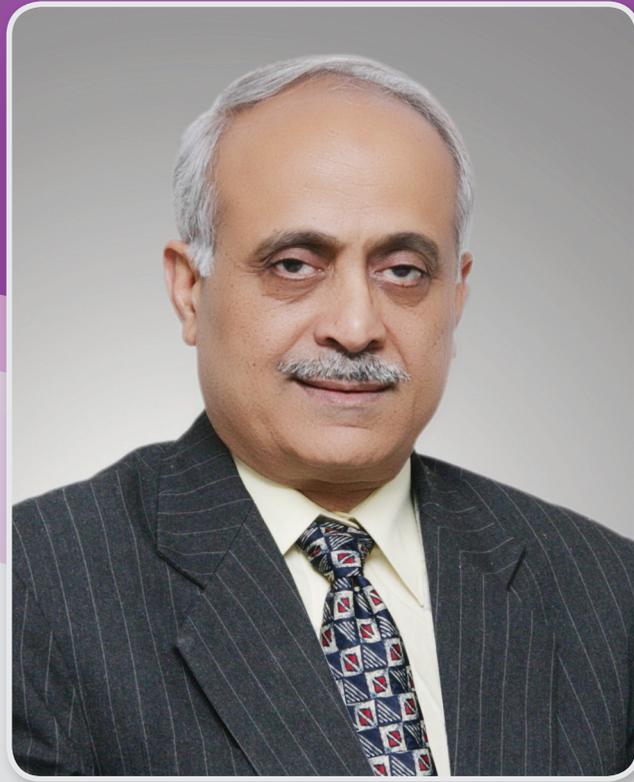


*Annual*  
**REPORT** **2014/15**

**ENDOWMENT FUND SECRETARIAT  
UNIVERSITY OF AGRICULTURE, FAISALABAD**



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## Executive Summary

During 2014-15 Endowment Fund made all out efforts to sustain its programs through prudent measures and managed to fulfill its obligations of the ongoing projects besides completing its capital intensive projects. In spite of meagre resources at its disposal, Endowment Fund Secretariat managed to finance 05 new projects each under Technology Transfer, and Research & Development components. The focus area of the new interventions were related to Guava cultivation, sewerage water treatment, use of ICT (Mobile Apps), agronomic practices, poultry diagnostics, food safety, varietal identification through PCR and cotton herbarium.

Endowment Fund Secretariat maintained liaison with PIs to facilitate the implementation of the projects. Monitoring & Evaluation was done through site visits, participation in farmers' days, and analysis of progress reports. In addition to the above, a project review workshop was also arranged by Endowment Fund Secretariat on June 17, 2015 to review the progress and share the achievements of recently completed and ongoing projects.

Endowment Fund Secretariat continued to support faculty members in arranging small outreach activities at the doorstep of farmers. University of Agriculture in collaboration with FAP successfully organized mega outreach events in Hafizabad and Sadiqabad.

Under Faculty Development 03 faculty members were sponsored for Short Visits while 02 for Short Trainings. Endowment Fund Secretariat granted funds for 13 Seminars/Workshops/Conferences/Trainings organized at University of Agriculture, Faisalabad.

The management of the Endowment Fund remained deeply concerned to the unstopped fall in the profit volume from investment. Keeping in view the week earning capacity through conventional investment in banks, the Endowment Fund Secretariat is exploring opportunities of alternative investments.

# Introduction

## Establishment of Endowment Fund at UAF

Endowment Fund was established with the assistance of USDA with seed money of Rs. 650.00 million. The Syndicate of the University of Agriculture Faisalabad approved to establish Endowment Fund at UAF. The major objectives were:

- a. To support UAF programmes for advanced training in biotechnology, agricultural sciences research, technology transfer and product commercialization.
- b. To strengthen faculty and support R&D activities of UAF.
- c. To support similar programmes with other institutions of higher learning, private sector, not-for profit organizations, and domestic and international organizations.
- d. To encourage increased cooperation among scientists conducting agriculture-related research at universities in Pakistan and the United States of America.

## Management of the Fund

The Board of Directors (BoD) is the governing body of this Fund and is responsible for Fund's program its financial and managerial policies. Following is the composition of Board:

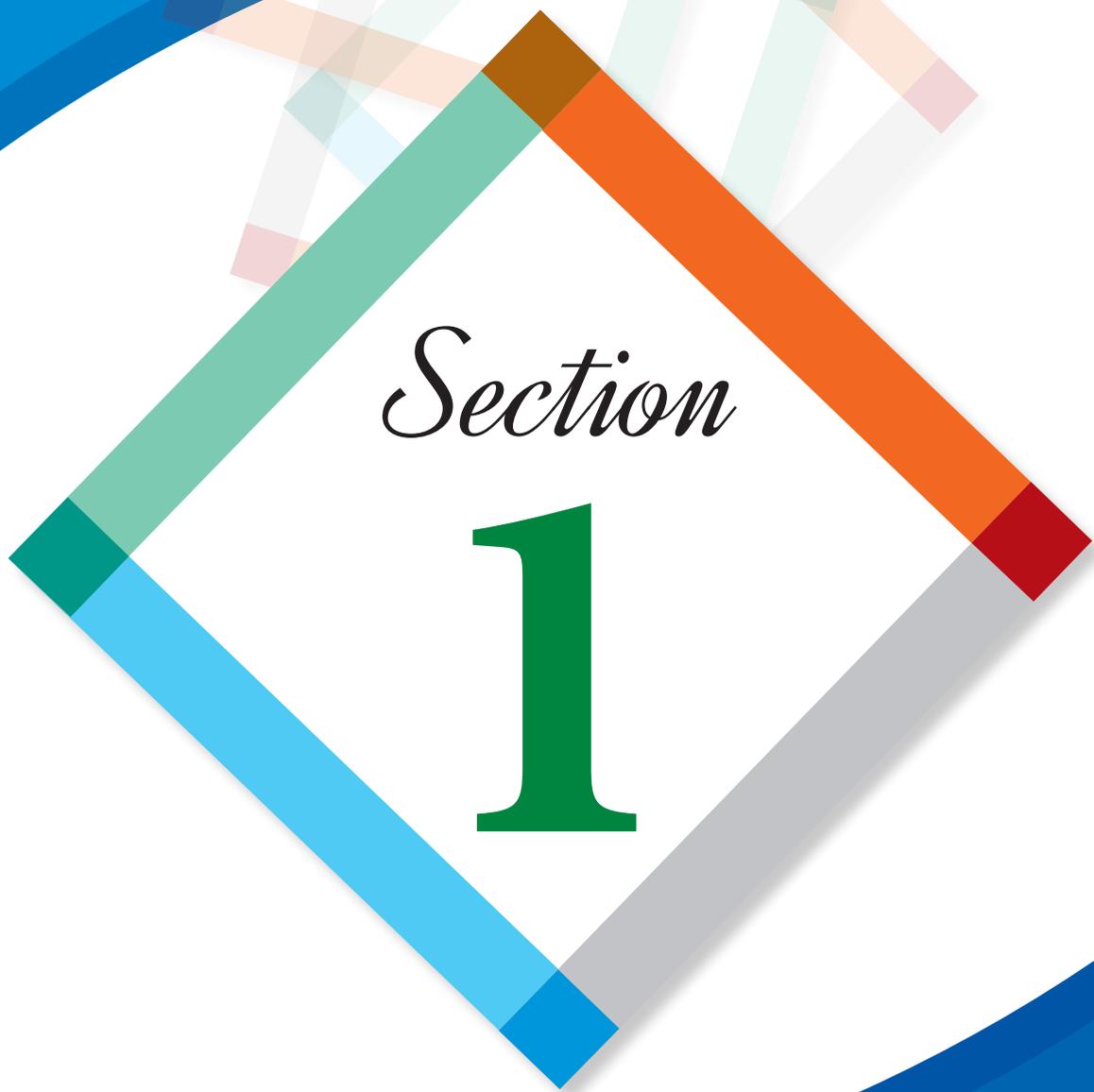
- |   |             |
|---|-------------|
| • Vice Chancellor, UAF (Chairman)                       | Ex-off      |
| • Vice Chancellor, Agriculture University Peshawar, KPK | Ex-off      |
| • USDA Agri. Attache in Pakistan or his nominee         | Ex-off      |
| • Agri. Specialist, USDA, US Embassy in Pakistan        | Ex-off      |
| • Eminent Scientists (Two)                              | For 3-years |
| • Progressive Farmer (One)                              | For 3-years |
| • Executive Director, ALP (PARC), Islamabad             | Ex-off      |
| • Registrar, UAF  | Ex-off      |
| • Treasurer, UAF  | EX-off      |
| • Executive Director, EFS (Secretary)                   | Ex-off      |



