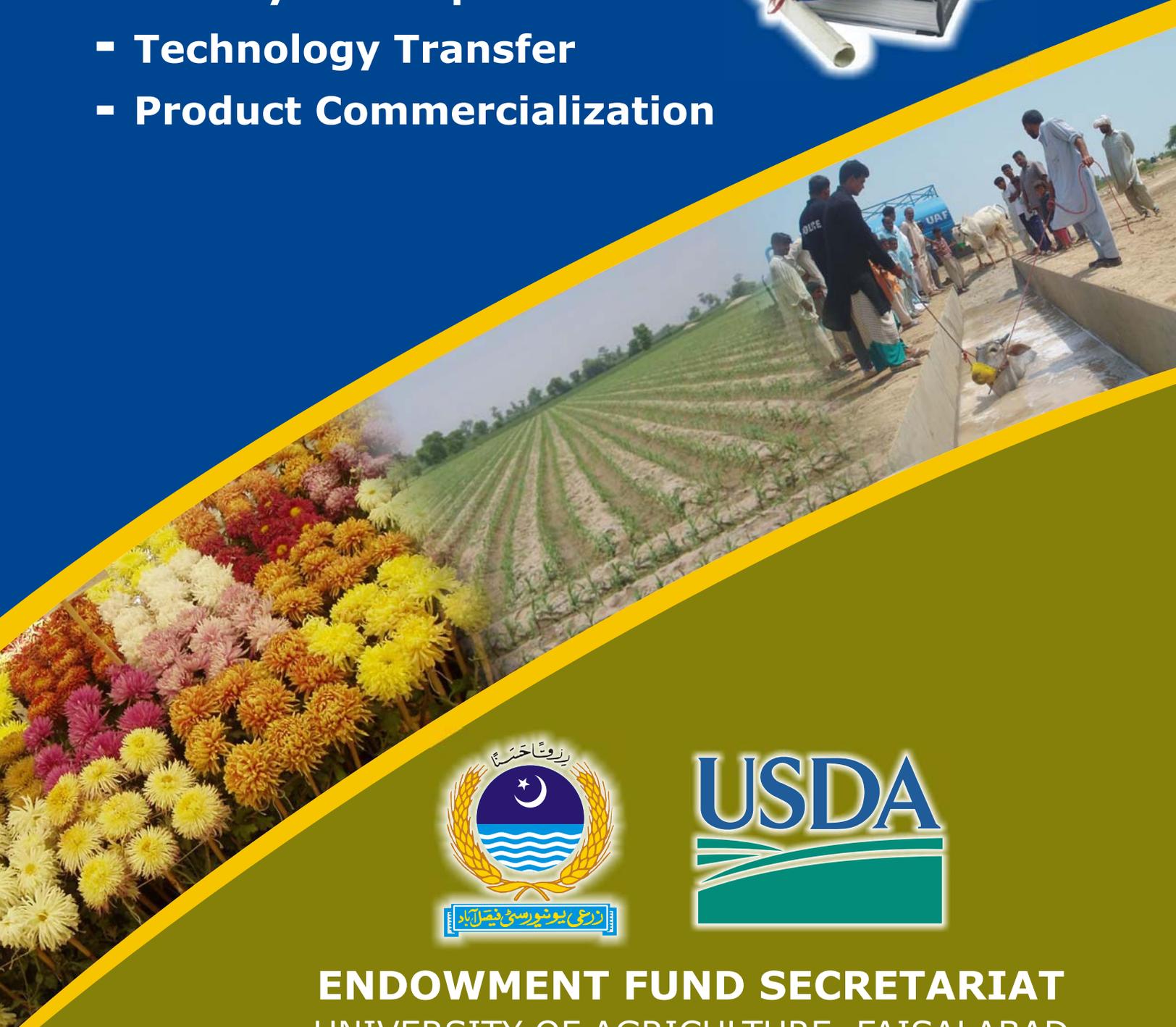


ANNUAL REPORT

2008-09



- Faculty Development
- Technology Transfer
- Product Commercialization



ENDOWMENT FUND SECRETARIAT
UNIVERSITY OF AGRICULTURE, FAISALABAD

(www.uaf.edu.pk/endowment_fund/end_overview.html)

ANNUAL REPORT (2008-09)



Compiled by

Dr. Naeem Mahmood
Additional Director/Associate Professor

Amir Saeed Rana
Deputy Director/Assistant Professor

Sajid Ali
Lecturer

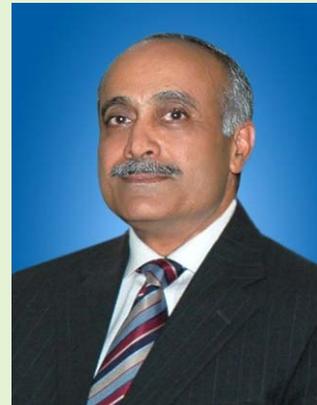
**ENDOWMENT FUND SECRETARIAT
UNIVERSITY OF AGRICULTURE
FAISALABAD**

CONTENTS

Sr. #	Description	Page #
	Message from the Vice Chancellor/Chairman BoD	i
	Executive Summary	ii
1	FACULTY DEVELOPMENT	
1.1	Short Term Trainings (Batch-II).....	3
2	TECHNOLOGY TRANSFER	5
2.1	Brief overview of the previous year (2007-08).....	7
2.2	Progress during 2008-09.....	7
2.3	Progress/achievements of ongoing projects.....	10
3	PRODUCT COMMERCIALIZATION	33
3.1	Current Status	35
4	FINANCIAL REPORT	37
4.1	Investment of Funds	39
4.2	Actuals for the financial year 2007-08	39
4.3	Allocations and expenditure for the year 2007-08 and 2008-09	39
4.4	Estimates for the financial year 2008-09	40
	Annual Expenditure Statement (Operational Budget)	41

MESSAGE FROM THE VICE CHANCELLOR

Unified Agricultural Research System (UARS) comprising of education, research and extension should be the strategy of near future for global food security. UARS is in practice in one or the other way in countries which have a significant progress in agricultural research and development. Endowment Fund sponsored by the US Department of Agriculture (USDA) provides an opportunity to invest in agricultural development. The objectives of EFS are close to those of UARS. Restricting to the mandate of Faculty Development, Technology Transfer and Product Commercialization, activities of the EFS were expanded to technology parks, product exhibitions, shows, in field and on campus demonstrations. All this was aimed at development of quality products in the form of research, processes, and technologies, and their marketing to the end users like farmers and industry. These events helped in a visible change in the traditional mindset not only of the faculty but also the students, farmers and entrepreneurs.



Partnership and continuing involvement of USDA in the Endowment Fund Secretariat, UAF is commendable. I hope mutual confidence, interests and collaborations between USDA and EFS, UAF will grow further in the future. I strongly believe investing in agricultural development is in fact investing in people of Pakistan. Therefore, such investments will not only help bring Pakistan's people out of poverty but will strengthen the already strong relationship between the United States and Pakistan.

(PROF. DR. IQRAR AHMAD KHAN)
Vice Chancellor/Chairman BoD

EXECUTIVE SUMMARY

The objectives of the Endowment Fund are to promote and support agricultural research and development activities in accordance with the Pakistan's long term development goals and to promote long term scientific cooperation between Pakistan and the United States in agricultural sector. The scope of agricultural research and development activities covers all scientific activities related to agriculture including production, processing, marketing and agricultural services. Emphasis is, however, on funding the projects aimed at improvement of farm and animal productivity, but not limited to the strategic researches. Therefore, potential proposals focusing on direct or indirect ways and means for the overall objectives of Endowment Fund are also considered for funding.



The proposals submitted to Endowment Fund Secretariat (EFS) need to qualify on competitive basis. The evaluation process includes an initial scrutiny by EFS, expert opinion(s), review by the Technical Advisory Committee (TAC) and Board of Directors (BoD) of EFS. The project proposers are requested to defend their proposals, if required during any step of the evaluation process.

In addition to follow up of the activities of year 2007-08, new short term trainings and technology transfer projects were funded in 2008-09. Activities of EFS were expanded by inviting proposals on Establishment of Technology Park, On-campus and In-field Demonstration of Technologies, Fairs/Melas and Exhibitions in view of “*see and believe vision*” approach. There was a tremendous growth in the proposals submitted to EFS for funding during year 2008-09. Of the total 67 concept papers submitted to EFS, 07 were funded for Outreach Technology Transfer, 13 for On-campus and In-field Demonstration of Technologies, 03 for holding Melas/Fairs and 07 for Exhibition of products on competitive basis. Similarly, funding for travel grants to present papers and organizing conferences/seminars/symposia was allowed by the BoD under Faculty Development Component of EFS.

The major interventions of EFS are water use efficiency, land reclamation/utilization, improved nutrition supply, pest management, and farm machinery in the area of crop production. In animal production, interventions were made in the areas of non-traditional animal nutrition supplies/management, and preventive medication including vaccination programs and other animal health management practices.

Prof. Dr. Zafar Iqbal
Executive Director



Section-1
Faculty Development

1.1 Short Term Trainings (Batch-II)

After preliminary evaluation the Scrutiny Committee recommended following candidates for short term training. These candidates were approved by BoD in its fifth meeting held on 25-2-09.

