *Prosopis* sp. could be grown at these sites using saline underground water for irrigation to provide the necessary fuelwood and forage, as well as bind the sand and stop desertification.

2. Future Extension: A natural plantation of *P. juliflora* is already existing at Sonmiani coast. It would be worthwhile if better wood yielding, mono-stemmed species like *P. alba*, *P. articulata* (which have shown better growth performance in our research work) are grown at some selected sites of Sonmiani coast. Their fuelwood producing capabilities may be evaluated for short- and long-term trials. Some of the plants may be left growing for 5-10 years to obtain their logs or furniture industry.

5. **RESEARCH PUBLICATIONS**

In addition to the papers presented and submitted during the project meeting at Bhurban, two papers are under preparation for presentation in the forthcoming International Conference on High Salinity Tolerant Plants to be organized from Dec. 12-16 at the University of Karachi (co-sponsored by NSF, USA).

**Summary/achievements**

- Bioassays of B. thuringiensis indicated high interaction between the bacterial toxin at early and late third instar. Dipel 2X was found to be the most potent (52,000 IU/mg potency) B.t. commercial preparation against the third instar larvae of H. armigera
- The modified artificial diet successfully supported growth of H. armigera upto 5th laboratory generation.
- Pheromone traps indicated high activity of H. armigera from March 26, 1993 to April 29, 1993 and accordingly, plant protection measures were adopted.
- Maximum larval population of H. armigera on chickpea crop was observed from April 4, 1993 to May 2, 1993, accordingly, treatments of biological insecticides were applied.
- Studies on residual activity of B.t on chickpea crop indicated that B.t. did cause larval mortality of H. armigera. The data also indicated that activity of B.t. decreased gradually over 5 days period.
- Application of microbial and chemical insecticides on chickpea crop indicated that Dipel 2X, Dipel ES, MVP, Deltaphos, Match and Monitor can subside H. armigera attack thereby causing appreciable increase in the grain yield of chickpea.
- Sixty six suspected B.t. isolates were obtained as a result of microbiological examination of soil samples and dead insect material collected from various localities of Pakistan.

**Justification for continuation of this research:**

This research is an important part of Integrated Pest Management (IPM) aimed at managing major lepidopterous pests of pulses, vegetables, fruits and forests by using microbial insecticides (non hazardous and environmentally safe insecticides).

The Pulses Program scientists have acquired sufficient research skill over the past four years of research and through the execution of BOSTID project. Moreover, Pulses Program is now in a position to establish a microbial insecticides production facility with the help of indigenous Bacillus thuringiensis strain at NARC in order to develop a complete package of plant protection technology for the farmers. These microbial insecticides would be also provided to other commodity programs to combat major insect pests of economic importance.

Note: The second year results on B.t. bioassays, population dynamics of chickpea pod borer, residual activity of B.t. commercial preparations, microbiological studies towards isolation of indigenous B.t. and B.t. field application are being analysed for the second year annual report.

SUMMARY FOR THE CONTINUATION OF THE PROJECT UNDER GRANT  
NO. PAK-CS-SD-15 "DEVELOPMENT OF WHEAT AND BARLEY  
VARIETIES FOR ROTATION WITH RICE IN  
MOISTURE DEFICIENT AND SALINE SOILS  
IN SINDH

The Wheat and Rice are important crops of Sindh. About 2,00,000 hectares are under rice production with wheat and barley rotation in Sindh.

Low yields are obtained in wheat and barley due to (i) the irrigation water is available for winter crops of wheat and barley. (ii) Wheat is planted very late as it is in rotation with long duration varieties of rice.

Improved rotation system with superior wheat and barley varieties selected for (i) short duration (ii) tolerant to moisture stressed conditions and saline soils of Upper and Lower part of Sindh respectively, will be developed with continuance of this project.

Specific objectives of the study are mentioned as under:

- (i) To identify new lines/cultivars for moisture stressed conditions following rice and confirm the results of last year.
- (ii) To develop technology for Rice-Wheat/Barley rotation to enhance production potentiality of wheat and barley varieties developed during the study.

It is evident from the recommendations made on the basis of results during 1992-93, that wheat cultivars/lines NARC-9 and NARC-26 have given better yield in Thatta areas, where as varieties/lines 90-CO-43 and AZARI-W2 have given more yield at Dokri. Likewise, barley lines (i) RUDZ/PHZURKA LB 77 - 6169-900-5AP-10P-12198/ER/APP (ii) HERMA= 02/11012-2/040/37 bn 610-7VULLN/WW 63191 CB 84 have given better yield in Thatta; B-8803B and AZARI-B 2 in Dokri.

As to complete the research work and to get authentic data, it is necessary to collect at least three years data to formulate the concrete recommendations.

#### FUTURE STUDY

As per the report of Dr. Jim Oster, to test and develop technology cultural practices for Rice-Wheat/Barley rotation to study production potential of wheat and barley cultivars identified during study, data for at least 2 more years is still required. It is therefore essential that the project may be continued for at least 2 to 3 years more in order to achieve the objectives.

SUMMARY

Twenty four soil series, representing a range of parent material were investigated for their potassium (K) chemistry in relation to mineralogy. The series included were Biha, Mali, Ushu, Shahi, Peshawar, Tikken (NWFP), Murree, Kotly, Guliana, Satgra, Wazirabad, Balkassar, Halizabad, Rasulpur, Bhalwal, Burhan, Missa, (Punjab), Pacca, Pitai, Shahdra (Sindh), Shamoza, Jhatpat, Balleli and Kundi (Baluchistan). Samples were collected from each genetic horizon by describing the soil profiles in specially prepared pits. The soil samples were fractionated into sand (2-0.05 mm), silt (50-2 um), coarse clay (2-0.2 um) and fine clay (<0.2 um) fractions. The differences in particle size distribution were attributed to the source of parent material and in some cases to the weathering process.

Mineralogical composition of all the soil fractions was determined. Mineral composition of sand and silt fractions as determined by total chemical analysis, X-ray diffractometer and microprobe analysis indicated that sand fractions of the soils were composed of mainly quartz and feldspar with some mica and chlorite except Kotly which was mainly composed of quartz and feldspar. Silt fraction was also composed of mainly quartz, mica, and feldspar. In the less weathered soils there is abundance of biotite type mica which releases K at a faster rate than the muscovite type mica. The coarse clay was mainly composed of mica, kaolinite, smectite, chlorite, quartz and vermiculite. Fine clay was composed of smectite, vermiculite, mica and traces of kaolinite. Mostly coarse clay contained dioctahedral mica and smectite, fine clay smectite was montmorillonite as indicated by infrared analysis.