## Endowment Fund Secretariat

Endowment Fund Secretariat is responsible for the operation of the Fund which consists mainly of the selection, processing, approval, monitoring, evaluation and coordination of projects supported in whole or in part by it. All the activities are planned, approved and coordinated through Endowment Fund Secretariat (EFS) under the supervision of Executive Director.





*Section*

1

**FACULTY DEVELOPMENT**

Faculty Development Component of Endowment Fund provides opportunity to the faculty members for enhancing their skills. This improves the interaction with the international community and exposure to the developed systems for better learning of the faculty. Various opportunities under this component include travel grants for short training, for presenting papers in conferences/seminars, specialized short visits and financial support for organizing seminars/conferences/workshops at UAF. EFS spent Rs. 3.500 million for Faculty Development during 2014-15. Following is the brief of activities during the year 2014-15:

1. Short Trainings (abroad)	02
2. Short visits for institutional collaboration	03
3. Seminars/Workshops/Conferences organized at UAF	13
4. Foreign visitors/experts invited	04

### 1.1 Short Trainings (abroad)

Sr. No	Name/address	Title/Host Institute
1.	Dr. Saeed Ahmad Institute of Horticultural Sciences, UAF	Modern Fruit Industry and its Production Techniques Research Institute of Pomology, Chinese Academy of Agricultural Sciences (CAAS), Liaoning Province, China
2.	Dr. Muhammad Azam Institute of Horticultural Sciences, UAF	June 25-July 10, 2015

### 1.2 Short Visits for Institutional Collaboration

Travel grants for short visits abroad are provided for strengthening international collaboration and signing of MoUs etc. Following faculty members were awarded grants under short visits program:

Sr.#	Name/Department	Title	Country
1.	Prof. Dr. Allah Bakhsh Dean, Faculty of Agri. Engineering & Technology, UAF	Signing of Agreement and Exposure Visit to Biomass Gasification Technology (Biomass Gasifier) April 7-12, 2015	China
2.	Engr. Rana Basharat Ali Project Director, Punjab Bioenergy Institute, UAF	Signing of Agreement and Exposure Visit to Biomass Gasification Technology (Biomass Gasifier) April 7-12, 2015	China
3.	Dr. Anjum Munir Coordinator, Energy System Engineering Department, UAF	Signing of Agreement and Exposure Visit to Biomass Gasification Technology (Biomass Gasifier) April 7-12, 2015	China

### 1.3 Seminars/Conferences/Workshops/Trainings organized at UAF

Endowment Fund provides financial support to UAF faculty members to organize seminars/conferences/workshops at UA. During the year 2014-15, EFS sponsored following events:

Sr. #	Organizer	Title of Seminar/Workshop/Conference
1.	Dr. M. Mahmood-ul-Hassan Department of Zoology & Fisheries, UAF	Training Workshop on Bat Research Techniques and Conservation. September 15-19, 2014
2.	Prof. Dr. Tahir Zahoor National Institute of Food Science & Technology, UAF.	International Symposium on Technological and Nutritional Aspects of Value added Dairy Products and Cheese Festival. October 30-31, 2014
3.	Prof. Dr. Zafar Iqbal Qureshi Department of Theriogenology, UAF	Training Workshop on Applications of Diagnostic Ultrasound in Animal Reproduction. November 12, 2014
4.	Dr. Anjum Munir Department of Farm Machinery & Power, UAF	International Workshop on Renewable Energy Technologies in Pakistan. December 16-18, 2014
5.	Dr. Syed Asher Mahfooz Department of Clinical Medicine & Surgery, UAF	Internees-Stakeholders Interactive Workshop on the Development of Training Modules. March 05, 2015
6.	Prof. Dr. Allah Bakhsh Faculty of Agri. Engineering & Technology, UAF	Seminar on Sustainable Use of Soil and Water Resources for Achieving Future Food Security: Challenges and Opportunities May 2-14, 2015
7.	Dr. M. Shahid Mahmood Institute of Microbiology, UAF	Seminar on Zoonotic and Vector borne Pathogens March 31, 2015
8.	Dr. Babar Shahbaz Institute of Agri. Extension & Rural Development, UAF	Workshop on Core Concepts of ICDD Research. April 15- 22, 2015
9.	Prof. Dr. Javaid Akhtar Institute of Soil & Environmental Sciences, UAF	International Mother Earth Day Celebrations. April 22, 2015
10.	Prof. Dr. Muhammad Younas Institute of Dairy Sciences, UAF.	One day Camel Workshop. May 30, 2015
11.	Dr. M. Anwar-ul-Haq Institute of Soil & Environmental Sciences, UAF	Celebration of World Environment Day June 05, 2015 with following activities: <ul style="list-style-type: none"> <li>• Awareness seminar on Seven Billion Dreams for Sustainable Life Style</li> <li>• Installation of waste bins in the corridor and Admin Block.</li> <li>• Walk at Campus and distribution of brochures.</li> </ul>
12.	Dr. Ashar Mahfooz Department of Clinical Medicine & Surgery, UAF.	Training Workshop for DVM Internees 2015 Through Field Experts June 07-18, 2015
13.	Dr. Muhammad Sohail Sajid Department of Parasitology, UAF	Seminar on Malaria Threat: Status and Future Prospects. June 16, 2015