Sr.#	Description
1.	<p>Dr. Muhammad Iqbal, Assistant Professor, Institute of Soil & Environmental Sciences, UAF Title: Learning of identification strategies of soil carbon sequestration to offset fossil fuel emissions, improve the environment and provide an opportunity for farmers to trade carbon credits. Host Institute: School of Natural Resources, Ohio State University, Columbus, USA</p>
2.	<p>Dr. M. Anwar-ul-Haq, Assistant Professor, Institute of Soil & Environmental Sciences, UAF Title: Na⁺ Transport in plant cells to encounter salinity tolerance Host Institute: University of Wales Bangor, UK</p>
3.	<p>Mr. M. Imran Khan, Lecturer, Department of Mathematic & Statistics, UAF. Title: Research on the Analysis of Microarray and other Multivariate Biological Data Host Institute: The Pennsylvania State University, USA</p>
4.	<p>Dr. M. Yaqoob, Associate Professor, Department of Livestock Management, UAF Title: Application of precision farming technologies (DGPS/GIS) to animal grazing systems Host Institute: Nova Scotia Agriculture College, Canada</p>
5.	<p>Mr. Iftikhar Ahmad, Lecturer, Institute of Horticulture Sciences, UAF Title: Post Harvest Management of Cut flower Host Institute: The University of Queensland, GATTON, Qld 4343, Australia</p>
6.	<p>Dr. Hamad Nadeem Tahir, Assistant Prof. Department of Plant Breeding & Genetics, UAF Title: Cytogenetics of Crop Plants Host Institute: Institute of Biol. Sciences, Aberystwyth University, Aberystwyth, UK</p>
7.	<p>Mr. Faiz-ul-Hassan, Lecturer, Department of Animal Breeding & Genetics, UAF Title: QTL detection for economic traits in Cattl Host Institute: Iowa State University of Science & Technology, USA</p>
8.	<p>Mr. Ihsan Qadir, Lecturer, Department of Forestry Range Management & Wild Life, UAF Title: Modern Techniques for rehabilitation/ improvement of range lands Host Institute: The University of Arizona, USA</p>

However, only two candidates (Mr. Faiz-ul-Hassan and Mr. Imran Khan) were able to complete the documentary requirements and successfully completed the training as per schedule.

The background features a central blue area with two thick yellow curved lines that sweep across the page from the left side towards the right. The top line curves downwards, and the bottom line curves upwards, creating a sense of movement and framing the central text.

Section-2
Technology Transfer

2.1 BRIEF OVERVIEW OF THE PREVIOUS YEAR (2007-08)

The BoD approved 14 projects under Technology Transfer component on 13.11.2007. Out of which, 12 projects were started w.e.f 01-01-2008, one was initiated w.e.f 01.07.08 and one was cancelled. BoD in its meeting on 27.3.08 approved three more projects out of which one was cancelled and other two were initiated during the current year.

2.2 PROGRESS DURING 2008-09

The concept proposals were invited through National Press in September, 2008. In compliance to the HEC Directive vide No.6-5/CHR/HEC/08/1609 dated September 4, 2008 and in consultation with the Deans' Committee, the worthy Vice Chancellor desired that a Technology Park may be established at the Campus. For this purpose, each department of the University would prepare showcases/models and display attractive exhibits pertinent to their respective disciplines and demonstrate their technologies through field trials or actual operation of the equipments. All Deans of the Faculties and Director, Division of Education & Extension were requested to formulate consolidated proposals. In response thereto, 67 concept papers were received. Depending upon the nature of work proposed in the concept papers, the projects were classified into Outreach Technology Transfer, Demonstration on Campus, Fairs/Melas and Exhibitions.

After Scrutiny of concept papers, the PIs of selected concept papers were asked to submit complete project proposals. These proposals were got evaluated through experts (external) and were placed before TAC on 21.01.2009. Out of 11 project proposals for Outreach Technology Transfer, TAC recommended 09 projects.

The TAC principally agreed to the proposals for on Campus Demonstrations and Exhibitions. However, regarding practical evaluation and rationalizing the budget, TAC authorized Executive Director, and Dean of the Faculty concerned to finalize proposals from each faculty before presenting to BoD.

Thus, proposals were finalized through frequent meetings of Executive Director and Dean of the Faculty concerned. All these projects including those recommended by TAC were presented to BoD in its meeting held on 21.02.2009. The BoD approved 07 projects under Outreach Technology Transfer program, 13 Dmonstration proposals, 03 proposals for holding Melas/Fairs and 07 Exhibition proposals. The details are as under:

A. Outreach Projects

Sr.#	Title of the Projects/ Location	Name of PI
1.	Transfer of Pheromone Control Techniques for the Control of Fruit Fly to the Farmers of District Lasbela, Balochistan, Pakistan Location: District Lasbela	Prof. Dr. Abdul Hameed Bajoi, Vice Chancellor, Lasbela University Uthal Balochistan
2.	Salt Affected Soils - Technologies Associated with their Management Location: Hafizabad	Muhammad Akram Qazi Agri. Chemist, Soil Salinity Research Institute, Pindi Bhattian
3.	A Rural and Peri-Urban Outreach Mastitis Control Program Focusing on Transfer of Technologies Developed by University of Agriculture, Faisalabad Location: Faisalabad Focus area: Narwala & surrounding villages	Prof. Dr. Ghulam Muhammad, Chairman Deptt. of CMS, UAF
4.	Technology Transfer for the Control of Inclusion Body Hepatitis Hydropericardium Syndrome in commercial poultry by the use of improved adjuvanted vaccine produced indigenously Location: Faisalabad Focus area: Narwala & surrounding villages	Prof. Dr. Iftikhar Hussain, Dept. of Microbiology, UAF.
5.	Low cost technologies for enhanced ruminant animal productivity Location: Faisalabad Focus area: Narwala & surrounding villages	Dr. Mahr-un-Nisa, Assistant Prof. , Institute of Animal Nutrition and Feed Technology, UAF
6.	Enhancing crop productivity on salt-affected soils through combined use of soil applied gypsum and pre-sowing seed treatments Location: UAF Farm at Proka	Dr. Saif Ullah, Assistant Professor, Inst. Soil & Env. Sci., UAF.
7.	Documentation of Traditional Agricultural Knowledge and Technologies in Punjab, Pakistan Location: Punjab	Prof. Dr. Iqrar Ahmad Khan Vice Chancellor, University of Agriculture, Faisalabad

B. Demonstration Projects (at Campus)

1.	Demonstration of Plant Pathological technologies at U-Road on the Main Campus, UAF	Dr. Nazir Javed, Chairman, Deptt. Plant Pathology, UAF
----	--	---

2.	Establishment of demonstration orchard for transfer of technology to the growers at PARS	Prof. Dr. Faqir Muhammad Tahir, Inst. of Hort. Sci., UAF
3.	Collection and Establishment of Germplasm unit (GPU) of Fruit plants at Square No. 32.	Dr. Saeed Ahmad, Associate Prof., Inst. of Hort. Sci., UAF
4.	Controlled Atmosphere Technology For Storage and Export of Horticultural Crops	Prof. Dr Aman Ullah Malik, Post-harvest Horticulture, Inst. of Hort. Sci., UAF
5.	Demonstration of innovative technology of the department at the Main Campus, University of Agriculture, Faisalabad	Prof. Dr. Rashid A. Khan, Chairman, Department of Forestry, Range Management and Wildlife, UAF
6.	Demonstration of Seed Priming for enhancing cereal yields under normal conditions	Prof. Dr Shahzad Maqsood Ahmad Basra, Deptt. Crop Physiology, UAF
7.	Demonstration of technologies developed by the department of agronomy in the University of Agriculture, Faisalabad	Dr. Zahid Atta, Chairman, Department of Agronomy, UAF
8.	Demonstration of Elite Breeding Lines of Different Crops at U-Road in the Main Campus, UAF	Prof. Dr. Faqir Muhammad Azhar, Chairman, Department of Plant Breeding and Genetics, UAF
9.	Facilitation of the Demonstration of Different Technologies under UAF-Technology Park Projects at Postgraduate Agricultural Research Station (PARS), University of Agriculture, Faisalabad	Mr. Amir Saeed Rana, Assistant Professor/ Superintendent PARS, Directorate of Farms, UAF
10.	Demonstration of Techno-chemical method for reclamation of hard Layered saline sodic soils Location: Proka	Prof. Dr. M. Shafi Sabir, Dean, Faculty of Agri. Engg. & Tech. UAF
11.	Demonstration of Improved Boom sprayer and Zone Disk Tiller Drill	Prof. Dr. Muhammad Iqbal, Deptt: Farm Machinery & Power, Univ. of Agri. Fsd.
12.	On farm demonstration of technologies for accelerated growth of calves and weaners for reducing the age at first calving of replacement dairy heifers	Dr. Shukat Ali Bhatti, Associate Prof. Institute of Animal Nutrition and Feed Technology, UAF

13.	Demonstration of farmer friendly equipments developed by department of poultry science	Prof. Dr. Ahsan Ul Haq, Chairman, Department of Poultry Science, UAF
-----	--	--

C. MELAS/FAIRS

1.	Spring and Winter Flower Exhibition/ Demonstration for Transfer of Technology at UAF	Dr. Atif Riaz, Assistant Prof., Institute of Horti. Sciences, UAF
2.	Demonstration of Modern Technologies through Kissan Mela	Prof. Dr. Ehsan Ullah, Director Farms
3.	National Horse and Cattle Show for Farmers Education	Prof. Dr. Muhammad Younas, Dean, Faculty of Animal Husbandry, UAF

D. Exhibition

- i. Under exhibition component, 7 proposals were approved for preparing showcases/models/ structures at faculty/Division level.
- ii. A proposal to establish a display center was approved where a space would be provided to each faculty to display attractive exhibits pertinent to their respective discipline.