Acid extractable K from sand and silt fractions was estimated by digesting 1 g sample in 1N HNO<sub>3</sub>. Acid extractable K was positively correlated with total Fe + Mg content in the sand and silt fraction. However, correlation was greater with Fe than Mg. Also acid extractable K was more positively correlated with total mica than K-feldspar. The soils derived from granite, granodiorite and alluvium contained higher boiling nitric acid extractable K than the soils with parent material originated from shale, or mixture of shale and limestone. The weathered alluvial soils (Kotly, Wazirabad) have less boiling HNO<sub>3</sub> extractable K in sand fraction. Therefore, boiling HNO<sub>3</sub> extractable K has strong relation with the source of parent material and weathering. Ammonium acetate extractable K of all the profiles was determined and found positively correlated with clay content which is due to clay's control over CEC. In almost all the soils NH<sub>4</sub>OAc extractable K increased toward surface.

Potassium fixation was studied in the whole profile by alternate wetting and drying for one month. Potassium solution of known concentration was added and then extracted with 1N NH<sub>4</sub>OAc, the amount not recovered is considered as fixed K. Potassium fixation varied with soil mineralogical composition but had no correlation with total clay content as usually thought. In the Jhatpat soil, silty clay in texture, even there was negative fixation. Potassium fixed and K extractable with 1N NH<sub>4</sub>OAc were negatively correlated.

Acid extractable K reserves in upper 1 meter depth, were estimated in the soils. Potassium quantity-intensity relationships of the upper four horizons of all the soils were developed, which aids in predicting the potassium status of the soils and describes subsequent (Q) and immediate (I) availability of K to plants. Through the study it would be possible to delineate the soils which will require K fertilization for optimum crop production.

**INSECT PEST MANAGEMENT IN STORED-GRAIN AND RICE CROP  
WITH BOTANICAL PRODUCTS (BOSTID/PARC Project No. 17)**

**SUMMARY OF ACHIEVEMENTS**

**1. RESEARCH RESULTS**

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- 1.1 Ethanol and hexane extracts of sweetflag (*Acorus calamus*), neem (*Azadirachta indica*) and turmeric (*Curcuma longa*) were as effective as commercial pesticides (Padan and Karate) in suppressing White Backed Plant Hopper (*Sogatella furcifera* Horvath.) Infestation in rice crop.
- 1.2 Oils of sweetflag, neem and turmeric were effective as protectants of stored rice in semi-commercial trials at Thatta and Dokri (Larkana) against *Oryzaephilus surinamensis* (L.) and *Tribolium castaneum* (Herbst).
- 1.3 Extracts of two marine animals were evaluated for the first time for their anti-insect activity. *Zoanthid* spp. and *Aplysia juliana* extracts proved promising repellents and growth inhibitors against red flour beetle, *T. castaneum*. Extract of a plant, *Artemisia dubia* was also promising.

**2. RESEARCH PAPERS PRESENTED AND POSTERS DISPLAYED**

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- 2.1 Repellent and growth inhibitory effects of indigenous plant/marine animal extracts against red flour beetle, *Tribolium castaneum* (Herbst) Coleoptera: Tenebrionidae (Noor Ullah, Syed Asim Rehan Kazmi, Farzana Ibrahim and Rahila Nazli).
- 2.2 Evaluation of some plant extracts/products against White Backed Plant Hopper, *Sogatella furcifera* (Horvath) Infestation on rice (Syed Asim Rehan Kazmi, Noor Ullah and Muhammad Ramzan Hakro).
- 2.3 Farm level evaluation of some botanical products as protectants of stored rice against insect attack (Noor Ullah, Syed Asim Rehan Kazmi and Ghulam Jillani).

**3. FUTURE RESEARCH THRUST**

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- 3.1 Identification and purification of active compound(s)/ fraction(s) from promising marine/plant extracts.
- 3.2 Toxicological studies of active compounds.
- 3.3 Standardization and formulation of Neem products for end users.

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ATTN: Dr. U.K. Baloch, Director PARC-BOSTID, PARC, Islamabad  
From: Dr. Kauser Malik, NIBGE, Faisalabad

July 26, 1994

No. of Pages: 4

Dr. Judith R. Bale,  
BOSTID, NRC, Washington D.C.

Dear Judy,

Ref. ur fax of July 20, I have already sent the corrected MS to Dr. Baloch to meet the thursday deadline. Since we are now on e-mail, I am sending the material requested by you thru ur fax of July 22 which I received this afternoon from Islamabad. I hope Yusuf has also sent you the required material. I received a copy of the email message sent to him.

It was nice meeting you in Islamabad. I am sure we will meet again in very near future. It was nice talking to your auditor (sorry- forgot his name).  
With best wishes, yours sincerely, Kauser Malik.

CONTRIBUTION OF BNF TO RICE (CS-PB-19)

1. Scientific Progress

The use of biofertilizers is desirable to reduce the expensive input of fertilizers for sustainable crop production. Rice is one of the main cash crops of the country and is also generally grown during reclamation of saline soils. Major portion of nitrogenous fertilisers is applied to rice and wheat crops. Therefore utilization of BNF technology by these crops will not only reduce the dependance on nitrogenous fertilizers but will also increase fertilizer use efficiency.

In order to to utilize BNF technologies for rice, extensive isolations of diazotrophic bacteria associated with roots of rice were made. All these isolates were then screened for their ability to produce growth hormones. In addition their survivability in soil was studied by preparing flourecent antibodies. After screening, 4 strains were selected which had both the properties of nitrogen fixation and hormone production. Their affect on root growth and N fixation was studied under aseptic conditions using N-15 isotope. In order to increase the survivability in soil of inoculated bacteris, soil based medium was devised and method of inoculum application to rice roots was optimised. Similarly, studies were conducted with Azolla which is another widely used technology in S.E. Asian countries. Various strains of Azolla were tested and an optimum medium for maintaing its nursery was formulated.

With all this information, a well replicated microplot field experiment using N-15 fertilizer was conducted to study the usefulness of these technologies to rice nutrition and productivity.. This experiment was conducted in 1.5x1.5 m plots arranged in CRBD having 4 replicates with 9 treatments viz. T1 = Control, T2 = Azolla cover, T3 = Azolla incorporated, T4 = Bacteria, T5 = Azolla cover + Bacteria, T6 = 30 kg N/ha, T7 = 30 kg N/ha + Azolla cover, T8 = 30 kg N/ha + Bacteria + Azolla incorporated, T9 = 30 kg N/ha + Bacteria + Azolla cover, T10 = 30

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kg N/ha + Bacteria and T11 = 60 kg N/ha. A mixture of bacteria having *Azospirillum* K-1, *Flavobacterium* (96-57), *Pseudomonas* (96-51) and *Azospirillum* (N-4) in soil extract medium was applied to rice by dipping seedling roots for 1/2 hr before transplanting, while a mixture of 6 strains of *Azolla* was inoculated (177 g fwt/m<sup>2</sup>) 7 days after transplanting, and N-15 labelled ammonium sulphate was applied in all the fertilizer treatments (T6-T11).