#### 1.4 List of Foreign Visitors/Experts Invited

Visit of foreign scholars is of utmost importance for faculty development as more people are benefited than the visit abroad of one individual. Foreign experts invited in training workshops/seminars/conferences are sponsored partially/fully as per requirement. Following Foreigner Scientists were invited during 2014-15:

Sr.#	Name of Visitors	Date	Event
1.	Dr. Neil Furey Research Associate, Centre for Biodiversity Conservation Fauna & Flora International (Cambodia) & Royal University of Phnom Penh, Cambodia	September 15-19, 2014	Training Workshop on Bat Research Techniques and Conservation Organized by Dr. Muhammad Mahmood-ul-Hassan Department of Zoology and Fisheries, UAF
2.	Dr. Uwe Richter Instrumentation and RE Expert, Germany	December 16-18, 2014	International Workshop on Renewable Energy Technologies in Pakistan Organized by Dr. Anjum Munir Department of Farm Machinery & Power, UAF
3.	Engr. Michael Hesse, Solar Energy Expert, Gemany		
4.	Prof. Dr. Ali Madaani, Department of Engineering, Nova Scotia, Canada	May 2-14, 2015.	Seminar on Sustainable Use of Soil and Water Resources for Achieving Future Food Security: Challenges and Opportunities Organized by Prof. Dr. Allah Bakhsh, Faculty of Agri-Engineering & Technology, UAF

## HIGHLIGHTS OF SOME EVENTS

**Organizer:** Prof. Dr. Zafar Iqbal Qureshi, Department of Theriogenology, UAF  
**Title of Event:** Training Workshop on Applications of Diagnostic Ultrasound in Animal Reproduction

The training workshop was organized on November 12, 2014. The ultimate aim was to shift the activities of the department to ultrasound imaging instead of conventional rectal palpation method.

#### Outcome of the Event:

This workshop was organized to provide latest information regarding principles and applications of ultrasound imaging in the area of animal reproduction to the staff, postgraduate students of Theriogenology, and field veterinarians working in different organizations. A total of 48 professionals were given demonstration regarding the use of this technique in different conditions. The participants also performed ultrasound scanning on different animals themselves.



**Organizer:** Dr. Syed Asher Mahfooz, Department of Clinical Medicine and Surgery, UAF

**Title of Event:** Internees-Stakeholders Interactive Workshop

The training workshop was organized on March, 05 2015. The objective was professional training of outgoing graduates and identify the job opportunities for them in the industry and to strengthen the linkage with stakeholders.

**Outcome of the Event:**

The objectives of internship program were discussed in detail with stakeholders and interneers. The suggestions of stakeholders were also included in the program. The interneers were accommodated in well reputed organizations and stakeholders provided them conducive learning environment. The private and public stakeholders from all over the Punjab participated in the workshop. The workshop got its objectives in term of training of DVM students and capacity building of stakeholders. All the participating stakeholders acknowledged the effort of Internship Working Group and assured that they will provide good training from their trained persons. The stakeholder were introduced and invited for their requirements and their suggestion were discussed and included. Dr. M. Kashif Saleemi presented the learning objectives of the internship to the stakeholders and interneers. Dr. Muhammad Ashraf from Nestle, Dr. Umar Farooq from DRDF-Nestle and Mian Zahid from JK Brothers Dairies also commented on the internship program and its objectives. From Faculty members, Dr. M. Zargham Khan and Dr. Maqbool Ahmed also participated in the discussion. In the end, Prof. Dr. Zafar Iqbal, Dean Faculty of Veterinary Science also thanked the stakeholders for their participation.



**Organizer:** Dr. Muhammad Shahid Mahmood, Institute of Microbiology, UAF

**Title of Event:** Workshop on Zoonotic and Vector Borne Pathogens

The workshop was organized on March 31, 2015 with the following objectives:

- To train the participants to understand the zoonotic pathogens and their detection in the laboratory
- To enable the participants to protect themselves from the exposure to zoonotic pathogens
- To make the participants capable of training others as resource persons

**Outcome of the Event:**

The workshop participants were trained during five different sessions to have a better understanding on zoonotic food borne bacterial pathogens, brucellosis, tuberculosis, vector borne parasitic diseases and methicillin resistant Staphylococcus aureus, particularly from nasal swab. One-day training workshop on Zoonotic and vector borne pathogens was held at Faculty of Veterinary Science, University of Agriculture Faisalabad on 31st March 2015. Pakistan is a country with high livestock and human density and an assumable frequent interaction of animals with human. Direct contact with animal or food remains the predominant cause of zoonotic diseases. Consequently, there is a high risk for transmission of infectious diseases to human. Zoonotic diseases are of immense public health importance. It has been estimated that 75 % of recently emerging diseases in human has animal origin. There are over 250 infectious diseases that are transmissible from animals to humans, which are called Zoonoses. The organisms causing zoonosis include viruses, bacteria, fungi and protozoa with both domestic and wild animals acting as reservoirs for these pathogens. Therefore, both human and veterinary medical specialists can play important roles in identifying, preventing and controlling zoonotic disease. The workshop was a multidisciplinary event which involved four departments/ Institutes from Faculty of Veterinary Science. This included Department of Pathology, Department of Parasitology, Department of Clinical Medicine and Surgery and Institute of Microbiology.

Hands-on training on diagnosis of Zoonotic and vector borne pathogens was provided to 21 stakeholders from following public departments

- National Institute for Biotechnology and Genetic Engineering, Faisalabad (NIBGE)
- Nuclear Institute of Agriculture & Biology, Faisalabad (NIAB)
- Government College University, Faisalabad
- Allied Hospital, Faisalabad
- Department of Livestock & Dairy Development, District Jhang
- Department of Livestock & Dairy Development, District Faisalabad
- Veterinary Officers (VO) from District Jhang
- Veterinary Officers (VO) from District Sahiwal
- Veterinary Officers (VO) from District Faisalabad





**Organizer:** Prof. Dr. Javaid Akhtar, Institute of Soil and Environmental Sciences, UAF  
**Title of Event:** International Mother Earth Day Celebrations-2015

The event was organized on April 22, 2015. The main objective of the activity was to give awareness to scientists, workers and the general public about Sustainable Management of Nuclear and Urban Waste.

**Outcome of the Event:**

- The participants learnt how to manage Nuclear and Urban waste to sustain soil and environment.
- 65 posters were submitted by the students of various Universities in Faisalabad. The posters were evaluated by three judges from GC University, AARI and UAF. Top three position holders were awarded cash prizes @ Rs.7000, RS. 5000 and Rs.3000, respectively.