Regarding execution of the exhibition projects, it was decided in the Review meeting held on 11.05.2009 that the display center will be established first and thereafter the Deans/Director will be asked to prepare the material according to the space provided.

2.3 PROGRESS/ACHIEVEMENTS OF ONGOING PROJECTS

The progress of the Technology Transfer projects in the form of brief achievements is given below:

TT-02/07: Technology Transfer for Using Tube Well Water on Salt-Affected Soils for Crop Production

Name of PI : Dr. Ghulam Murtaza, Associate Professor, Institute of Soil & Environmental Sciences, UAF
 Total cost : Rs. 2.965 million
 Funds released : Rs. 1.012 million
 Funds utilized : Rs. 0.886 million

Main thrust/theme

Pakistan is facing an acute shortage of good quality water for irrigation. Ground water may supplement irrigation needs but its quality is mostly hazardous. About 55 MAF ground water is pumped, of which 70-75 % is brackish. Continuous use of such low quality ground water without appropriate management practices or amendments could make the soils saline/sodic. By now, about 3.5 mha soils have developed surface salinity/sodicity due to the use of poor quality irrigation waters. Recycling of low quality waters at or near source would permit an expansion of irrigated area and also will help to reduce drainage disposal or associated environment problems. Farmers in arid and semi-arid regions are forced to exploit low quality ground water, which needs addition of a Ca-source. Otherwise such waters could result in deterioration of soil health and economic yield as well as produce quality. Considerable research work on the use of low quality water for irrigating crops has been carried out in Pakistan and abroad, but farm level adoption needs site-specific consideration because of differences in edaphic factors.

Since the gravity of salt problem soils and waters varies considerably, the technology transfer already established for such situations still needs continuous involvement of farmers to address the site-specific issues. It is, therefore, planned to demonstrate and replicate the known package of technology at the Proka Farm II to establish the Technology Park for productive use of poor quality soils and waters. This way, large abandoned areas will become productive and income of rural masses will increase to help alleviate the rural poverty. Keeping in view the worth of these studies, it is planned to extend these effects as an outreach program in the UAF focus area of Proka Farm II.

Objectives

- To study and demonstrate the reclamation effectiveness of ground water with or without using inorganic amendments.
- Growth response of wheat-rice and berseem-sorghum crops to amelioration strategies on saline-sodic soils with the participation of farmers.
- To educate farmers about the reclamation technologies for salt-affected soils and low quality waters.
- To identify the constraints regarding the transfer of technology for amelioration of salt-affected soils using brackish water.

Achievements during the period under report

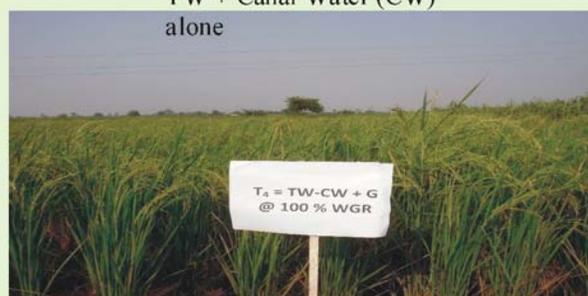
The soil reclamation with respect to pH_s , EC_e and SAR remained considerably better and faster/earlier with the cyclic irrigation of canal and tube well waters along with the application of farm manure @ 25 Mg ha⁻¹, auger hole 60 m⁻² along with gypsum @ 25% soil gypsum requirement (SGR) or gypsum alone @ 100% SGR. The same treatments produced the highest grain and straw yields of wheat and berseem crops. This suggests that low quality waters could be used for irrigation on salt-affected soils by following the above treatments. No significant change in physical properties of soils was observed because improvement in these properties is a long term process.



Tubewell Water (TW) alone

TW + Canal Water (CW)
alone

TW+CW+ Gypsum@ 50% Water Gypsum requirement



TT-03/07: Improving Water Use Efficiency of Cereals through ACC-Deaminase Biotechnology

Name of PI: Prof. Dr. Muhammad Arshad (*T.I.*), Institute of Soil and Environmental Sciences, University of Agriculture Faisalabad

Total project cost : Rs. 2.527 million
 Funds released : Rs.1.301 million
 Funds utilized : Rs.1.206 million

Main thrust/theme

Water scarcity in agriculture sector is becoming very serious problem in hampering the crop yields. One of the several strategies to reduce the pressure on scarce water resources could be to increase the efficiency of water use in agriculture. One strategy to overcome the limitation of plant growth by soil drying could be to promote root growth to allow water uptake from greater soil volume. Ethylene is a plant hormone that is involved in the regulation of many plant physiological responses especially under stress conditions. Water stress has been extensively associated with elevated release of endogenous ethylene by the plant which results in root growth inhibition dramatically. It is highly likely that sensitivity of plants to water stress might be due to a sharp surge in ethylene production. It implies that the regulation of ethylene under water stress conditions can eliminate the inhibitory effects of water stress on plant growth. 1-Aminocyclopropane-1- carboxylic acid (ACC) is the immediate precursor of ethylene in higher plants. Fortunately, there are certain plant growth promoting rhizobacteria (PGPR) which contain a unique enzyme, ACC-deaminase that hydrolyses ACC and decreases ethylene in inoculated plant roots. It is well established fact that inoculation of seed/plant with these PGPR increase growth of inoculated plants. More root growth can result in better water use efficiency through exploiting greater soil volume. In the laboratory of Soil Microbiology and Biochemistry, Institute of Soil & Environmental Sciences, several indigenous strains of PGPR containing ACC-

deaminase were isolated from the rhizosphere of wheat and maize. These PGPR were screened for growth promoting activity in wheat and maize under axenic conditions. A direct correlation was found between ACC-deaminase activity of the PGPR and root growth. Under natural field conditions, PGPR containing ACC-deaminase activity showed very promising results for improving growth and yield of inoculated plants even in the presence of high levels of nitrogenous fertilizer. These rhizobacteria were also used effectively in rhizobium consortia inoculants to increase nodulation in legumes. All these studies clearly demonstrated that plant growth could be controlled by either changing the ethylene synthesis endogenously and/or in the close vicinity of root through careful selection of rhizobacteria to be used as inocula. Therefore, the project is aimed at enhancing growth and yield of wheat (*Triticum aestivum* L.) and maize (*Zea mays* L.) by improving water use efficiency through bacterial ACC-deaminase activity at local farms. A biofertilizer will be prepared using the PGPR containing ACC-deaminase activity. The quality parameters and consistency of biofertilizer will be defined to use under field conditions. Then the biofertilizers will be provided to the farmers for improving crop production under water stress conditions. Adoption of this technology will help in increasing yield of cereals by improving water use efficiency and resultantly, pressure on water resources could be decreased.

Objectives

- Biofertilizer will be prepared by using the PGPR found effective in the first year trial.
- Compost of different quality and components will be tested as carrier material for biofertilizer.
- Methods for application of biofertilizer at farmers' fields will be standardized.

Achievements during the period under report (2008-09)

Two PGPR found effective in the first year trials were used to prepare the biofertilizers by using different kinds of compost (SSP-enriched, RP-enriched & N-enriched) as carrier of



Positive influence ACC-deaminase on wheat



Inoculated Organic fertilizer (Biofertilizer)

bioinoculants. Application of inocula as seed inoculation or as inoculated compost (biofertilizer) was compared for effectiveness under farmers' field conditions. Enhancement in the growth and yield parameters due to inoculation from same amount of water was used as an indicator of better water use efficiency. Results revealed that seed inoculation or inoculated compost (biofertilizer) caused significant increases in growth and yield parameters of wheat, sorghum and maize over respective uninoculated NPK control under variable number of irrigations. However, inoculated

organic fertilizer (biofertilizer) was the most effective treatment. Since, less than optimum number of irrigations were applied which may imply that the technology is useful in promoting the growth and yield of wheat, sorghum and maize under limited water supply. A farmer's field day was held on 20th April, 2009 at the farm of M Naveed, Chak No. 381 J.B. Toba Tek Singh. Farmers observed/found better plant growth in response to seed inoculation or band application of compost based biofertilizer, as compared to uninoculated NPK control.

TT-04/07: Computer Assisted Identification of the Large Ruminants

Name of PI: Prof. Dr. Muhammad Younas, Faculty of Animal Husbandry, University of Agriculture Faisalabad

Total project cost	:	Rs. 4.204 million
Funds released	:	Rs.1.710 million
Funds utilized	:	Rs.1.546 million

Main thrust/theme

Various systems have been tested and adopted in modern dairy farms and experimental stations. Most common used systems are (i) with the conventional components attached to the collar around the animal's neck, (ii) Calvin Gate systems (iii) special integrated circuits (ICs) with minimum size of transponders, (iv) system of identifications and registration of animals to control their movements from birth to slaughterhouse, (v) injectable transponders, electronic ear-tags, and ruminal boluses, etc. and/or (vi) or any other innovations not known to us. Anyway it should match with the ISO certification and WTO standards.

Main purpose of this project is to automatize the large ruminants kept at Livestock Experiment Station (LES), UAF through electronic IDs using neck chain transponders (NCT) and rumen boluses (RB) identifiable by the computer reader devices. The large ruminants, buffaloes, were selected to put under these electronic identification devices (EIDs). The animals when walked in milking area were identified by the EIDs so that their milk recording is made through milking machine, correct and entered in the record.