The rice yield (straw+grain) was maximum for T7 and T10 and minimum for T11, indicating the usefulness of *Azolla* and bacteria for increasing rice biomass. As traced with N-15 labelled fertilizer the fertilizer-N recovery in rice was maximum for T9 followed by T7 indicating usefulness of *Azolla* cover to improve fertilizer-N use efficiency, which may be due to lowering of floodwater pH by *Azolla* cover. To quantify the BNF in rice, N-15 isotope dilution method was used and the high N treatment (T11) was kept as non-fixing control. Maximum amount of BNF (46 kg N/ha) was obtained for T10 where bacteria were inoculated alongwith 30 kg N/ha. This was followed by T8, having 17 kg N/ha as BNF due to bacterial and *Azolla* inoculation.

The study indicated that use of biofertilizers alongwith a low input of chemical-N fertilizer is useful for increasing rice yield, fertilizer-N use efficiency and BNF in rice, grown in saline soils.

2. Problems encountered: No major problems except some unavoidable delays in getting supplies (but no complaints!).

3. Achievements: The results of the microplot field experiment has once again indicated the importance of associative nitrogen fixation. The presence of *Azolla* helps in reducing N losses and increasing fertilizer use efficiency.

4. Applications for Farmers/Agribusiness: We are already negotiating the extension of these technologies through some entrepreneurs. However presently we are repeating the field experiment and also doing a trial in Swat (Mingora) at their Research Station because of the cooler climate which is better for *Azolla*.

Research publications: Four research papers are in preparation

#### Research Presentations:

1. International Congress on Nitrogen Fixation, Cancun, Mexico, Dec. 1992
2. 6th Int. Symp. on Nitrogen Fixation with Non Legumes, Ismailia, Egypt, Sept. 1993
3. Int. Symp. on Biotechnology for Sustainable Development, Faisalabad, Pakistan, Dec. 1993
4. Several National scientific meetings; details have been provided in the technical reports.

Grant # 20  
3/4**Title: Development of Protoplast Technology for Genetic Transformation of Rice****Project # PAK-CS-PB-20****P.I.: Dr. Yusuf Zafar,  
NIBGE, Faisalabad.****SUMMARY****Scientific Progress**

This pioneering project was initiated for the improvement of local indica rice through protoplast fusion and other transformation techniques. As a prerequisite, *in-vitro* (callus, cell and protoplast) cultures were developed for seven local indica rice cultivars and some wild rice species.

Conditions were first optimized to obtain regenerating calli from seven genotypes; Basmati-370, Basmati-Pak, DM-25, IR-6, NR-1, Johna-349 and Kashmiri Permati on two different media (MS and N6) in light and dark condition, Callus induction and regeneration was achieved in all the tested cultivars with varying frequencies. This technology is now being exploited as a source of salt tolerance by Mutation breeding division of NIAB. Uniform and stable rooting cell lines of these genotypes were established on AA media. Conditions for isolation, purification and culturing of protoplasts from these newly developed cell lines were established. Non morphogenic calli were obtained from protoplast derived calli. Mesophyll protoplasts though isolated successfully were unable to regenerate. Present efforts are directed to establish protoplast to plant system in these genotypes. Electroporation conditions were optimized to carry out transformation studies.

A parallel study was conducted to established *in-vitro* system in wild rice species namely *Oryza nivara*, *O. eichingeri*, *O. rhizomatis* and *O. glaberrima* (African cultivated rice). Callus, cell and protoplast cultures are at different stages of development which will finally be used for somatic hybridization studies.

Biolistic gun offers a rapid method for delivery of DNA to plant cells. The main benefit of this method is that intact plant tissues can serve as the target. Extensive experiments of particle bombardment were performed in collaboration with IRRI to develop transgenic basmati rice. Calli were bombarded with two constructs having Hyg+SBT1 and GUS, and selected on medium containing Hygromycin B. Some calli were observed GUS positive. Efforts were made to get plants from these calli. From rest of the calli, plants have been regenerated. The regenerated plants were analyzed for stable transformation by PCR and some of them found to be positive. Further confirmation will be made by Southern Hybridization. Efforts are underway to generate transgenic rice plants. The development of this technology would aid in opening the era of transgenic crops in Pakistan.

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**Problems Encountered (solved?).**

- Problems encountered in obtaining regeneration from calli have been solved.
- Regeneration from mesophyll isolated protoplast is still problematic.

**Achievements.**

- Regenerating calli from seven genotypes.
- Established conditions for isolation, purification & culturing of protoplasts derived from cell lines.
- Plasmid constructs having Hyg<sup>+</sup> SBTI and GUS genes.
- Successful use of biolistic gun for transforming Basmati rice.
- Stable transformation of rice (PCR analysis).

**Applications for Farmers/Agribusiness:**

Extension activities to date. (Nil)

**Future extension (be specific).**

The biolistic gun mediated transformation technique will be employed for transferring salt tolerant gene into rice to develop salt tolerant rice.

**Research Publications.**

Yusuf Zafar, A. Wajid and K.A. Malik (1994) Microcalli from basmati rice (*Oryza sativa* L. cv Basmati 370) protoplasts. Pak J. Sci. Ind. Res. (Accepted).

**Research Presentations.**

Zahid Mukhtar, Y. Zafar, and K.A. Malik (1993) *In-vitro* studies of wild rice: Development of Cell and protoplast cultures of *Oryza glaberrima* *stend.* Third National Meeting of Plant Tissue Cultures, Bara Gali, August 2-5.

Yusuf Zafar, Z. Mukhtar and K.A. Malik (1993) Development of *In-vitro* techniques for the improvement of Pakistani indica rice, International Symposium on Biotechnology for Sustainable Development, Dec. 15-20.

## FINAL REPORT

## SCIENTIFIC PROGRESS AND ACHIEVEMENTS

Crop yields and soil fertility patterns are usually spatially variable in steep eroded lands. To improve the efficiency of fertilizers and minimize the potential for contaminating surface and ground water, it would be desirable to vary fertilizer applications to match crop productivity patterns. This study was conducted to compare the uniform rate of fertilizer application with variable rates of fertilizer on a steep spatially variable eroded land.

The farm is located at Thana (Swat). Spatial variability of soil properties and crop yields was studied in 1992-93 and was found that most of the soil properties and wheat yields had spatial patterns. In 1993-94 the farm was divided into four parallel transects in East-West direction. Each transect was further divided into two strips. In one strip on each transect, a uniform rate of N was applied, while three rates of N were applied to match the varying crop productivity patterns on the second strip. Uniform rate of fertilizer was 120 kg N - 90 kg  $P_2O_5$  - 60 kg  $K_2O$ /ha. Three rates of N were determined using the relationship between lime content and wheat yield. The three variable rates of fertilizer N were 80, 110, 125 kg/ha for low, medium and high crop productivity areas. These three N rates were blended with 90 kg  $P_2O_5$  and 60 kg  $K_2O$ /ha. Pirsabak-85 wheat was planted in the field. Crop was harvested from an area of 1 m<sup>2</sup> at 15 m intervals on each strip in the four transects, and yield was measured in kg/ha.