**Organizer:** Dr. Muhammad Sohail Sajid, Department of Parasitology, UAF  
**Title of Event:** Seminar on Malaria Threat: Present Scenario and Future Prospects

This seminar intended to achieve the five main objectives:

- To understanding the malaria as a parasitic disease
- To discuss the frequency distribution and associated determinants of malaria in our Society
- To assess role of mosquitoes vectors (ecology to control)
- To find potential areas for control of malaria parasite and vector mosquitoes
- To generate an enthusiastic work force for initiating a thematic research

**Outcome of the Event:**

The seminar provided an opportunity to the Departments of Parasitology, Entomology, CMS, Pathology and Zoology and Institutes of Microbiology and Pharmacy, Physiology and Pharmacology, UAF, NIAB, Faisalabad, NIBGE, Faisalabad, University of Health Sciences, Lahore, Health Department of Punjab, Government College University, Faisalabad, and PMRC, Punjab Medical College, Faisalabad to share the on-going activities with reference to Mosquito and Mosquito borne diseases. The participants maximally attained the benefits through keynote address and lectures of the resource persons and knowledge sharing and brainstorming sessions. All the participants actively participated in question answer sessions with resource persons. At the end of seminar, participants gathered much information about malaria with its determinants especially role of mosquitoes in its distribution. They also acquired fruitful knowledge about the treatment regime and preventive strategies of the disease round the globe in general and in Pakistan specific. Additionally, this seminar provided stimulus for the establishment of collaboration between University departments as well as with other institutions of Punjab on mosquitoes-borne diseases.

**Organizer:** Prof. Dr. Muhammad Younas,  
**Institute of Dairy Sciences (IDS), UAF**  
**Title of Event:** Camel Workshop 2015

The Camel Workshop and CAP meeting was organized by the Institute of Dairy Sciences (IDS) with the help of Camel Association of Pakistan (CAP) on May 30, 2015. The seminar part also covered the reports from different committees, CAP budget affairs, sustainability of DAACHI MILK launched and the venue of next World Camel Day 2015, etc. The event was followed by camel tea and lunch with camel dishes in the Faculty. Despite that day was full of activities at Campus, many Faculty, students and camel lovers attended this workshop. Our guests included farmers from Cholistan, Khanoana Faisalabad, and some special guest from Sindh: Dr Jaimal Dhanani from BBSUAVS and Dr Pershotam Khatri from SAU, Tnadojam. Dr M Ashraf Iqbal Mughal Ex-DLF was the guest of Honor.



**Organizer:** Prof. Dr. Allah Bakhsh,  
**Faculty of Agri-Engineering & Technology, UAF**

**Title of Event:** Seminar on Sustainable Use of Soil and Water Resources for Achieving Future Food Security: Challenges and Opportunities, held on May 2-14, 2015.

**Objectives:**

- Sustainable use of soil and water resources for achieving future food security,
- Improving courses and practicals delivered for undergraduate students of Faculty of Agri-Engineering & Technology, UAF
- Trainer or writing and presenting scientific papers
- Setting goals and vision of WMRC

**Outcome of the Event:**

The collaboration between Dalhousie University, Nova Scotia Agriculture College, Canada and University of Agriculture, Faisalabad, Pakistan may start a new era in water management research. The scheme of study of undergraduate and graduate degree program were improved. Also faculty members and undergraduate and postgraduate students were trained regarding the techniques for writing and presenting scientific papers. During the visit of Prof. Dr. Ali Madani and Dr. Qamar Zaman in water management research center, the future vision of WMRC was framed. Furthermore, research and academic collaboration possibilities were explored.

**Organizer:** Dr. Muhammad Anwar –Ul- Haq,  
Institute of Soil & Environmental  
Sciences, UAF

**Title of Event:** World Environment Day  
Celebrations

The event was organized on June 5, 2015.

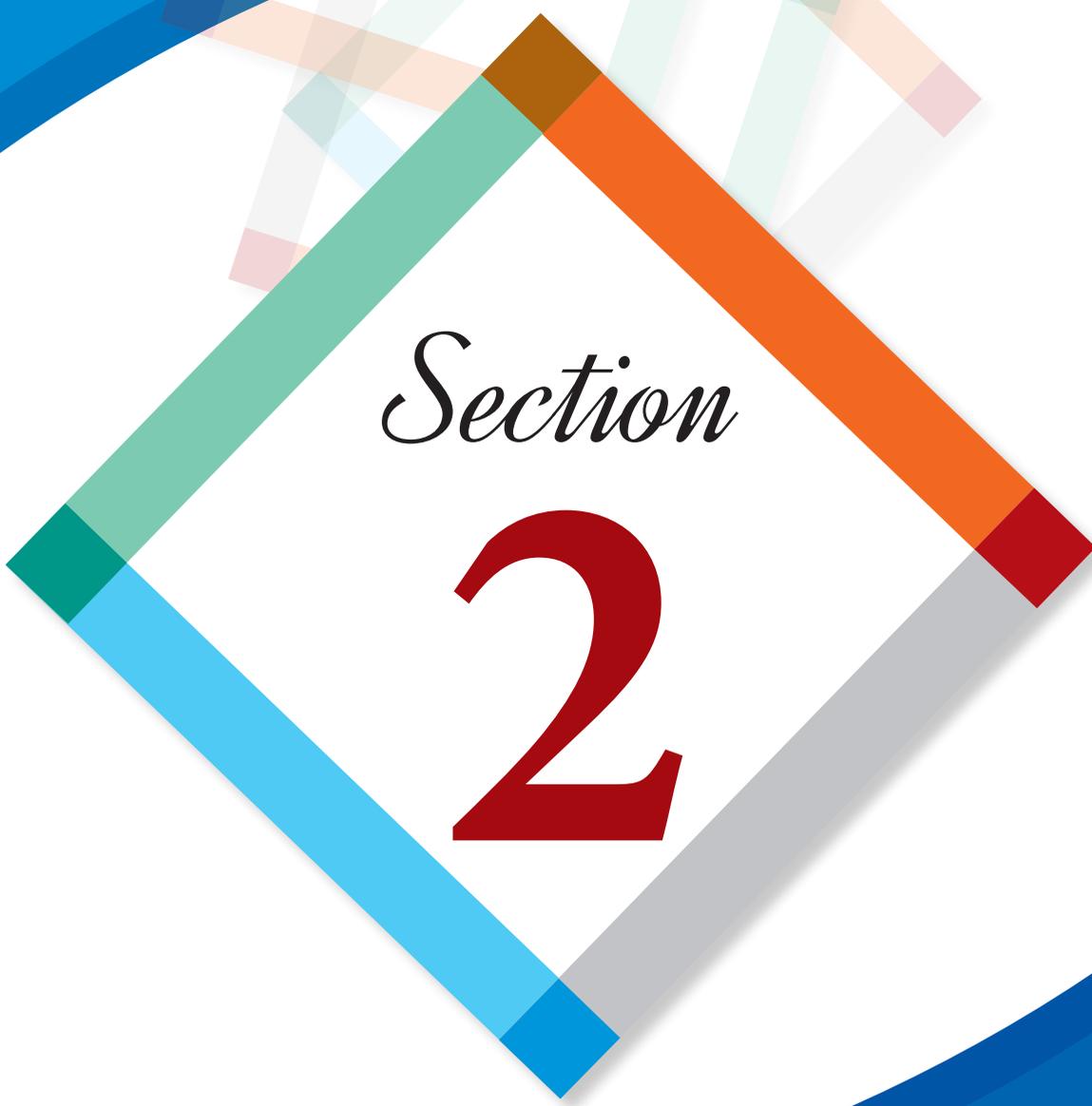
**Objectives:**

- To aware researchers, scholars and public about environmental challenges and its management for sustainable life style
- To Install waste bins at the campus in the corridor University of Agriculture, Faisalabad
- To distribute brochures at campus and surroundings