A prototype for Pakistani conditions will be developed that must be cost effective and affordable system of animal identification for all large ruminants making their management easier. The same may be adopted by the peri-urban dairy farmers, progressive breeders, and fattening units, etc.

Objectives

- To compare the computerized ID devices like transponders and rumen boluses, their application safety and durability
- The efficiency of reading and recognizing the devices,
- The trends and extent of providing a temper proof system, cost effectiveness and management ease,
- Daily behavioral responses of large ruminants to these devices.

Achievements during the period under report (2008-09)

The project was initiated with the aim to introduce computerized identification system at the Livestock Experiment Station (LES), UAF. Identification devices including Neck Chain Transponders and Ceramic Rumen Boluses were used on lactating buffaloes. The transponders and rumen boluses were compared with control group on traditional tattoo numbers or ear tags. The first phase of the project has completed successfully with conclusion that this system can be adopted for our dairy animals successfully. The milk production data, behavior and health status of lactating dairy buffalo observed during study period suggest that this system can be used efficiently for our dairy buffalo. At present this system seems to be more feasible for large dairy enterprise to be run on commercial basis as all the electronic devices have to be imported. By the advent of corporate farming and commercial ventures, the ID system has to match the efficient management and proper recording of animals. Some affordable system will be developed to provide future replication incentives in the livestock industry and are expected to lead to efficient management of the dairy enterprises.



Computerized transponder, ear tags and GES-reader



Bolus loading and injection

TT-10/07: Demonstration of Multinutrients Foliar Feeding Technology for Sustainable Crop Production

Name of PI : Dr. Muhammad Yaseen, Associate Professor, Institute of Soil & Environmental Sciences, University of Agriculture Faisalabad.

Total Cost : Rs. 2.244 million

Funds released : Rs. 1.174 million

Funds utilized : Rs. 1.101 million

Main thrust/theme

Fertilization strategies can influence germination, tillering, flowering, grain formation, fruit set, fruit size and the amount of vegetative growth and other plant characteristics. Foliar feeding has been used as a means of supplying supplemental doses of minor and major nutrients, plant

hormones, stimulants and other beneficial substances. Foliar fertilization can be from 10 to 20 times as efficient as soil application. However, this efficiency is not always achieved in actual practice due to weather extremes, application of the wrong spray mix, or of the right mix at wrong time. Foliar fertilizations are often timed to coincide with specific vegetative or fruiting stages of growth, and the fertilizer formula is adjusted accordingly. Therefore, judging what foliar materials to apply and at what plant stage to spray a

observed in this treatment indicating production of higher yields probably due to efficient uptake of nutrients. Therefore, results on all sites concluded that application of multinutrients foliar spray @ 1000 ml acre⁻¹ was found most economical. Moreover, comparative results on growth parameters of wheat and cotton between sprayed and unsprayed plots were shown to mass gathering of farmers of the project and surrounding areas by holding farmer's field days Results of all demonstration trials and scale of income generation elucidated that farmers of the area were fully convinced to adopt the technology as they purchased 860 liters out of total 1215 liters sold for use in the project district area in the reported year.

TT-21/07: Construction of Mobile Communal Dip and Demonstration and Dissemination of its Use for Tick Control

Name of PI: Prof. Dr. Zafar Iqbal, Department of Parasitology, Faculty of Veterinary Sciences, UAF

Total project cost	:	Rs. 1.862 million
Funds released	:	Rs. 0.456 million
Funds utilized	:	Rs. 0.354 million

Main thrust/theme

Tick infestation is one of the major problems of livestock industry in tropical and subtropical countries throughout the world. Likewise, in Pakistan, tick infestation is also a main impediment for livestock raisers in general and dairy farmers in particular. Ticks cause significant losses to the cattle industries. Ticks cause heavy blood losses in cattle. Each engorged female *B. microplus* can reduce the weight gain by 1.37 g in cattle. They also play an important role in the transmission of protozoal, bacterial, viral and rickettsial diseases. Control of ticks largely depends on the use of synthetic acaricidal drugs but there are a number of problems with this strategy. Ticks have striking ability to become resistant to the toxic effects of the chemicals. A large number of ticks have become resistant to various synthetic compounds. In Pakistan, a well organized dairy production system does not exist. Most of the farmers are small holders, who usually keep 20-40 cattle/buffalo for milk production, in cattle colonies established outside the boundaries of cosmopolitan areas. During the season of peak tick infestation these farmers usually use the injection of avermectins to keep their dairy animals free of ticks. High cost of avermectin injections compared to treatment with other wettable acaricides, treatment cost paid to veterinary staff for drug administration and time consumed in handling of individual animals for injecting the drugs are major drawbacks associated with this practice. Use of plunge dips is the most economical and easiest method of treating large animals with acaricides in less time. In this method only three to four people can treat hundreds of animals at one time. But, construction of dipping vat is not feasible for individual farmer (small holder) due to high cost involved in construction.

Present study consists of two parts, first a study on development of acaricide resistance will be conducted. Purpose of this study is to check if acaricides currently being used by farmers are still effective against ticks as many farmers report the problem of treatment failure. This will result in finding out the most effective drug. Second part of this study is construction of mobile dip, a dip has been designed which can be shared by farmers at community level and is transportable from one place to another, for use. After this study, the use of most effective drug and mobile dip will reduce the treatment cost and labor involved in treatment process. Ultimately, new tick

control method will result in decrease of losses due to tick borne diseases and increase in milk production from parasite free animals, resulting in increased GDP.

Objectives

- Detection of development of resistance in ticks, against acaricides currently being marketed in Pakistan.
- Construction of mobile dip, (i) which can be shared by dairy farmers on community level (to reduce time and cost involve in acaricide treatment) and (ii) could be transported to different areas.

Achievements during the period under report (2008-09)

The taxonomic identification of the tick specimens collected from the study area revealed the presence of more than one type of species on the domestic ruminants. The species identified were *Hyalomma marginatum* and *Boophilus microplus* (see Fig.). During the First farmers day it was observed that farmers have very little or no knowledge of tick born diseases and risk factors associated with tick infestation. But later at the end of one year, targeted community was very well aware of tick and tick borne pathogens and associated problems. During the first year of project farmers were educated about the different tick control strategies. After the construction of dip, animals of the whole village were successfully treated with the acaricide.



Cattle infested with *Boophilus microplus* ticks



PI and his team on farmers day



Dip constructed in the project area and demonstration of its use to farmers

During these activities farmers realized that how dangerous the ticks are for their animals. They also realized the importance of keeping the animals free from tick infestation. It was the results of the extensive on farm education program that farmers started contacting the Principal investigator for advice on subsequent incidence of tick infestation. During the first year of project 58 farmers participated in the activities.

TT-23/07: Use of Sodium Bicarbonate for Optimum Weight Gain of Growing Buffalo Calves and Lambs

Name of PI: Prof. Dr. Muhammad Sarwar, Director, Institute of Animal Nutrition & Feed Tech., UAF

Total project cost : Rs. 2.098 million
 Funds released : Rs. 1.137 million
 Funds utilized : Rs. 1.051 million

Main thrust/theme

Growing calves and lambs/goats are well known victim of high temperature and humidity which not only reduce the dry matter intake (DMI) but also their growth performance and ultimately profitability of the enterprise in tropical and subtropical countries of the world. Moreover, high nutrients demand of growing livestock can usually be fulfilled by high concentrate diet which generally results in low acetate to propionate ratio. This may lead to decreased feed consumption because of ruminal acidosis and thus reduced growth rate. There may be many ways and means to enhance the feed intake for growing animals. Supplementation of sodium bicarbonate (SB) may be one of the promising tools to gain more weight in growing animals by improving the DMI through counteracting ruminal and systemic acidosis. Increased DMI by supplementation of SB has been documented in exotic dairy calves in various foreign studies. Sufficient scientific evidence is available regarding favorable effects of SB supplementation in exotic dairy cows. However, limited scientific literature is available about its effects in growing buffalo male calves and goats. Moreover, physiological status, environmental condition and feeding strategies of buffalo calves and goats vary from that of cow calves reared in temperate region and SB findings obtained from experiments on exotic cow calf may not be of worth for direct application on buffalo calves. Therefore, the present study was planned to know the influence of varying level of SB on nutrients intake, their digestibilities, nitrogen balance and weight gain in growing buffalo calves and goats.

Objectives

- To know the influence of varying sodium bicarbonate levels on parameters like nutrients intake, Nutrient digestibility and Nitrogen metabolism.
- Optimum weight gain in growing calves and goats.
- Dissemination to the farming community thorough seminars/ workshops and farmers' day activities.

Achievements during the period under report (2008-09)

During the reported period, a study was executed to observe/demonstrate the potential benefits of adding sodium bicarbonate (SB) in the diet of growing goats maintained for weight gain at farmers' field in Tehsil Toba Tek Singh. Five isocaloric and isonitrogenous diets containing 0, 0.40, 0.80, 1.20 and 1.6% SB concentration were formulated by using the available local feed ingredients. Sixty growing goats (6-8 months old) were divided into five groups, each containing twelve goats, belonging to five different feedlot farms in a randomized complete block design. The experiment lasted for 3 months. First 3 week served as adaptation period while each week

after every three week served as collection period (i.e. three collection periods, each of one week). Feed was mixed daily and offered twice a day at *ad-libitum* basis, i.e. in the morning and evening, but at 10% weigh back during collection period. Animals had a free access to drinking water throughout the trial period. A farmer's day will be organized at the location of experimental site to educate and encourage the farmers to use SB in the diet of growing goats for optimum weight gain.