Yields under the two management strategies were compared. The variable fertility management strategy proved better and economical than the uniform one. Variable rates of fertilizer N used less fertilizer without affecting the yield. It can be concluded that soils should be fertilized according to the patterns of crop productivity. This management strategy will save fertilizer resources and increase the efficiency of fertilizer application, reducing the hazard of contamination of surface and ground water.

#### PROBLEMS ENCOUNTERED:

The main problem faced during the execution of the project was lack of vehicle. At odd times it was difficult to manage for the vehicle to visit the site. However, the problem was solved by hiring a vehicle.

#### APPLICATIONS FOR FARMERS/AGRI.BUSINESS:

The field trial was laid out at farmers field and the fertility management strategy was developed at the farm level. This project had a demonstration aspect in addition to the research. This fertility management can be demonstrated on the same farm using variable rates of fertilizer based on the crop productivity potential of the soil. If some funds are provided, field day can also be arranged.

#### RESEARCH PUBLICATIONS:

A research paper was finalized and sent to Dr. Judith Bale for further process paper will be presented at the 5th National congress of Soil Science organized by Soil Science Society of Pakistan to held at Peshawar in October 1994.

RESPONSE OF WHEAT AND CHICKPEAS TO ORGANIC AND INORGANIC MANURES IN RAINFED AGRICULTURE #.22

M. Hatam., M. Aslam, M. Sadiq and A. Karim  
NWFP Agricultural University Peshawar.

Wheat (*Triticum aestivum* L.) and chickpeas (*Cicer arietinum* L.) are the two winter season crops of major economic importance in the rainfed areas of Pakistan. Informations on specific management practices to optimize crop production in these areas is limited. The objective of this study was to determine the response of wheat and chickpeas to 1) farm yard manure (FYM) and 2) the rate and method of N and P application in rainfed agriculture. A total of 24 trials consisting of 1242 plots were conducted at 3 locations in representative dryland areas during the 24 months of the project period.

Application of FYM increased grain yield in chickpea and wheat. Nodulation in chickpea increased by 84% with manure. Increment in FYM increased grain yield in wheat and chickpea. The increase in grain yield in wheat was linearly proportional to the increase in P<sub>2</sub>O<sub>5</sub> levels. One kg of applied N increased wheat yield by 5kg, however, chickpea was not as responsive to N levels as wheat. Application of FYM in combination with N and P not only increased yield but also improved soil condition, which leads towards more sustainable productive farming system.

1. This message was passed on to the farmers community during a farmers field day arranged during the growing season. These results can be used as very effective motivating tool by the Fertilizer Industry in rainfed areas.
2. Two graduate students will receive their MSc degrees based on the ROSTID project research.
3. A paper entitled, "Role of farm yard manure in sustainable dryland agriculture" has been submitted for presentation at the Asian Farming Systems Symposium 1994 to be held in Manila Philippines from November 7-11, 1994.

Future extension and research activities.

1. Layout of adoptive pluss demonstration trials in collaboration with extension workers.
2. Establishment of cash and commodity loan system by the involvement of the NGOs (Non-Government Organizations) specially the Fertilizer Companies, and Banks for providing fertilizer and loans for the purpose.
3. Continuation of research on problems like seeding depth, moisture conservation through residue management, deep tillage and cultivar adaptability.
4. Further studies on rotations and inclusion of legumes other than chickpea for improving soil fertility and avoiding building up of specific disease problems are required.

*Dr. U.K. Datta*  
*Please pass on*

*GA*

Summary of Achievements of the Project: Control Strategies for  
Maydis Leaf Blight of Maize in the NWFP

Maize is an important cereal crop of the North West Frontier Province (NWFP) of Pakistan, contributing to 55% of the total national production and more than half the total area of the crop. Planted on marginal land, maize suffers stress from the attack of various diseases including Maydis leaf blight (MLB).

Maydis leaf blight reduces maize yield in the NWFP substantially which necessitates its control. The research under this project was aimed at (1) developing an integrated model for the disease control by researching the synergistic effect of cultivar type and fungicide on MLB and yield in maize and (2) identifying the sources of resistance to the disease.

Achievement # 1.

An integrated approach was developed for the control of Maydis leaf blight which involved the use of promising fungicide Antracol (propineb) and improved cultivar Dehqan. This IPM caused about 24.3% increase in yield and 43% decrease in MLB attack over the local variety receiving no fungicide. The synergistic effect of Antracol and Dehqan also increased kernel number by 11% than that in the local variety.

Achievement # 2.

Several maize genotypes showing low reaction to MLB were identified. These included Ehsan, PS 8549 and Ehsan x Swat 49-2. Ehsan has become popular among the farmers in this region for its adaptability, high yield and low reaction to MLB.

project # 25: Selection of cotton varieties tolerant to salinity  
P.I.: Dr. Akhtar Nawaz Khan

1. Scientific Progress:

Mass screening technique of cotton cultivars for salinity tolerance has been developed. The salt tolerance of 20 cotton (*G. hirsutum* L. and *G. Arboreum* L.) cultivars was studied in several experiments that included both hydroponic and soil culture in different saline growth conditons. Two leaf stage seedling of cotton cultivars raised in silica sand were transferred to foam plugged holes in thermopal sheets floated over aerated half strength Hoagland solution in plastic lined galvanized iron tanks (60 x 30 x 8 cm). Two days were allowed after transplanting for the seedlings to become established, and the medium was then salinized with NaCl salt to 100, 160 and 220 mol m<sup>-3</sup> in increments. Absolute shoot fresh yield was the main selection criterion to measure the salinity tolerance of cotton cultivars. Absolute shoot fresh weights (solution culture) were closely comparable with those of seed cotton yields under saline field conditons which authenticated the validity of the technique. The salinity tolerance of cotton cultivars based on different selection criterion indicated that overall pattern of varietal behaviour for most tolerant and most sensitive cultivars was consistent in different growth media. Cultivars were exhibited in a wide range in salinity tolerance, with Rehmani and S-12 being the most tolerant.

2. Problems Encountered.

The heterogeneity of the soil is well known problem for this kind of work. This problem (heterogeneity) was reduced by making blocks.

3. Achievements.

Results showed that screening at the seedling stage was a convenient and fairly reliable technique for determining differences to salinity tolerance of cotton cultivars.