**Outcome of the Event:**

- The honorable Vice Chancellor Prof. Dr. Iqar Ahmad Khan (S.I) and Professor Emeritus Dr. Riaz Hussain Qureshi joined the walk which included officials from Environmental Protection Agency (EPA), Faisalabad Waste Management Company (FWMC) and doctors of Punjab Medical College (PMC)-Faisalabad. There was wide coverage of this walk by the media.
- 36 Waste collection bins were installed at new campus UAF
- In seminar session, participants learned how to manage seven Billion Dreams for sustainable life style. The invited speaker from PMC, Prof. Dr. Ahmad Bilal delivered a very comprehensive talk for sustainability of life. The representative from EPA Faisalabad, Mr. Shaukat Hayat informed about activities of his department and the ways how to save our environment from different pollution sources.
- The brochures were distributed among the participants i.e students and UAF staff at the campus and especially to the public at the main gate of UAF to aware the peoples about environmental challenges and their remedies.





*Section*

2

**TECHNOLOGY TRANSFER**

Endowment Fund Secretariat accepts proposals for technology transfer from all public entities which demonstrate needed research and development capabilities and financial responsibilities. The portfolio under this component consists of outreach projects, demonstration on campus, organizing Farmers' Fairs/Exhibitions and Horse & Cattle Show.

## 2.1 Evaluation of the Proposals:

The project proposals are processed in accordance with the procedures approved by the BoD as under:

- Invitation of proposals in the National Press.
- Initial evaluation by Endowment Fund Secretariat.
- Review of proposals by two national referees (Nominated by the Chairman BoD/Vice Chancellor)
- Submission of projects to TAC along with recommendations of referees for evaluation.
- Rationalization of the recommended projects by the Committee constituted by the Chairman BoD.
- The rationalized projects are submitted to the BoD for final approval and allocation of budget.
- Implementation Agreement between the executor/PI and UAF.
- Issuance of Administrative approval of the projects and release of funds.

## 2.2 Projects Initiated during 2014-15

Sr.#	Title of the Project	Name of the PI	Duration
1	Demonstration of in vitro Clonal Propagation System in Elite Guava Cultivars	Dr. Muhammad Usman Institute of Horticultural Sciences, UAF	3 years
2	Agricultural Technology Transfer Through Mobile Applications (Apps)	Prof. Dr. Tanvir Ali Institute of Agri. Extension & Rural Development, UAF	1 year
3	Removing Early Fruiting Branches (REFB) at Higher N Dose Improves Growth and Yield of Bt Cotton by Altering its Senescence and Cry1Ac Expression Pattern	Dr. M. Farrukh Saleem Department of Agronomy, UAF	2 years
4	Low Cost Agrowaste Biosorbent Technology for Removal of Heavy Metals	Dr. Raziya Nadeem Department of Chemistry, UAF	1 year
5	Transfer of Viticulture Technology to the Farmers in Pothwar Region	Prof. Dr. Nadeem Akhtar Abbasi PMAS-Arid Agriculture University, Rawalpindi	2 years

## 2.3 Projects Completed during 2014-15

Sr.#	Title of the Project	Name of the PI	Duration
1	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 Directorate of Farms, UAF	5 Years
2	Technology Transfer through Cyber Extension: Helping Communities to Help Themselves	Dr. Babar Shahbaz Department of Agri. Extension, UAF.	3 Years
3	Creating Knowledge-Based Society through Agricultural Technology Transfer via FM Radio	Prof. Dr. Tanvir Ali Division of Education & Extension, UAF	2 Years
4	Establishment of Integrated Farming Facility for Crops/Vegetables, Fish and Livestock at Proka Farms of University of Agriculture, Faisalabad	Executive Director, EFS, UAF (Coordinator)	3 Years

5	Establishment of Fish Farming Facility in Integration with Poultry/Crop Farming at Proka Farms University of Agriculture, Faisalabad	Prof. Dr. Muhammad Javed Department of Zoology & Fisheries, UAF	3 Years
6	Establishment of Poultry Farming Facility in Integration with Fish/Crop Farming at Proka Farms University of Agriculture, Faisalabad	Prof. Dr. Ahsan-ul-Haq Department of Poultry Science, UAF	3 Years

#### 2.4 Ongoing Projects during 2014-15

Sr.#	Title of the Project	Name of the PI	Duration
1.	Introducing Farmers with UAF-11: A Brassica Oilseed Elite Line of the University of Agriculture, Faisalabad	Prof. Dr. Hafeez Ahmad Sadaqat Department of Plant Breeding & Genetics, UAF	3 years
2.	Integrated Control of Drug Resistant/ Susceptible Worms of Goat by Targeted Selective Treatments Using FAMACHA	Dr. Zai Ud Din Sindhu Department of Parasitology, UAF	3 years
3.	Establishment of Mushroom Cultivation Unit for Demonstration and Growth Trials of Wild and Exotic Mushrooms	Prof. Dr. Muhammad Asif Ali Institute of Horticultural Sciences UAF	3 years
4.	Improving Farmers' Profitability and Human Nutrition through Popularization of Carrots	Prof. Dr. Muhammad Amjad Institute of Horticultural Sciences, UAF	3 years
5.	Demonstration of Resources Utilization Efficiency for Citrus and Mango Plants under Drip Irrigation at PARS	Dr. Saeed Ahmad Institute of Horticultural Sciences, UAF	3 years
6.	Spring and Winter Flower Exhibition/ Demonstration for Transfer of Technology at UAF	Dr. Atif Riaz Institute of Horticultural Sciences, UAF	3 years
7.	Demonstration/Dissemination of Promising Ber Cultivars in Marginal Land in Distt. Faisalabad	Dr. Saeed Ahmad Institute of Horticultural Sciences, UAF	3 years
8.	Quantification of Agro-Forestry Services and Increment in Agro-forestry Area in Distt. Khushab through Participatory Approach	Dr. M. Farrakh Nawaz Department of Forestry, Range Management and Wildlife, UAF	3 years
9.	Establishment of Crop, Seed and Weed Museum	Dr. Hassan Munir Department of Agronomy, UAF	3 years
10.	Demonstration of Technology of Silymarin Extraction from Milk Thistle	Prof. Dr. Khalil-ur-Rehman Department of Biochemistry, UAF	3 years
11.	Dissemination of Seed Production Technology of Important Vegetable Crops	Dr. Khurram Ziaf Institute of Horticultural Sciences, UAF	3 years
12.	Dissemination of Seed Production Technology of Alfalfa	Mr. Qamar Shakil Fodder Research Sub-Station, AARI Faisalabad	3 years
13.	Demonstration and Control of Mango Mealy Bug ( <i>Drosicha stebbingi</i> Green) at the University of Agriculture Faisalabad Using Funnel Type Slippery Trap (an innovative technology)	Prof. Dr. Rashid A. Khan Department of Forestry, Range Management and Wildlife, UAF	3 years
14.	Transfer of Animal Health Related Technologies to Farmers by Involving DVM Students	Prof. Dr. Ghulam Muhammad Department of Clinical Medicine and Surgery, UAF	1 year