Project site



Animals being fed



Farmers meeting

TT-29/07: Epidemiology of parasitic fauna of domestic animals of Tehsil Toba Tek Singh

Name of PI : Prof. Dr. Muhammad Nisar Khan, Department of Parasitology, FVS, UAF
 Total cost : Rs. 2.332 million
 Funds released : Rs. 1.120 million
 Funda utilized : Rs. 0.978 million

Objectives

- To conduct an epidemiological survey for documentation of ectoparasitic fauna of livestock and dairy industry of Tehsil Toba Tek Singh.
- To determine the factors affecting the prevalence of ectoparasitic infestation in the area.
- To transfer the latest technology/ information to the dairy farmers regarding the control of the ectoparasites in the field.
- To estimate economic losses attributed to livestock and dairy industry

Main thrust/theme

Parasitic infections are one of the greatest causes of diseases worldwide causing lowered livestock productivity leading to economic losses at national level. There are two types of parasites including endoparasites and ectoparasites. They cause retarded growth lowered productivity, mortality and high economic losses. There are a number of factors that influence the prevalence of endoparasites. These include age, sex, breed, worm population, weather condition and husbandry or management practices.

In Pakistan, earlier studies indicated that prevalence of parasitism in ruminants of various regions rang from 25.1 to 92 % but none of these studies reported risk factors influencing the parasitic diseases. In this project prevalence of parasitic diseases will be documented and associated risk factors influencing parasitism will be determined which will provide baseline data in planning control program in the study area. After documentation, deworming schedule will be made and

transferred to local dairy farmers in the study area. Guidelines to the farmers will also be provided regarding associated risk factors influencing parasitism to end with control of parasitism in the study area resulting in reduction of economic losses to the dairy industry in the study area.

Achievements during the period under report

Months wise prevalence of ecto-parasite infestation was carried out in three areas of Tehsil Toba Tek Singh for the documentation of ecto-parasitic fauna of livestock viz. Chak No.298/GB, 316/GB and Toba Tek Singh proper. Ecto-parasites were collected during each month and identified. According to the survey, 5640 cattle and buffaloes each and 4020 sheep and goats were examined for the presence of ecto-parasite. A total of 2808 (14.53%) animals were found positive for ecto-parasite infestation. Among various domestic animals studied, sheep were found to have highest infestation of ecto-parasites (17.02%; 684/4020), followed in decreasing order by buffaloes (15.14%; 954/5640), cattle 14.57%; 822/5640) and goat (11.14%; 448/4020). The study provided base line data to educate the farmers about these ecto-parasite diseases.



TT-31/07: Dissemination of Technologies for Profitable Dairying at Farmer's Level.

Name of PI : Dr. Muhammad Qamar Bilal, Associate Professor, Dept. of Livestock Management, UAF
 Total Cost : Rs. 2.319 million
 Funds released : Rs. 1.226 million
 Funds utilized : Rs. 1.149 million

Objectives

- To introduce the technologies in field to reduced calf mortality and age of maturity in heifers.
- To train farmers about technologies related to feeding management of dairy animals.
- To introduce dairy herd health management packages at farmer's level.

Main thrust/theme

Low dairy sector productivity requires to be enhanced to meet not only the dietary needs of local human population but also to produce surplus to earn foreign exchange through exports. Among many factors of low productivity of livestock in Pakistan, limited genetic potential exploitation

mainly due to under feeding and high incidence of certain diseases, lead to high monetary losses to farmers There is need to reduce calf mortality and age of maturity in heifers. Calf mortality at farmer level is very high and almost 30% calves die before attaining the age of two months resulting monetary losses for the dairy farmers. Delayed colostrum feeding and high incidence of opmphlitis are the leading factors of high calf mortality. Training and awareness of farmers is neede to ensure reduction of calf mortality and age of maturity in heifers. To increase quality milk production at national level, it is imperative to keep dairy animals healthy. It is possible through training of the farmers about vaccination, dipping, deworming and mastitis control program (milk screening test, milk let down techniques, milking methods, teat dipping and dry period antibiotic therapy).

It is also imperative to ensure regular provision of quality feed and fodder even during slump periods because our animals are under fed both in quantity and quality resulting to produce less milk. Reduction in cost of feeding and regular supply of quality fodder is possible through training/educating the farmers about high yielding fodder varieties, proper stage of fodder cut, silage making, straw treatment, urea molasses blocks and ration formulation.

It is expected that effective dissemination of above mentioned management techniques will lead to boost milk production, improve the financial status of the farmers and strengthen the dairy sector and national economy. In study area (TT Singh) farmers have huge population of dairy animals but managing/ raising them on traditional lines that results low profit. Hopefully, the knowledge of farmers about profitable dairying and financial status of the farming community will improve to a lager extent as a result of project activities

Achievements during the period under report

Technologies related to calf management (deworming and dipping) and feeding management



Demonstration of deworming



Demonstration of urea molasses block



Demonstration of ration formulation



Demonstration of wheat straw treatment



Farmer's meeting on 22-3-09



Farmer's day on 27-6-09

(urea molasses blocks, ration formulation, urea treatment of wheat straw) of dairy animals were Deworming and dipping was found very beneficial to improve the body condition of calves and to reduce the mortality rate. Use of urea molasses block, balance rations and urea treatment of wheat straw increased feed intake, milk yield and improved the body condition of dairy animals.

Farmers awareness and adoption trend about recommended technologies disseminated in year I, (timely colostrum feeding, 91.66%; naval card care, 81.66%; deworming and dipping, 95.83%) increased to a large extent along with a significant reduction (50 to 10%) in calf mortality. Four farmer's days were organized on 18-10-08, 3-12-08, 18-4-09 and 27-6-09. Farmers responded very well and showed extra-ordinary interest towards the adoption of recommended practices.

TT-34/07: Survey and management of mite pests of stored grains in Tehsil Toba Tek Singh, Punjab.

Name of PI : Dr. Muhammad Hamid Bashir, Assistant Professor, Department of Agri. Entomology, University of Agriculture, Faisalabad.
 Total Cost : Rs. 2.174 million
 Funds Released : Rs. 1.091 million
 Funds Utilized : Rs. 0.990 million

Objectives

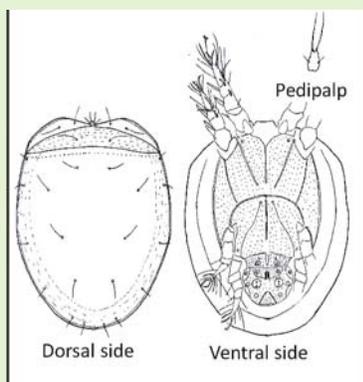
- To elucidate the exact picture of incidence and losses caused by different mite species.
- To explore the existence of different mites in different localities of Toba Tek Singh, Punjab.
- To develop a strategy in order to control and management of stored grain mite pests.
- Demonstration / dissemination of technology by holding farmer's field day with the collaboration of the extension field staff of the area.

Main thrust/theme

Mites are very tiny microscopic creatures belonging to subclass Acari of class Arachnida. They occupy highly particular biome and are considered of great importance as they are reported to severely infest and damage the food stuffs like flour, seed, bulbs, cheese and dried fruits etc. The direct damage of mites to stored grains is through contamination and penetration into seeds which consequently lower the vitality and germination capability of the seeds. They damage the embryo after penetrating into seeds and thus lowering the germination capability of seeds. They eat away the grains and sometimes the whole contents of the seed are destroyed. The indirect damage is through raising the moisture contents of stored grains and generating much heat which subsequently favours the growth of bacteria and fungi that would deteriorate the quality of produce i.e. fusty smell and bitter taste. Different measures to protect grain from mite infestation embody prophylactic, hygienic and destructive measures. Under prophylactic measures low temperature, low humidity, sufficient ventilation and low rate of micro-biological processes and proper cleaning during threshing are taken into account. Hygienic measures include drying, turning and cleaning of grains. The destructive measures include fumigation of grain and storage buildings. These situations need comprehensive studies on the ecology, biology and physiology of mite pests on different crops, fruits and vegetables in general but stored grain mite pests in specific. This study is focused to assess the status of stored grain mites with reference to post harvest losses. Extensive survey and collection of different mite pests in the fields and in grain storage will be made on different locations of Toba Tek Singh. The collected specimens will be analyzed and processed for their identification and description in the Laboratory. The project involves the active participation of local farmers in order to transfer the technology and to impart farmers training.