4. Applications for Farmers/Agribusiness.

Introduction of exotic or indigenous cultivars without testing them against salinity some-times results in failure of crops when grown in the salt-affected areas. The solution to this problem is, in part, the identification of cultivars which have the potential to tolerate salts. To achieve this end, it is necessary to screen

existing cultivars for salt tolerance and to recommend for general cultivation is saline areas. Through these experiments 20 cotton cultivars have been screened out for salinity tolerance. Out of these, Rehmani and S-12 proved to be the tolerant ones. The farmers were informed to sow these tolerant cotton cultivars in saline field.

4. Research Publications.

Plant materials analysis for inorganic ions ( $\text{Na}^+$ ,  $\text{K}^+$ ) are in progress to determine the relationship of ions with salt tolerance.

5. Research Presentations.

I have been invited to present a paper in the international conference being held on September 25-30, 1994 at Buenos Aires, Argentina. The topic of conference is:

IX International conference on Jojoba and its uses.

III International conference on new industrial crops and products.

I have submitted abstract of a paper for this conference.

All the equipments supplied by National Academy of Science, U.S.A. have been fixed at Saline Agriculture Laboratory, Faculty of Agriculture, Gomal University, Dera Ismail Khan (N.W.F.P), Pakistan.

# MANIPULATION OF THATA LEGHARI (D. G. KHAN) RANGELAND TO IMPROVE THE PRODUCTIVITY OF SMALL RUMINANTS IN PAKISTAN

M. F. Khan

## Scientific Progress.

In this study the range area of about 1000 h was first protected from grazing. During in 1992 and 1993, a total area of about 600 h was reseeded with a mixture of improved grass species; gorkaha (*Lasiurus indicus*) and buffel grass (*Cenchrus ciliaris*). Forage production on the reseeded and natural range was determined in 1992 and 1993 under natural climatic conditions. The reseeded area produced 10 times (4000 kg/h) more forage than the native range (424 kg//h) in 1992 and more than twice the forage (1250kg/ha vs 534 kg/ha) in 1993, a year with 37 mm less rainfall. Proximate analysis of the hand harvested forage plants growing in the area was done. Buffel grass had higher crude protein value 7.8% than did gorkha and chimber (*Eleusine flagellifera*). The forage shrub, lana (*Salsola foetida*) had a higher energy value 2.7 Mcal/kg than all of the forage species. Forty five percent of goat diet consisted of shrubs whereas sheep consumed 39 percent. Sheep consumed 49% grass and goat consumed 43% in their daily diet. Live weight gain in goats was 34 gm/day whereas in sheep it was 14gm/day. Therefore, these results indicate that the area is most suitable for goat grazing for sheep. The results of two years data indicated that reseeded may be an important intervention for the improvement of Thatta Lehari rangeland which may provide major feed to livestock in the area.

## PROBLEMS

No Major problem was found.

## ACHIEVEMENTS

This study can serve as a model for the inhabitants of the Thatta Leghari area. It is also a contribution to the knowledge of sustainable

systems in the desertifying rangelands of semiarid lands in Pakistan. From the study results, it may be concluded that controlled grazing and reseeding of rangelands with palatable species substantially improve the forage production subsequently increases livestock productivity. Furthermore the results of this study suggested that for the efficient utilization of rangelands, mixed species of livestock should be raised rather than a single species.

## APPLICATIONS FOR FORMERS/AGRIBUSINESS

### Extension Activities to date

we have provide the extension facilities to the farmers that during drought season concentrate supplement play a major role in sustaining the small ruminant production. The grass seed which is produced from the rangeland is using for reseeding in the other rangeland area.

### Future Extension.

Two years is very short period for the development of rangeland. About 5 years is required to established the rangeland. Then introducing the feed lot system for mutton production based on appropriate grazing systems. Furthermore grass seed production is an other future priority.

### Research Publication.

We are waiting for more data, to Publish it in the appropriate international Journal

## RESEARCH PRESENTATIONS

The results of this study were presented in the following places.

- West Texas A & M. university, Canyon, Texas, USA
- Animal Sciences Institute, NARC, Islamabad, Pakistan.

## Project Report

### 1. Scientific Progress

A project of unique nature was started in the farmer's field of Rod-Kohi area with a view to improve the socio-economic conditions of the farmers of the area during the year 1992-93, 93-94 with the courtesy of PARC-BOSTID funds. The Rod-Kohi cultivation is one of the largest in this part of the country. Approximately 0.4 m ha of land is under this type of cultivation in D.I.Khan only. Four different types of pre-flood tillage practices were tried to evaluate the utility of each for conservation of water for longer period of time so that the conserved water is best utilized for increased crop production. The improved varieties of two traditional rabi crops were also introduced to boost up the crop productivity of the area.

The results have been very encouraging when they were compared with ensuing practices of old out moded types of cultivation using the seed of old local cultivars. Among the four pre-flood tillage practices, deep tillering with chisel plough allowed more water to percolate down the soil profile. Availability of more water was reflected in increased crop produce in the understudy cultivars of wheat and chickpea. The improved varieties of wheat and chickpea gave significantly more yield/ha than the local cultivars.

In two years time much scientific progress has been made in the Rod-Kohi areas of D.I.Khan through the project.

### 2. Progress Encountered (Solved)

It is hard to measure the quantum of progress made. However, start has been made. The problem has been well understood and direction of research has been delineated. It all depends on the sincere concerted effort in the future to capitalize on the gains made in few areas of Rod-Kohi of D.I.Khan.

### 3. Achievements

Through this project, a big stride has been made where 2-3 fold increase in production has been achieved in the traditional rabi crops in the project command area.

### 4. Application for Farmers/Agribusiness

- Extension activities to date: Farmers of the research area have learned much to improve the production of the lands with less inputs. They themselves have witnessed the improved methods of cultivation and make utilization of facilities offered by the Government in form of Agri. loans etc.

- Future extension: Future experiments have been laid in other village of Rod-Kohi area for the ensuing year 1994-95. Pre-

flood tillage practices have been given to about 4 fields in village Akhmad of D.I.Khan. The flood water has inundated the fields. Crops will be grown when the soil comes in proper moisture condition.

In some areas Sorghum and Millet (Kharif Crops) have been sown in addition to our main thrust on Rabi crops. Farmers of this area will also be benefitted through this project in the third year of its implementation.

5. Research Publication

A paper is under preparation.

6. Research Presentation

The seminars on the research project were given in the Dryland Research Institute of Texas A & M University at Canyon, Texas, USA, and in the auditorium of Plant Science Lab. of University of Reading, England.

These seminars aroused lot of interest among the audience and the achievements of the research project were much appreciated.

7. Future Work

The project has great scope as it is directly linked with the creation of interest in the agricultural profession by the farmer community of Rod-Kohi areas. Presently, the farmers of the area are living below the poverty line. They are abandoning their land and profession for good and settling in urban areas for other lucrative jobs. It is highly required that projects be run in the farmers fields so that the value of highy-tech is fully utilized. This would include low inputs with manifold increase in crop produce.

To make it meaningful, the project will be run for atleast five years more in different parts of Rod-Kohi area provided funds are available.