15.	Demonstrational Hydroponic Model of Vegetable Production under Shade House	Prof. Dr. Rai Naiz Ahmad Vice Chancellor, PMAS-UAA, Rawalpindi	1 year
16.	Construction of Bag Type Biogas Plant at University of Agriculture, Faisalabad	Prof. Dr. Muhammad Iqbal Faculty of Agri. Engg. and Tech. UAF	1 year
17.	Establishment of Date Palm Germplasm Unit	Mr. Summar Abbas Naqvi Institute of Horticultural Sciences, UAF	3 years
18.	Rain Water Harvesting for Groundwater Recharge	Prof. Dr. Allah Bakhsh Department of Irrigation and Drainage, UAF	1 year
19.	Technology Transfer to Citrus Growers in Relation to Changing Cultivars in Existing Citrus Orchards through Top Working	Dr. Muhammad Jafar Jaskani Institute of Horticultural Sciences, UAF	3 years
20.	Water Economics of Growing Basmati, Hybrid and Coarse Rice in Punjab, Pakistan	Prof. Dr. Muhammad Ashfaq Institute of Agri. and Resource Economics, UAF	1 year
21.	Improvement of Beetal Goats and Indigenous Chicken through Availability of Superior Sires	Prof. Dr. Muhammad Sajjad Khan Department of Animal Breeding and Genetics, UAF	2 years
22.	Direct Seeding of Rice: A New Option in Rice-Wheat Cropping System in Central Punjab	Dr. Nadeem Akbar Department of Agronomy, UAF	2 years

#### 2.4 Projects Review Workshop

A Project Review Workshop was organized on June 17, 2015 by Endowment Fund Secretariat at UAF. All the concerned PIs/Deans/ Directors were invited to review the progress and share the achievements of recently completed and ongoing projects (which had completed at least one year).



## PROGRESS AND ACHIEVEMENTS FROM SOME OF THE PROJECTS

### Introducing Farmers with UAF-11: A Brassica Oilseed Elite Line of the University of Agriculture, Faisalabad

The spreading of seed of this line was achieved in Punjab, in other provinces of Pakistan and also other countries like China and India. The outreach work in all districts of Punjab was accomplished through brochures, banners, electronic and print media, talks and visits to the farmers and farmers' days at campus and outside campus. The seed of UAF-11 was multiplied at campus/PARS under the direct supervision of the breeding team every year. The seed was also multiplied at farmers' fields to meet the ever increasing demands.

The seed was also gifted to the farmers, visiting University of Agriculture, Faisalabad during Rabi Mela and other events. Thousands of farmers obtained seed of UAF-11 from the research team, Directorate of Farms and from other farmers of their locality. Demonstrational/ observational plots of UAF-11 were sown at farmers' fields and Govt. farms in all Punjab and the seed was submitted to Federal Seed Certification Department & Research Development for Distinctiveness, Uniformity and Stability evaluation which was completed for two years. The seed was also given to National Agriculture Research Council for National Uniform Rapeseed Yield Trials which have also been completed on multiple locations for one year. The data on yield and yield performance traits at different locations of Punjab were collected and analyzed at local level.



## Improving Farmers' Profitability and Human Nutrition through Popularization of Carrots

Demonstration plots were established to create awareness about modern carrot husbandry, harvesting practices and its marketing. Advanced crop management practices were displayed at these demonstration plots. Local farmers were educated about different steps of quality carrot root and seed production through various visits arranged by the project team.

Fifteen government primary schools were selected at each location (Faisalabad and Layyah) to create awareness about carrot nutrition among school children. Surveys were carried out to assess the present status of nutritional awareness about health and healthy eating. A series of lectures were delivered with special emphasis on the use of carrot in daily diet as the nutritional value of carrot is well established. The response of the students in such activities was fantastic. They were eager to learn about what they eat. The students were raising different vegetables particularly carrots at school level.

In addition to this, farmers of both locations were interviewed to ascertain the present status of carrot production and to select the farmers for the implementation of the improved crop husbandry practices based on their willingness to participate in the project activities. Fifteen farmers were registered for training at each location. The project team is focusing on quality seed production as a mean for quality carrot root and seed production among small land holders/ vegetables growers. Therefore, seed produced from demonstration blocks was distributed among farmers and local people for kitchen gardening.

Several workshops and seminars were organized at both project areas to make people aware of the modern crop production techniques. These technology transfer activities brought about positive changes in the behavior of farming community towards better crop management. The basic purpose of these workshops was to provide opportunities to the farming community to share their own experiences and problems related to their crop for better management of the issues emerging during crop production. Farmers were better educated through such activities like series of visits, workshops, farmers' gatherings and discussion forum about quality seed, modern crop production and seed storage.





### **Direct Seeding Rice, a New Option in Rice- Wheat Cropping System in Central Punjab**

Information regarding direct seeding of rice (DSR) were disseminated to promote its adoption in Rice-Wheat cropping system. Technical knowledge was communicated directly to farmers through different programmes of field visits, farmer days, farmer-to-farmer exchange and distribution of pamphlets. It was all done at the time of harvesting of rice crop when late monsoon would otherwise delay transplanting. Direct seeded rice reduced the use of irrigation water and reduced labour costs. Wet seeding has also an advantage in irrigated rice allowing timely crop establishment with decreased costs.

Weed management options for direct-seeded rice were disseminated to farmers. It was demonstrated that DSR has the ability to produce similar yield as that of transplanted rice with additional benefit of cost-saving technology that saved water and labour efforts. Farmers had observed a shift in weed population and the emergence of new problematic weeds. Farmers were educated about weeds and control strategies such as mechanical and chemical methods to manage specific weeds. Farmers took keen interest in this new technology of direct rice seeding through drill method and were greatly motivated to adopt this technology.