Achievements during the period under report

Work on systematics continued which resulted in identification of one new species *Acotyledon seiulensis*. This new species was collected from wheat grain from Chak No. 221 (T.T. Singh). Experiments on the role of mite pest population on the germination revealed negative correlation between mite population and germination percentage and a significant positive correlation between infestation and mite population. Experiments were conducted for rearing the stored grain mite pests involving different diets (combinations of wheat, yeast, wheat straw and wheat flour) under laboratory conditions. Maximum population was recorded from whole wheat + Kibbled wheat + yeast + wheat straw (10:1:0.1:1). Results regarding the acaricidal activities of aqueous extracts of neem revealed that minimum mite population was recorded after 1st, 2nd, 3rd and 4th week from 40% solution. The descending trend was observed from 20, 10 and 5 % respectively. Uniqe-M (fenpyroximate) was also found effective against the mite pests in the lowest concentration of 6.25 ppm (35.71 % Population inhibition) maximum control was recorded from 200 ppm solution with 90.99 % population inhibition. Besides corner meetings, seven large farmer meetings were arranged in the project area to demonstrate the innovative technologies. Four demonstration plots were also sown at different farmer's fields which yielded an additional 4-7 monds/ Acre



Acotyledon seiulensis
A new mite .sp



Mites attack on stored wheat grains



Farmer's day meeting

TT- 35/07: Dissemination of Raised Bed Technology to Address water Shortage in Irrigated Areas

Name of PI : Prof. Dr. Rai NiazAhmad, Water Management Research Centre, UAF.
Total Cost : Rs. 1.907 million
Funds Released : Rs. 0.859 million
Funds Utilized : Rs. 0.771 million

Main thrust/theme

Many developed countries facing irrigation water shortages have replaced the traditional irrigation methods with high efficiency irrigation methods i.e. drip and sprinklers irrigation methods, whereas the developing countries are planning to adopt these irrigation methods. High efficiency irrigation techniques are also becoming imperative need for sustainability of agriculture in Pakistan. However, it is difficult to introduce high cost techniques due to many factors like economic level of farmers, provision of energy on the farms, and low farm return etc. Thus, the effective and cheap technologies are the need of hour. Growing of corps on raised beds

is one of the improved irrigation methods being practiced all over the world. Yield of crops on bed is increased through better nutrient management and efficient irrigation and because of the reduced risk of lodging. Bed planting has also been found to show improved water distribution and efficiency, fertilizer use efficiency, reduced weed infestation. This technique also requires reduced seed rate without sacrificing crop yield as compared to flat sowing. Improvement of root proliferation in bed planting also ensure better crop stand and yield. Above all, bed planting promises a considerable amount of water saving (by almost 35 to 45 %) as compared to conventional sowing method, eliminating the formation of crust on the soil surface. Since it has been established that bed planting is important water saving irrigation technique, therefore, it was imperative to adopt this technique in the country. But unavailability of the suitable machinery to help grow our major crops using this method was the major limitation. Water Management Research Centre (WMRC) of the University of Agriculture, Faisalabad, has designed and developed a four rows wheat beds planting machine which not only saves 50% irrigation water but also increases yield by 25%. The machine has been improved to plant cotton and maize on beds as well. The machine is locally fabricated and can easily be further improved for different situations. Keeping all this in view, it has been planned to transfer this technology (machine) to the farmers for its test, demonstration, and fine tuning after getting feed back from the farmer's community.

Objectives

- To introduce **University Bed Planter** to grow cotton and maize on bed-furrow system for improving their water productivity;
- To demonstrate Raised Bed Technology and Laser Land Leveling at Farmer's fields in comparison with traditional irrigation practices;
- To search and address the constraints, both at the farmers and technology level, to adopt the raised bed technology among farming community.

Achievements during the period under report

The project activities continued with data collection regarding yield and water saving from previous year's cotton and maize bed-planted sites. Final results revealed 15-22% increase in yield of maize under bed planting in comparison to ridge planting with 40% water saving. For this year two more sites viz. 251/GB and 258/GB were selected for maize where 20% yield



Maize on beds



Cotton on beds

increase with 30-35% water saving was achieved under bed planting in comparison to ridge sowing. Cotton bed planting resulted in 10-15% increase in yield with 30% water saving in comparison to ridge sowing. Farmers greatly appreciated the technology and due to its promising results, the area under cotton bed planting in this year was increased from 33 to 600 acres in different villages viz. 249/GB, 251/GB, 253/GB, 254/GB, 258/GB, etc., out of which 48 acres is under data collection regarding yield and water saving. This farmers' adoption of technology on hundreds of acres in the project area is an indication of the success story of the project.

TT- 37/07: Impact Assessment and Evaluation of Projects under Endowment Fund at Tehsil Toba Tek Singh

Name of PI: Prof. Dr. Ashfaq Ahmad Mann, Chairman Deptt. of Rural Sociology, UAF

Total Cost : Rs. 3.058 million

Funds Released : Rs. 1.728 million

Funds Utilized : Rs. 1.135 million

Objectives

- To investigate the Agro-economic and social characteristics of the people/farmers in the projects area.
- To make evaluation from time to time activities of on-going projects.
- To conduct impact assessment of the projects under Endowment Fund.
- To suggest policy implications and give recommendations for future research, development and technology transfer programs under Endowment Fund at UAF.

Main thrust/theme

The role of the present project is to conduct impact assessment/evaluation of all the projects of Endowment Fund underway in the rural areas of District Toba Tek Singh, in terms of work plan, procedures, objectives and activities of these projects. On the basis of this assessment and evaluation, further suggestions will be made to improve the effectiveness of the use of Endowment Fund for rural development programs. Endowment fund schemes are given the task to facilitate in skill-development and provide training to the poor and needy people/farmers in rural communities for development and utilization of new technology. Technology Transfer projects are of different types with specific objectives and methodologies. This study will make an evaluation of the on-going activities from different dimensions from time to time and make an assessment of their existing work. At the end, suggestions will be made for future research agenda and new development programs in the area.

Achievements during the period under report

Meetings with PI's & Project staff were carried out for Sharing knowledge and information on the progress of the projects and location and changes in the location of villages. Meetings with PI's and their staff have created a helpful environment. This has further increased the confidence and ability to enhance the working capacity of the projects. Visits of the projects sites were made to observe the proper functioning of the projects. FGD with farmers and observation of farms were conducted. Observations of crops/technology quantity / quality were done. Interaction with the projects teams was ensured for proper operation of the projects and filling the gap if any.

Field observation/field visits (check list) and situation analysis were made. Photographs and taped records were also used. Pictorial evidence was used to support the evaluation results. Farmers meetings, Interviews/ FGD, solution of problems/ confidence building and data collection were completed. Evaluation of objectives, procedures and activities to explore of technology transfer projects was done. Use-effectiveness of fund was ensured. In-depth interviews were conducted to explore individual issues for improvement in functioning of the projects.



Discussion with farmer



PI inspecting a farmer's site

TT- 38 /07: Investigating Aquifer Storage and Recovery Techniques to Recharge the Saline Groundwater at Farmer's Field

Name of PI : Prof. Dr. Allah Bakhsh, Department of Irrigation & Drainage, UAF
 Total Cost : Rs. 2.333 million
 Funds Released : Rs. 0.918 million
 Funds Utilized : Rs. 0.741 million

Main thrust/theme

It is obvious that without irrigation water supplies, crops can not be grown round the year because majority of the agricultural areas lie in the arid to semi arid zones. Moreover, significant role of groundwater is apparent because country's surface water reservoirs are shrinking due to sediment loadings whereas as our food and fiber requirements are increasing due to population growth. The groundwater levels have started declining because of higher pumping rates. This huge abstraction of groundwater has resulted in lowering the depth of groundwater level in the range of 5 to 7 m in Punjab and in some cases even mining the aquifer when discharge rate exceeded the recharge rates. This practice has also resulted in continuous falling water tables, deteriorating groundwater quality and inducing the secondary salinization problems in the irrigated agriculture of Pakistan. These indicators present an alarming situation for all of us because of the diminishing and deteriorating groundwater resources. Realizing the gravity of the situation, it is imperative that ground water reservoirs need to be taken care of in terms of its recharge so that the falling watertables and deteriorating groundwater quality can be controlled and can also minimize the secondary salinization processes. Therefore, it is of utmost importance that aquifer needs to be recharged with surplus water supplies during rainy season or periods of less crop water requirements which can be pumped and used during periods of peak water requirements.

Aquifer Storage and Recovery (ASR) techniques are cost effective alternatives which aim at storing surplus water during flood periods and recovering it during times of water shortages. These techniques provide an option to the farmer like water bank deposit especially when the groundwater quality is brackish. This technique can serve as a tool to recharge the aquifer and control the falling water tables in order to promote the sustainable exploitation of groundwater and also to minimize the salinity buildup in the root zone. This project has been designed to focus on evaluating the aquifer storages and recovery concept at the farmer's fields based on its technical, economical and environmental impacts. The aquifer will be investigated, recharged, monitored and evaluated for groundwater qualities of the injected and pumped water to determine the aquifer recovery efficiency and aquifer suitability. The project outcome will result in the development of groundwater recharge technique (ASR) and will promote the sustainable use of groundwater resources by controlling the falling water table and minimize the secondary salinization issues in the saline zone of groundwater throughout the country.

Objectives

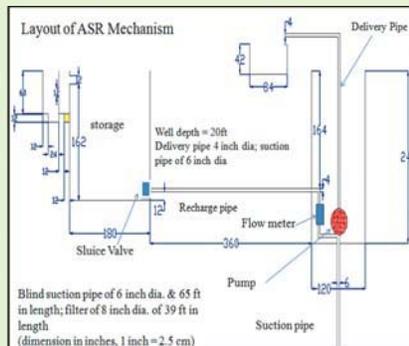
- To study the physical and chemical characteristics of the aquifer planned for Aquifer Storage and Recovery (ASR) techniques in the saline groundwater zone of Tehsil Toba Tek Singh at farmer's field using resistivity survey meter.
- To investigate the effects of volume, rate and periods of surplus water storage on groundwater quality and lateral and vertical extent of the injected water in the aquifer.
- To monitor the quality of groundwater injected and pumped and evaluate the recovery efficiency and suitability of the aquifer for implementing the ASR concepts by ensuring the farmer's participation and the Agri. Extension personnel.