  
(Prof. Dr. Hamid Ullah Khan)

**PLANNING COMMISSION  
PROFORMA-IV**

GOVERNMENT OF PAKISTAN  
PLANNING COMMISSION

FORM FOR SUBMISSION OF COMPLETION  
REPORT ON DEVELOPMENT PROJECTS.

To be submitted on the physical completion of the projects regardless of whether or not the accounts of the project have been closed.

1. Name of project. MANAGEMENT OF AGRICULTURAL RESEARCH & TECHNOLOGY (MART) PROJECT.
2. a) Administrative authority responsible for
  - i) Sponsoring Pakistan Agricultural Research Council & ARW, Islamabad. MINFA
  - ii) Executing Pakistan Agricultural Research Council & ARW, Islamabad. MINFA
- b) Central Ministry concerned with
  - i) Sponsoring Agricultural Research Wing, MINFA.
  - ii) Execution PARC - ARW, MINFA.
3. a) Date of actual commencement of project. 1984
- b) Date of actual completion of project. August, 1994
- c) Period of completion of project as originally planned. 120 Months (1984-1994)
4. Project history

|  | Cost  |     |       | Period |    | Remarks. |
|--|-------|-----|-------|--------|----|----------|
|  | Local | F.E | Total | From   | To |          |

a) Sanctioned Cost 34.00 803.865 837.865 1984 1994  
 Actual Cost 34.00 803.865 837.865 1984 1994

b) Financial phasing of project. (RS. IN MILLION)

| Year | Phasing as per Last revision |     | Actual ADP Provision | Actual Amount Released |     | Actual Amount Utilized |     | Remarks |
|------|------------------------------|-----|----------------------|------------------------|-----|------------------------|-----|---------|
|      | Local                        | F.E |                      | Local                  | F.E | Local                  | F.E |         |

|                        |        |         |         |        |         |        |         |                      |
|------------------------|--------|---------|---------|--------|---------|--------|---------|----------------------|
| 1985-86                | 1.300  | 119.262 | 39.589  | 0.206  | 21.401  | 0.206  | 21.401  | FEC expenditure      |
| 1986-87                | 2.535  | 89.930  | 57.000  | 1.093  | 58.605  | 1.093  | 58.605  | is in the control    |
| 1987-88                | 3.445  | 98.202  | 99.747  | 2.118  | 98.771  | 2.118  | 98.711  | donor agency which   |
| 1988-89                | 3.627  | 57.057  | 82.470  | 2.012  | 105.197 | 2.012  | 105.197 | is planned according |
| 1989-90                | 3.848  | 25.558  | 71.000  | 2.217  | 91.508  | 2.217  | 91.508  | to activities. Govt. |
| 1990-91                | 4.497  | 79.820  | 79.846  | 2.269  | 111.904 | 2.269  | 111.904 | imposed cuts on Dev. |
| 1991-92                | 4.859  | 82.344  | 44.000  | 2.068  | 55.833  | 2.068  | 55.833  | budget from year to  |
| 1992-93                | 5.224  | 70.248  | 55.675  | 1.586  | 72.366  | 1.586  | 72.366  | year.                |
| 1993-94                | 5.656  | 28.272  | 17.645  | 1.887  | 30.000  | 1.887  | 30.000  | P: Provisional       |
| 1994-95                | 6.144  | 21.264  | 22.000P | --     | --      | --     | --      | P: Provisional       |
| ARDA, CIMMYT & SUPPORT | --     | 124.762 | 124.762 | --     | 124.762 | --     | 124.762 |                      |
|                        | 34.000 | 803.865 | 693.734 | 15.456 | 770.287 | 15.456 | 790.287 | Provisional          |

c) Physical phasing of project.

(RS. IN MILLION)

| Year | Phasing as per last revision |      | Actual ADE Provision | Actual Amount Released |      | Actual Amount Utilized |      | Remarks |
|------|------------------------------|------|----------------------|------------------------|------|------------------------|------|---------|
|      | Local                        | F.E. |                      | Local                  | F.E. | Local                  | F.E. |         |

(PHYSICAL PHASING IS SAME AS GIVEN IN PART-C FINANCIAL PHASING)

|            |        |  |        |    |        |    |        |                     |
|------------|--------|--|--------|----|--------|----|--------|---------------------|
| 1. 1984-89 | 19.284 |  | 19.284 | -- | 19.284 | -- | 19.284 | } Only Civil Works. |
| 2.         |        |  |        |    |        |    |        |                     |
| 3. 1990-94 | 1.200  |  | 1.200  | -- | 1.200  | -- | 1.200  |                     |
| 4.         |        |  |        |    |        |    |        |                     |
| 5.         | 20.484 |  | 20.484 |    | 20.484 |    | 20.484 |                     |

5. Have the accounts for the project been closed? If not, what amount is still unaccounted for?

6. Number of persons employed.

| CATEGORY | PLANNED |                   | ACTUAL |                             |
|----------|---------|-------------------|--------|-----------------------------|
|          | Local   | Foreign           | Local  | Foreign                     |
|          | 44      | (116 Consultants) | 40     | (116 Left after completion) |

7. Benefits as reworked on the basis of actual costs (Give detail of expected changes in recurring costs and benefits) Not applicable. Requiring Cost: Rs.4.500 Million

- a. Profit/Sale
  - b. Benefit Cost Ratio
  - c. NPV
  - d. IRR
  - e. Cost per unit of service.
  - f. Non-quantifiable benefits.
- } Not applicable

8. Specify any changes in scope or design of original scheme.

9. Suggestions for planning and implementation of similar projects in future.

- i) Preparation of estimates.
- ii) Implementation of project.
  - a) Prevention of delays
  - b) Prevention of cost escalation

Other suggestions

Name and designation  
of Reporting Officer  
Date:

INSTRUCTIONS FOR FILLING FORMS

Please refer to PG-I Form for definition of terms.

2. Use the same classification of personnel requirements as in PG-I.

- 3. (a) In remarks column, give reasons for revision.
- (b) In remarks column give reasons for differences in columns 3 and 4 & 5.
- (c) In remarks column, give reasons for changes in phasing of project.
- (d) Actual physical performance may be compared with planned performance.

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### Regarding Point No.7

The recurring cost of Rs.4.5 million per year has been worked out on the basis of 44 staff positions (ranging BPS 19-04) including their salaries, benefits, operation and maintenance cost and cost for production of video and audio program, conducting incountry training of scientist. This also include payments for utilities and maintenance of AVCTI building constructed under the project and maintenance of AV/Training equipment and filed duty vehicles. Annually some 20 video, 10 audio and almost 30 radio program will be produced and broadcasted/telecasted. Some 400-500 scientists will be annually trained locally in different disciplines.