### **Dissemination of Seed Production Technology of Important Vegetable Crops**

To achieve objectives, different aspects of vegetable seed production viz., preparation and plantation of steckling's of root crops, maintenance of isolation distance, plantation of shelter/catch crops to prevent pollen contamination, discard strip technique, rouging methods and stages of rouging, impact of flower/inflorescence position on seed quality and appropriate crop maturity, were elaborated to various groups of farmers from different areas. Farmers were briefed about germination test, harvesting of seed, curing and storage. Farmers were also communicated about various diseases and insect-pests of vegetable seed crops. Early onion production technology was also demonstrated to farmers. A group of females from rural areas of Tehsil Kamalia was trained in sowing of seed for onion set nursery and briefed about the complete production technology of onion set crop. A group of visitors from Balochistan was also given demonstration about seed production technology of vegetable crops. Seed production technology of carrot, okra, and pea was published in Urdu and distributed among farmers. Moreover, vegetable seed crops (carrot, radish, pea and okra) were grown on sub-campus Depalpur. Farmer's participatory workshops were held at main campus of UAF and at sub-campus Depalpur in which the above mentioned technology of seed production was demonstrated to farmers. Researcher of a private seed company from Arifwala also visited UAF to seek seed production technology of root vegetable crops. He was provided the necessary information and related literature.

Seed of radish, carrot, turnip, peas, and onion was produced, sold to farmers and income was deposited in the account of Endowment Fund Secretariat, University of Agriculture, Faisalabad. Seed packets of vegetables were distributed among farmers of two flood affected areas namely, 18-Hazari and Bhawana. Seed packets of okra were also distributed among farmers in Kisan Mela (Jashan-e- Baharan) held at University of Agriculture, Faisalabad.



### Dissemination of Seed Production Technology of Alfalfa Crop

More emphasis was given on the selection of soil and plantation of alfalfa crop in isolation for seed multiplication. Farmers were told that sandy loam to clayey loam soil was prerequisite for alfalfa seed production. Heavy soil with efficient drainage system was also suitable for its plantation. Fungicide was used to treat the seed to avoid fungus attack before sowing. Water soaked seed was sown at row distance of 30 cm by seed-drill or 'kera' at sufficient soil moisture. To obtain good germination, pre-sowing irrigation was applied. The crop required frequent irrigations during its early growth period at an interval of about one week but once the plants were established, subsequent irrigations were provided at an interval of 15–20 days during winter and 10–12 days during spring and summer seasons. Optimum germination temperature ranges between 65°F and 77°F. Farmers should ensure optimum seed to soil contact, plant seed not deeper than ½ inch, provision of adequate level of nutrients and minimize risk of soil crusting in order to attain maximum plant population. The farmers were advised to control weeds during the first 60 days to prevent seed loss. New planting should not be harvested until sufficient carbohydrates have been stored in the roots to support rapid regrowth. Depending on growing conditions, this generally occurs around 60 days after emergence. Delaying harvesting beyond 60 days generally does not improve regrowth and may drastically reduce forage yield. The farmers were demonstrated when and how the alfalfa crop must be left for seed multiplication. The last cut of the crop was done up to 30<sup>th</sup> of March and not later than 1<sup>st</sup> week of April in order to ensure good seed setting. After last cut before the crop was left for seed, it was irrigated for maximum sprouting. After that irrigation was stopped in order to limit the vegetative growth. Alfalfa seed fields must be dried before harvest to efficiently separate the seed from the pod and residual plant material. Once the majority of the seed is mature, it should be cut manually and laid in windrows on the stubble to air dry in the field. Any green seed that remains on the plant will continue to ripen (mature) in the windrow. Windrows are ready for threshing when the moisture content of the plant is from 12 to 18 percent. Alfalfa seed is threshed by wheat thresher or manually. Farmers were demonstrated that alfalfa seed must be stored in jute bags after proper cleaning of seed, so that air and light can pass through it.





### **Demonstration/Dessimation of Promising Ber Cultivars in Marginal Land in District Faisalabad (Punjab)**

Peoples of Punjab province are not used to establish ber orchards. Moreover high yielding and attractive cultivars were not available. Different good attractive cultivars have been collected and transplanted in Sq.32, Institute of Horticultural Sciences, University of Agriculture Faisalabad which can be grown in different types of soils successfully. Canopy management was carried out and demonstrated to the growers. Plants height was maintained at 6 and 4 feet. After the proper survey and discussion with farmers at initial stages, four Farmers /growers were convinced to establish a Ber orchard at their farms with Promising Ber Cultivars and to adopt the technology of canopy management. JK Farms Jhumra, Ch. Muhammad Tanveer, Farm, Chak No 25 J. B. Sathoi Wala and Salman Shah Farm, Pansera were selected for the establishment of Ber orchard with promising Ber cultivars. Orchard of Ber in each Farm was established adopting the advanced technology. These cultivars were also transplanted at Paroka 2 in 4 acres during this period and more than five thousand plants of Ber were raised. More than 2000 were grafted and true to type plants were prepared and sold to the farmers. Urdu Brochures were published and farmer's workshop were organized to train the farmers. Byproducts such as Jam and Chatni of Ber fruit were prepared and introduced to increase the return of growers and to create self employment.



### **Technology Transfer to Citrus Growers in Relation to Changing Cultivars in Existing Citrus Orchards through Top Working**

The technology is well taken by the growers with introduction of new cultivars especially the low seeded Kinnow. For growers, a user friendly brochure in Urdu has been published for the better understanding of growers about the technique. Also, a block of 50 citrus trees was top-worked at Horticultural Fruit Garden Sq. No. 32, UAF, which serves as a technology demonstration site. Further, training and demonstration sessions were arranged at grower's property in Sargodha and Layyah districts. The project has strong collaboration with ACIAR funded project 'ASLP Citrus' team who helped in training students and growers.

### **Demonstration of *in vitro* Clonal Propagation System in Elite Guava Cultivars**

Survey of the main guava producing areas including Lahore, Faisalabad and Sahiwal regions have been completed for selection and collection of fruits of elite guava strains for fruit quality analysis. Morphological characterization and fruit quality analysis of 24 strains in 11 Gola cultivars and 28 strains of 10 Surahi cultivars have been completed. Data analysis revealed few better candidate strains in both Gola and Surahi cultivars taken from geographically different localities. The PCA analysis of the data revealed that cv. Surahi strains were more variable and distantly related as compared with cv. Gola strains. The clonal multiplication procedure has been optimized and development of mother plants in selected elite strains is in progress. Additionally, the guava cultivars selected under EFS funded Citrus and Guava Nursery Project (Completed) and the current Guava Clonal Propagation project are being established as germplasm resource in the University gardens for future evaluations. The technology is being demonstrated and disseminated to the progressive growers and other stakeholders through participation in exhibitions, festivals, conferences and web resources.



## Establishment of Crop, Seed and Weed Museum

Crop, Seed and Weed Museum has been established at the U-Road of the University of Agriculture, Faisalabad on an area of 12 kanals to demonstrate crops, seeds and weeds on seasonal basis. Special purpose crops, vegetables, medicinal plants and new crops are also being demonstrated on the site to create awareness among the farming community.