Achievements during the period under report

After conducting resistivity survey, a tubewell along with six observation wells, was installed at the project area site (Chak No. 405/JB, Tehsil Toba Tek Singh). Tubewell discharge was measured during the pumping test as $1.52 \text{ m}^3/\text{min}$ (0.89 cfs) and drawdown was measured using water level indicator in all the six observation wells. The maximum drawdown after continuous pumping of 12 hours for all the observation wells of ES1₅₀, ES1₉₅, ES1₇₅, W1₅₀, W1₉₅ and W2₇₅ were 0.33, 0.86, 0.40, 0.35, 1.09 and 0.35 m, respectively.



ASR technology demonstration



ASRDesign



Transmissivity, storage coefficient and hydraulic conductivity were calculated for these observation wells. Mean transmissivity value for these observation wells was $1160 \text{ m}^2/\text{day}$ ($0.803 \text{ m}^2/\text{min}$), mean storage coefficient for these observation wells was 0.476 and mean

hydraulic conductivity was 44 m/day (0.03 m/min).The groundwater recharge mechanism has also been designed and constructed according to the aquifer storage capacity. The ASR technology was properly demonstrated to the farmers.

TT-43/07: Control of Newcastle Disease in Rural Poultry of District T.T. Singh

Name of PI: Dr. Muhammad Arshad, Associate Professor, Department of Veterinary Microbiology, UAF

Total project cost	:	Rs. 1.967 million
Funds released	:	Rs.0.934 million
Funds utilized	:	Rs.0.843 million

Main thrust/theme

Eggs and meat from rural poultry is well liked by community and are being sold almost at double price. There are about 81.4 million numbers of rural poultry birds (Desi) in Pakistan. Rural poultry shares upto 12.5% of the total poultry production and is playing a vital role in the village house economy. It contributes upto 43.8 % of total eggs and 30.5% of the total poultry meat. Newcastle disease (ND) is the top ranking disease of rural poultry in Pakistan. Sero prevalence of ND in un-vaccinated rural poultry in the area of district Faisalabad was recorded as 40.5 %. In a study, about 41.33% of un-vaccinated rural chicken were found positive for the presence of antibodies against ND virus. Newcastle disease (ND) is a highly contagious viral disease particularly of domestic poultry. Number of rural poultry birds in district T. T. Singh is 4,00,821 according to census of year 2006. If 60,000 desi eggs are obtained per day and the average price per egg is Rs. 5/= the annual income contributed by rural poultry through eggs in the district touches the figure of Rs.109.5 million. Infectious diseases especially ND is the major hurdle in prosperous of rural poultry in our country. The present project has, therefore, been started to apply the already standardized epidemiological techniques to control the disease in rural poultry of Tehsil T. T. Sing. Practical demonstration of vaccination, meetings, lectures, farmer days and printed material will create awareness in rural population of the area to control the most important disease of rural poultry. It will improve the economy and protein availability of the rural population in the area and save the losses caused by ND in the form of morbidity and mortality.

Objectives

- To involve rural families/persons having poultry to create awareness for the control of ND in rural poultry.
- To apply epidemiological techniques on ND in rural poultry of the area.
- To introduce the scientifically designed ND control programme for rural poultry in the area.
- To reduce economic losses caused by the disease in rural poultry.

Achievements during the period under report (2008-09)

Meetings were held with District Livestock Officer (D.L.O) T. T. Singh and Veterinary officers of Tehsil T.T.Singh. They were briefed in detail about the project. Five villages were randomly selected and more than 400 families/persons were registered during the year. All the poultry in the 5 selected villages was vaccinated using standard Newcastle Disease Vaccines and vaccination schedule. The persons having rural poultry were trained to vaccinate their birds by

themselves. Post-vaccinal antibody titres against Newcastle Disease were monitored in randomly selected birds of each village. The families/persons of the villages having rural poultry were given awareness about the method for control of the disease through farmer meetings, farmer days and printed material in Urdu.

TT-45/07: Distribution and Management of Root-Knot Nematodes (*Meloidogyne* spp.)

Name of PI: Dr. Tariq Mukhtar, Associate Professor, Deptt of Plant Pathology, UAAR

Total project cost : Rs. 2.222 million
 Funds released : Rs. 1.731 million
 Funds utilized : Rs. 1.233 million

Main thrust/theme

Among Phyto-nematodes, root knot nematodes (*Meloidogyne* spp.), being ubiquitous, infecting a wide host range and causing colossal yield losses are the most important pathogens curtailing world agricultural productivity. Root-knot nematodes are serious constraints to the production of vegetables in Pakistan. This is because susceptible crops are grown regularly in the same land sometimes in monocultures or in rotations of vegetables, majority of them are hosts to root-knot nematodes. Conditions are generally good for vegetate production in all the climates and ecological zones of the country, allowing root-knot nematodes to thrive well.

The soil of Taxila ranges from clay loam to sandy with rare stones and rocks. Tehsil Taxila constitutes more than 37 % of the total area of District Rawalpindi under vegetables.

Because of the serious losses caused by root-knot nematodes, efficient control measures are necessary to minimize the crop losses. There are several management strategies like cultural practices, resistant hosts, biological control agents, physical factors and chemical means which can be adopted for the control of nematodes. Although each of these methods of pathogen management has its own importance, yet none is completely successful when applied alone for nematode control. The project focuses on the integration of root-knot management strategies and to create awareness and identification of these nematodes in the fields and about different management strategies through training.

Objectives

- Conducting extensive and intensive surveys on the occurrence, distribution, and infestation of root-knot nematodes.
- Effect of different inoculum densities of root-knot nematodes on the growth of important vegetables grown in the area (Cucumber, Tomato, brinjal).
- Screening of different cultivars of major important vegetables grown in the area for their resistance against root-knot nematodes.
- Transfer of nematode management strategies to the farmers.

Achievements during the period under report

Surveys of several vegetables in Tehsil Taxila were continued in the second year for the determination of the incidence and severity of root-knot nematodes which was found to be the maximum on cucumber during the current year followed by okra, brinjal and gourds. The effect of inoculum levels of *M. incognita* on the growth parameters of egg plant showed that all inoculum densities decreased plant growth and increased root galling. Incorporation of

antagonists viz. *Trichoderma harzianum* and *T. viride* caused reduction in root galling and consequently improved plant growth. Similarly application of carbofuran and abamectin resulted in reduction in root galling and enhanced plant growth. The awareness regarding identification and management of root-knot nematodes was also created among the farmers and field staff to make them able to understand the problem and adopt suitable control measures.



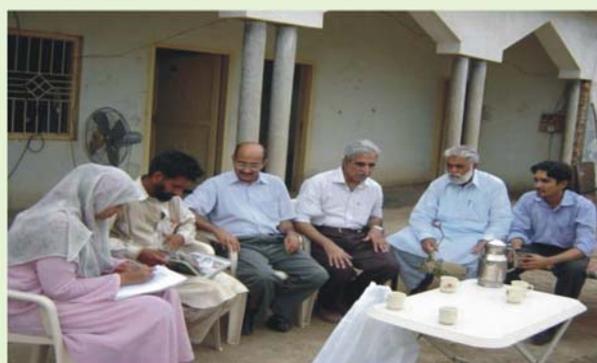
Heavily root -knot infested tomato field



Farmers' meeting



Farmers' gathering



Discussion with the contact farmer

TT-48/07: Demonstration of Light Equipped Power Insect Killer (LEPIK Technology) for Mechanical Insect Pest Control in Cropland

Name of PI: Prof. Dr. Rashid Ahmad Khan, Deptt. Forestry, Range Management & Wildlife,
University of Agriculture, Faisalabad

Total project cost : Rs. 2.243 million
Funds released : Rs. 1.120 million
Funds utilized : Rs. 0.902 million

Main thrust/theme

Use of highly toxic pesticides on edibles leads to disaster when the user is illiterate and the consumer is ignorant. Most of the under developed countries are facing similar situations all over in their cultivated landscapes where mono-cropping system is a common practice. The vegetable growing belts specifically around cities and the rice, cotton and maize (Indian corn) farming

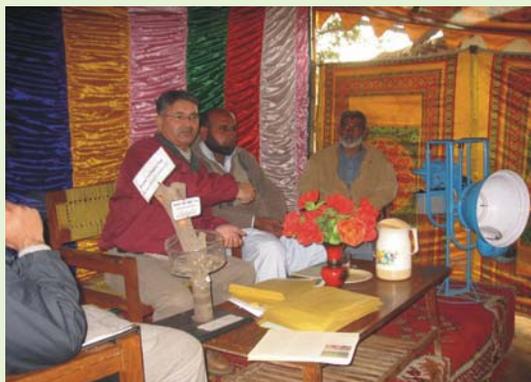
areas of Pakistan come under this category where almost 10,394 tons of pesticide and herbicide material is annually added for pest control. These chemicals are not only distractive for wildlife but also play havoc with human lives directly as well as indirectly by promoting deadly diseases. A sharp increase in the incidents of heart attack, kidney failure and cancerous diseases has been observed after the introduction of insecticides in the agro ecosystems. Thus, it necessitates use of biological or mechanical control of insect pests in crops. The Light Equipped Power Insect Killer (LEPIK) is actually a night device, which attracts and kills the insects mechanically. The operator needs to carry the device through crop like a spray machine. Being environment friendly, this kind of equipments can prove to be safe for human beings and can certainly help in the conservation management of wildlife and the related habitats.