Other benefits of the project include training of scientists Ph.D M.Sc(foreign) and short training (local & foreign), supply of technical assistance, conducting of system studies review, etc. import and evaluation of germplasm conducting of special studies, farming system research supply of scientific and field equipment supply of vehicles and computers etc etc. The benefit of such activities can not be measure in tangible terms. Therefore, the concepts of profits/sale, BCR, NPV, IRR, cost/unit can not be worked out.

### Regarding Point No.9

#### 1. Preparation of Estimate

Estimate should be worked out by providing enough cushion for price escalation and changes in exchange rate.

#### 2. Implementation of Project

##### a) Prevention of delays

Contractual agreement arrangements should be started right after the approval of project. Detail of commodities to be imported and training required should be worked out prior to PC-I approval.

##### b) Prevention cost escalation

ADP provisions should be made as per project phasing, unnecessary cuts on development expenditure of the construction project should be avoided. Contractors should be bound to start work intime and complete it intime.

110

**IMPORTANT NOTIFICATION**

41 2-52

No. F. 2-2/85-ARD  
Government of Pakistan  
Ministry of Food, Agriculture & Cooperatives  
Agricultural Research Division  
\*\*\*\*\*

Islamabad, the 19th February, 1985.

To

The Director(F),  
Pakistan Agricultural Research Council,  
Islamabad.

SUB: PROJECT MANAGEMENT OF AGRICULTURAL RESEARCH AND TECHNOLOGY:

Sir,

I am directed to convey the administrative approval of the Government of Pakistan to the execution of the above project at a total cost of Rs. 147,000,000 (Rupees four hundred forty seven million only) with a USAID contribution of Rs. 132,200,000 (Rupees four hundred thirty two million and two hundred thousand only) and Government of Pakistan contribution of Rs. 14,800,000 (Rupees fourteen million eight hundred thousand only) over a period of 60 months subject to following conditions:-

- (i) Foreign consultancy services (number of expatriate experts) should be reduced at the time of review. PARC should draw up a plan for this purpose.
- (ii) List of equipment should be scrutinized to eliminate items which are available in the country.
- (iii) PARC would ensure that the bulk of the benefits of the projects flow to the Provincial Research Organizations, and that the provinces are closely associated with the detailed planning and implementation of the scheme.
- (iv) The construction of a Studio should be deferred. The PARC should consult the PTV corporation and should proceed with their plan only if the latter is unable to provide the facilities.
- (v) The Agricultural Research Division would postpone some of the low priority schemes included in the sixth plan.
- (vi) The installation of computers should be undertaken in a phased manner so that new equipment is not purchased unless previous installations are being fully utilized.

2. The Executive Committee of the National Economic Council have approved the project in its meeting held on 24th January 1985.

Your obedient servant,

(MAHMUDUL HASAN)  
SECTION OFFICER  
TELE: 829539

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No. F.2-2/85-ARD  
GOVERNMENT OF PAKISTAN  
AGRICULTURAL RESEARCH DIVISION

Islamabad, the ~~26th May~~ 1st June, 1992

The Director (P)  
Pakistan Agri. Research Council,  
Islamabad.

SUBJECT: MANAGEMENT OF AGRICULTURAL RESEARCH AND TECHNOLOGY PROJECT - (REVISED)

Sir,

(2023/)

In continuation of this Division's letter No. F.2-2/85 ARD, dated the 19th February 1985 and 9th March 1989 on the above subject, I am directed to convey the approval of the Government of Pakistan to the execution of the Management of Agriculture Research and Technology (Revised) at a total cost of Rs. 837,865,000 (Rupees eight hundred thirty seven million and eight hundred sixty five thousand only) including a USAID contribution of Rs. 803,865,000 (Rupees eight/hundred three million and eight hundred sixty five thousand only) for a period of 120 months with effect from 1st July, 1984.

The Executive Committee of the National Economic Council approved the revised project in its meeting held on 11th April, 1992. (2762/)

(Mahmud-ul Hassan)  
Section Officer

Copy forwarded to :

- 1) AGPR, Islamabad.
- 2) Planning & Development Division (Mr. Parvaiz Khan, SO), D.A. Section (with 5 copies).
- 3) The Finance Division, (Mr. Abdul Hayee), Deputy Secretary (Dev). P. Block, Pak. Secretariat, Islamabad.
- 4) The Economic Affairs Division (Jarjis Ali Khan, SO, US-1), C. Block Pak. Secretariat, Islamabad.

SECRET/IMMEDIATE

GOVERNMENT OF PAKISTAN  
CABINET, SECRETARIAT  
(CABINET DIVISION)

No.ENC-2/M/92

Islamabad the 22nd April, 1992

A copy of the decisions of the meeting of the Executive Committee of the National Economic Council (ECNEC) held on 11th April, 1992 in the auditorium of the Planning & Development Division 'P' Block, Islamabad is sent herewith for information and necessary action in terms of rule 24 of the Rules of Business, 1973 read with para VII of the pamphlet 'Procedure in regard to ECNEC'.

(Syed Yasin Ahmed)  
Deputy Secretary (Committees)  
Phone: 818114

- Additional Secretary Incharge, Agricultural Research Division - Case Nos.ENC-4/2/92, \*ENC-7/2/92 (para II -\*with summary).
- Secretary, Kashmir Affairs and Northern Affairs Division - Case No.ENC-5/2/92.
- Secretary, Food & Agriculture Division - Case Nos.ENC-6/2/92 and ENC-26/2/92.
- Secretary, Education Division - Case Nos.ENC-7/2/92, & ENC-8/2/92.
- Secretary, Petroleum and Natural Resources Division - Case Nos.ENC-9/2/92, ENC-10/2/92 and ENC-33/2/92.
- Secretary, Water and Power Division - Case Nos.ENC-15/2/92, ENC-28/2/92 and ENC-29/2/92.
- Additional Secretary (C&M), Cabinet Division - Case Nos.ENC-15/2/92, ENC-16/2/92, ENC-24/2/92 and ENC-30/2/92.
- Secretary, Communications Division - Case No.ENC-17/2/92.
- Additional Secretary Incharge, Railways Division - Case Nos.ENC-18/2/92 and ENC-19/2/92.
- Secretary, Defence Division - Case No.ENC-21/2/92.
- Secretary, Production Division - Case Nos.ENC-32/2/92, ENC-35/2/92 and ENC-36/2/92.
- Secretary, Economic Affairs Division. ]
- Secretary, Planning & Development Division. ]
- Secretary, Finance Division. ] Case Nos.ENC-2/2/92 to
- Additional Chief Secretary(Development), ] ENC-36/2/92.
- Azad Govt. of the State of Jammu and ]
- Kashmir. ]

25-4-92

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D(P) 27/4  
DD(P)

copy of Case no. ENC - 7/2/92 para II along with summary forwarded for action in collaboration with Planning Commission.

1/2/92

2743

Case No. ENC-4/2/92 - Management of Agricultural Research and  
Technology (MART) Project (Revised):  
Dated: 11-1-1992

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Decision

The Executive Committee of the National Economic Council took note of the Summary submitted by the Planning and Development Division and approved the project "Management of Agricultural Research and Technology (MART) Project (Revised)" at a total cost of Rs 837.865 million including USAID grant of Rs 803.865 million.

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115

No.F.1-22/93/ARW  
GOVT OF PAKISTAN  
- MINISTRY OF FOOD AGRICULTURE & COOPERATIVE  
AGRICULTURE RESEARCH WING

6-6-94  
Islamabad the ~~April 20, 1994~~

To

✓  
The Accountant General,  
Pakistan Revenue,  
Islamabad:

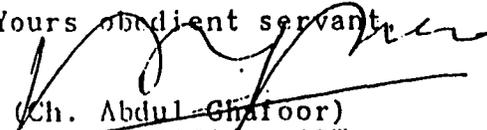
SUBJECT:= CONVERSION OF DEVELOPMENT PROJECT "MANAGEMENT OF AGRICULTURAL RESEARCH AND TECHNOLOGY (MART) PROJECT" TO CURRENT EXPENDITURE SIDE.

Sir

I am directed to convey the sanction of the President of Pakistan to the transfer of the development project "Management of Agricultural Research and Technology(MART) under the Pakistan Agricultural Research Council from development to the current budget w.e.f 01.09.1994.

This issues with the approval of Financial Adviser's Organization (F&A).

Yours obedient servant

  
(Ch. Abdul Ghafoor)  
Section Officer-ARW

Tele:829539

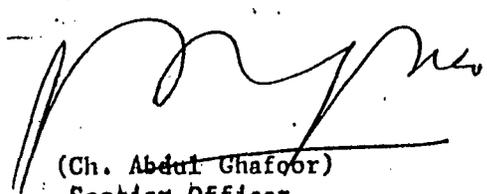
No.Dy. 534-DFA (F&A) 94  
GOVT OF PAKISTAN  
FINANCE DIVISION  
(FA's ORGANIZATION)

31-5-94  
Islamabad the ~~April 20, 1994~~

  
(Hafiz Khalid Mahmood)  
Dy. Financial Adviser(F&A)

cc:

- Deputy Financial Adviser(F&A), Islamabad
- Member(Finance), PARC
- Director(Planning), PARC
- Director(P.Admn), PARC
- Project Secretary, MART
- Dy. Secretary(Dev.Exp-II) Finance Division.
- Sanction register.

  
(Ch. Abdul Ghafoor)  
Section Officer

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No.F:1-4/84-PARC(P)  
GOVT OF PAKISTAN  
FOOD AGRICULTURE AND LIVESTOCK DIVISION  
AGRICULTURAL RESEARCH WING  
\*\*\*\*\*

Islamabad the July 21, 1994

To

The Director Planning,  
Pakistan Agricultural Research Council,  
Islamabad:

SUBJECT:= MANAGEMENT OF AGRICULTURAL RESEARCH AND TECHNOLOGY  
(MART) PROJECT

I am directed to convey the approval of the President to the creation of the following posts under the Management of Agricultural Research and Technology (MART) Project (Revised) of Pakistan Agricultural Research Council, with immediate effect:-

| <u>S.No.</u>                   | <u>Designation</u>                                      | <u>BPS</u> | <u>No.of Posts</u> |
|--------------------------------|---|------------|--------------------|
| A. Audio Visual Communication: |   |            |                    |
| 1.                             | Director  | 19         | 1                  |
| 2.                             | Dy. Director  | 18         | 2                  |
| 3.                             | Senior Producer   | 18         | 1                  |
| 4.                             | Senior Scriptwriter                                     | 18         | 1                  |
| 5.                             | Senior Media Engg.                                      | 18         | 1                  |
| 6.                             | Producer  | 17         | 3                  |
| 7.                             | Scriptwriter  | 17         | 2                  |
| 8.                             | Cameraman   | 17         | 2                  |
| 9.                             | Media Engineer  | 17         | 4                  |
| 10.                            | Computer Graphic Artist                                 | 17         | 1                  |
| 11.                            | Graphic Artist/<br>Set Designer                         | 17         | 1                  |
| 12.                            | Asstt. Director   | 17         | 1                  |
| 13.                            | Asstt. Media Store<br>Officer/Asstt. Media<br>Engineer. | 16         | 1                  |
| 14.                            | Stenographer  | 15         | 2                  |
| 15.                            | Jr. Clerk   | 5          | 1                  |
| 16.                            | Production Asstt.                                       | 4          | 3                  |
| 17.                            | Driver  | 4          | 3                  |
|                                | Sub Total:  |            | 30                 |

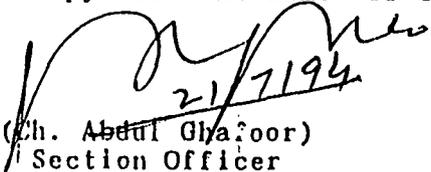
B. Training Institute:

|     |   |    |   |
|-----|---|----|---|
| 18. | Dy. Director                            | 18 | 1 |
| 19. | Training Officer                        | 17 | 2 |
| 20. | Scientific Officer<br>English Language. | 17 | 1 |
| 21. | Scientific Officer<br>Evaluation.       | 17 | 2 |
| 22. | Admn. Officer                           | 16 | 1 |
| 23. | Account Assnt.                          | 11 | 1 |
| 24. | Jr. Assistant                           | 7  | 2 |
| 25. | Driver                                  | 5  | 2 |
| 26. | Naib Qasid                              | 1  | 1 |

Sub Total: 13

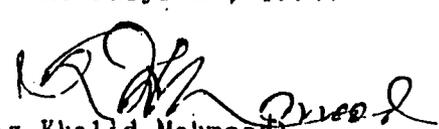
Grand Total: 43

This issues with the approval of the Additional Secretary Incharge Ministry of Food, Agriculture & Livestock in consultation with Financial Adviser's Organization, Ministry of Food & Agriculture through whom a copy of the same is being endorsed.

  
21/7/94  
(Ch. Abdul Ghafoor)  
Section Officer  
Tele: 829539

No. Dy. 765-DEA (FAA) / 94  
GOVERNMENT OF PAKISTAN  
FINANCE DIVISION  
(FA'S ORGANIZATION)

Islamabad the July 21st, 1994.

  
(Hafiz Khalid Mahmood)  
Dy. Financial Adviser (F&A)  
Tele: 211578

cc:

- Accountant General, Pakistan Revenues, Islamabad.
- Member (Finance), PARC Islamabad.
- Director (P. Admn), PARC Islamabad.
- Dy. Financial Adviser (F&A), Islamabad.
- P.S to Additional Secretary ARW, Islamabad.
- Project Secretary, PARC Islamabad.
- Sanction register.