Objectives

- Introducing “Light Equipped Power Insect Killer (LEPIK)” in the field of agriculture for non-chemical control of insect pests and comparing the cost benefit ratio of insect control by LEPIK machine against other insect control methods.
- Improving efficacy of the LEPIK device by modifying its various parts and using the most attractive light for higher insect response on the basis of field experience.
- Conducting large scale field experiments involving local framers to familiarize this technology in agriculture sector.
- Translating field experience into suitable recommendations, i.e. best time for field operation, optimum coverage speed of the machine during treatment, row to row distance of crops and field size etc. for operating the machines in croplands to achieve better insect control results

Achievements during the period under report (2008-09)

Recent investigations under this project have indicated that weekly cleaning of crops with LEPIK machine gives ideal pest control results. It has been observed that crops with sever insect pest attack attracts huge number of social insects like variety wasps, bees, black and brown ants beside many insectivorous birds thus their role need to be researched. Insect collection during the current year show the presence on insect Orders Coleoptera, Lepidoptera, Diptera, Ephemoptera, Hemioptera, Orthoptera, Dermaptera, Plecoptera, Thysanoptra, Homoptera, Mesoptra and Trizoptera while the insects falling under the Orders Diptera (55%), Coleoptera (19%), Lepidoptera (13%) and Hemioptera (9%) were observed in the highest number (n20). Almost 348 hectare area at five localities was successfully treated with LEPIK machine and wind speed was found to negatively affect the efficacy of this mechanical insect pest control.



PI discussing with the farmers



SECTION-3
Product Commercialization

3-1 CURRENT STATUS

The BoD constituted a committee to emphasize the ways and means pertaining to Product Commercialization. The BoD suggested the University of Agriculture, Faisalabad to develop companies on priority to promote partnership between public and private sector, develop database of technologies ready for commercialization.

Concept papers for proposals were invited from scientists working in the public sector organizations, through National press in January, 2008. In response, 12 concept papers were received from which 8 were rejected and 4 are under process. No funds were expended during 2007-08 for this activity.

The staff at EFS remained in search of prevalent practices for research commercialization within and outside the country as a bench mark. Some breakthrough is expected in the next year.

EFS also identified products developed at the university which have the potential for commercialization. The list of some products is given as under.

INNOVATION PROFILE OF TECHNOLOGIES/PRODUCTS DEVELOPED AT THE UNIVERSITY OF AGRICULTURE, FAISALABAD (approved)

No.	Name of the Scientist	Technologies/Products
1	Prof. Dr. Faqir Muhammad Anjum, DG, NFSAT. 0300-6633298, 041-9201105 dgnifsat@ymail.com	Aquatic Feed
2	Prof. Dr. Faqir Muhammad Anjum	Texturized Vegetable Protein (TVP)
3	Dr. Fawwad Ahmad, Lecturer, Poultry Science. 0333-6506207, fawwad55@yahoo.com	Automatic Feeding System
4	Prof. Dr. Iftikhar Hussain, Department of Microbiology, 0333-6572520, driftikharuaf@hotmail.com	An egg-adapted Inclusion body hepatitis-hydropericardium syndrome (IBH-HPS) montanide adjuvanted vaccine for poultry
5	Prof. Dr. Muhammad Iqbal, Deptt. Farm Machinery & Power, 0322-6382441, uaf_miqbal@yahoo.com	A zone disk tiller drill system
6	Prof. Dr. Muhammad Iqbal	An improved boom sprayer
7	Prof. Dr. Muhammad Iqbal	A boom sprayer test bench
8	Prof. Dr. Mumtaz A. Khan, Inst. Hort. Sci., 0300-6664674, mumtaz59pk@hotmail.com	Citrus Budwood Certification and Propagation Program at UAF

9	Prof. Dr. Ghulam Muhammad, CMS, 0300-7991051, drgm_pk@yahoo.com	Commercialization of Mastitis Vaccine
10	Prof. Dr. Ghulam Muhammad	Commercialization of innovative Surf Field Mastitis Test kit for farmers' level detection of hidden mastitis
11	Dr. Shaukat Ali Dept. of Chemistry and Biochemistry, UAF	Zinc Sulphate Fertilizer (21% Zn, Crystal)
12	Dr. Khalil ur Rehman, Associate Professor, Deptt. Chemistry, 0300- 6655727, khaliluaf@yahoo.com	Isolation and purification of enzymes for production of diagnostic kits
13	Prof. (Rtd) Dr. Rana Muhammad Aslam Khan, 0300-7601119 /Prof. Dr. Muhammad Aslam Pervaiz, Insti. Hort. Sci., pervez62@hotmail.com	Rose perfume



SECTION-4
Financial Report

4.1 INVESTMENT OF FUNDS

The principal amount of Rs. 650.0 million was invested during 2006-07 under the relevant rules, which increased to Rs. 710.00 million in 2008-09 with the addition of unspent balance of Rs. 30 million for the year 2006-07 and also with the addition of 15% of the total profit for the years 2007-08 and 2008-09 on account of inflation/devaluation, in line with BoD's decision made in its 3rd meeting held on November 13, 2007. The financial year 2008-09 closed with an income of Rs. 82.180 million, showing an increase of Rs.26.913 million (48.7 %) over the year 2007-08.

Investment and income (Rs. in million)

Description	2006-07	2007-08	2008-09
Principal Amount	650.000	700.000	710.000
Investment	650.000	700.000	710.000
Income	40.607	55.267	82.180

4.2 ACTUALS FOR THE FINANCIAL YEAR 2007-08

The year 2007-08 closed with the unspent balance of Rs. 33.054 million as shownbelow:

(Rs. in million)

Description	Revised estimates	Actuals
Unspent Balance	8.719	8.719
Income	56.711	55.267
Expenditure	10.932	10.932
Transfer to Principal Amount	20.000	20.000
Unspent balance	34.498	33.054

4.3 ALLOCATIONS AND EXPENDITURE FOR THE YEAR 2007-08 AND 2008-09

Fewer activities were witnessed in the sphere of Faculty Development and Product Commercialization that resulted a low volume of expenditure during the year 2007-08 and 2008-09. There was a saving of Rs. 33.054 million and Rs. 83.397 million during the year 2007-08 and 2008-09 respectively.

Allocations and Expenditure (Rs. in million)

Description	2007-08	2008-09
Allocations	43.986	105.234
Expenditure	10.932	21.837
Unspent balance/Saving	33.054	83.397

4.4 ESTIMATES FOR THE FINANCIAL YEAR 2008-09

Receipts

The income from investment out of Endowment Fund was originally estimated at Rs. 76.935 million during the financial year 2008-09. Actual income, however, increased to Rs. 82.180 million. The total allocated funds for the year 2008-09 remained at Rs. 115.234 million.

Expenditure

The expenditure during the year 2008-09 was originally estimated at Rs. 101.433 million. As a result of fewer activities under Faculty Development and non-initiation of activities under Product Commercialization, the year closed with revised expenditure of Rs. 21.837 million. Break-up of receipt and expenditure has been given as under.

(Rs. in million)

Allocations/expenditure	Budget Estimates 2008-09	Revised Estimates 2008-09
Unspent balance for 2007-08	34.498	33.054
Income from Investment 2008-09	76.935	82.180
Total amount available for allocation	111.433	115.234
Expenditure against components	101.433	21.837
Transfer to Principal Amount	10.000	10.000
Unspent balance	---	83.397

Component-Wise Allocation/Expenditure During The Year 2008-09 (Rs.)

Name of Components	Allocation			Expenditure 2008-09	Unspent Balance 2008-09
	Unspent balance (2007-08)	Allocation (2008-09)	Total		
Faculty Development (30%)	12,548,038	21653967	34202005	10,82,000	33120005
Technology Transfer (40%)	8892232	28871956	37764188	16782992	20981196
Product Commercialization (20%)	8,365,359	14435978	22801337	0	22801337
Operational Cost (10%)	3248334	7217989	10466323	3972138	6494185
Grand Total	33,053,963	72179890	105233853	2,18,37130	83396723

ANNUAL EXPENDITURE STATEMENT (Rupees)
OPERATIONAL BUDGET 2008 - 09

Code	Head	Expenditure (2008-09)
A037	Contractual Services	48475
A03805	TA/DA to Office/Staff	29306
A01273	Honorarium	354000
A03807	POL/running cost of Vehicles/Hiring of Vehicles	224111
A03905	News paper, periodicals and Books	4624
A03901	Stationary	68990
A03201	Postage and Courier etc.	33229
A03202	Telephone and Trunk calls, E-mail/Internet	26188
A3902	Printing and Publications etc.	9953
A06301	Entertainment Charges	301852
A03907	Publicity & Advertisement	60337
A03903	Seminars/Workshops	5000
A03940	Other Contingencies	54503
A137	Repair of Computer & Office Equipment	8200
A132	Repair of Furniture & Fixture etc	0
A13301	Repair and Maintenance of Office Building	263270
A13304	Miscellaneous	456722
A092	Purchase of Computer & Office Equipment	81978
A097	Purchase of Furniture & Fixture etc	0
A095	Purchase of Transport	1941400
	Grand Total:	3972138