### **Rabi Season Demonstration:**

Rabi plantation is comprised of Wheat, Oat, Barley, Gram, Lentil, Canola, Raya, Toria, Taramera, Gobi Sarsoon, Desi Sarsoon, Safflower, Lucern, Berseem, Shaftal, Sugarcane, Quinoa, Camelina, Soy, Fenal, Methay, Methi, Niaz boo, Kalwanji, Ajwain, linseed, Aloe vera, Onion, Garlic, Corriander, Babchi, Unth chara, Wild and Paper mint, Lemon grass etc. As far as the Zaid Rabi crops are concerned, Sunflower, Maize, Potato, Peas, Pigeon peas, Clusterbean, Soybean, Moth, Mashbean, Mungbean, Sesame, Tomato, Tobacco, Sorghum, Millet, Strawberry, Bitterguord, Radish, Cabbage, Turnip, Sugarbeet, Sugarleaf (stevia), variety of cucurbits, Okra, Melon and Water melon, Brinjal (egg plant) etc. were cultivated.

### **Kharif Season Demonstration:**

For Kharif cultivation, Rice, Cotton, Guar, Sesame, Mungbean, Mashbean, Pigeon pea, Moth, Clusterbean, Soybean, Jute, Sunhemp, Rhodes' grass, Castorbean etc. are being cultivated. In addition to crops, the museum has been being decorated with the seasonal vegetables. Face uplift has also been done with the help of special purpose crops such as Poppy, Strawberry, Broccoli, Bok choy, Red cabbage, Iceberg and Chinese cabbage.

### **Visitation:**

The museum remained the source of attraction for a mixed community at the campus as well as it attracted many of the progressive farmers, local and foreign visitors, students of other universities and schools etc. Different farmers, progressive growers, study visitors of Gilgit Bultistan Agriculture Department, University of the Punjab students, Haji Sons Pvt. Limited Chiniot, Jaffar Brothers, Kanzo (Avoyl group) and International Delegates of different conferences visited the museum through arrangements of special visitors and kissan melas at the project site. The museum is presentation worthy at the moment from the agri-tourism view point.





## Establishment of Date Palm Germplasm Unit

Sharing of planting material is limited between different date palm growing regions of Pakistan. Farmers are bound to one window varietal selection. On the other hand, date palm is being propagated both sexually and asexually which are more adopted propagation methods in Pakistan. Propagation through seeds results as chance seedlings. Suckers are the only available best propagation material for sustainable orchard. Generally, date palm starts to produce suckers at the age of 8-10 years and produce probably 25-40 suckers at the base or top in the whole life span depending on cultivars and cultural practices. Suckers remain attached to mother plant for 3-4 years to attain appropriate maturity, size and enough root system so that they can survive independently. After that, they are detached from mother plant and planted in the new place. Aerial suckers almost destroy due to failure in root development. During first year (2013-2014), germplasm collecting trips were concentrated towards important date palm growing regions of Punjab (Muzafargarh, Dera Ghazi Khan, Multan, Layyah, Bahwalpur, Rahim Yar Khan, Jhang, Shorkot) and Dera Ismail Khan (Panyala and Dhakki). Important date palm accessions depending on their fruit color and taste were marked and further collection was made from visited regions escaping flooded areas. In total, 35 different cultivars were conserved at PARS-UAF. The collected material includes female as well as male plants. Good agronomical practices were adopted. During first year of the project, 99 % survival rates of the suckers were observed.



## Rain Water Harvesting for Groundwater Recharge

Thirty years' (1983-2013) rainfall data for Faisalabad City of one day maximum rainfall events were studied using normal, log-normal, log-pearson type III and gumbel distributions. Log-normal distribution was found to be the best fit for the study area. The analysis revealed that one day maximum rainfall varied from 24 mm to 102 mm, which has the potential for rainwater harvesting (RWH). Keeping in view the rainfall analysis, RWH system was designed and installed to collect rooftop rainwater.

The roof top area of the selected lecture rooms in the Faculty of Agri. Engineering and Technology, was 626.75 m<sup>2</sup> having dimensions of 54.5 x 11.5 m. The collected data of rainfall-runoff showed the harvesting coefficients of 0.6 to 0.7 and an event of 17 mm with rainfall intensity of 1.7 mm/min was enough to fill two tanks of 1000 gallon capacity each. The collected rainfall water was used to recharge groundwater using three pits of 4 x 3 x 5 ft of length, width and depth, respectively in size along with having bore depth of 25, 35 and 45 ft. The first pit of 25 ft bore depth had blind pipe of 15 ft and 10 ft gravels with 4 inch PVC pipe showed recharge rate of 6.5 lpm. The second pit of 35 ft bore depth had same size of blind pipe followed by 20 ft screened pipe, showed recharge rate of 47.2 lpm whereas the third pit had blind pipe of 20 ft with screened pipe of 25 ft showed recharge rate of 52.2 lpm. The results indicated that RWH has potential to recharge groundwater under conditions similar to those of the study area.





### **Integrated Control of Drug Resistant/Susceptible Worms of Goat by Targeted Selective Treatments Using FAMACHA**

In present study, trials for diagnosis of anthelmintic resistance were carried out at public and private farms and farmers were advised to change the drug in future where resistance was found. FAMACHA system was standardized for Pakistani breeds of sheep and goat. This system has been evaluated for use in Beetal breed of goat and Kajli, Lohi and Thali breeds of sheep in Punjab. Farmer's days were also organized to educate the farmers regarding targeted selective treatment and use of FAMACHA system. So far, more than 50 farmers have been trained for use of FAMACHA system at selected project sites in District Faisalabad. Similarly, anthelmintic activity of Coper Oxide Wire Particles (COWP) was evaluated at Livestock Production Research Institute (LPRI), Bahadurnagar, Okara in Beetal breed of goat. After initial evaluation of anthelmintic activity of COWPs, free treatment was provided at farms included in the project area. Farmers are now fully trained in using FAMACHA system and convinced for using new treatment method i.e. use of COWPs for control of drug resistant *Haemonchus contortus*.

### **Transfer of Animal Health Related Technologies to Farmers by Involving DVM Students**

DVM students under the supervision of their teachers from Department of Theriogenology, Clinical Medicine and Surgery visited various livestock farms and veterinary hospitals in the periphery of Faisalabad metropolis. Visited places are as under:

1. Malakanwala veterinary hospital
2. Veterinary hospital, Ram Dewali
3. Veterinary hospital cattle colony
4. Veterinary hospital Judgewala
5. Satellite Veterinary Clinic, PARS
6. Gutwala Wildlife Park
7. Chawala Dairy Farm
8. Paroka Farm
9. Chak No. 88 G.B.
10. S.B. Farm, near Pensra
11. Semen Production Unit Qaider Abad, District Sahiwal.

On each visit, the students and their instructors spent the whole working day in treating the animals at the above mentioned sites. Students got the opportunities to treat various animal diseases including mastitis, chronic diarrhoea, parasitism and drenching pneumonia. Students also got the opportunities to perform pregnancy diagnosis, handling of dystokia and to treat the cases of endometritis etc. The farmers were also trained in animal health related technologies such as drenching of medicine, application of surf field mastitis test. The female students interacted with women folks and transferred animal health related technologies to the women who share a major responsibility of animal health management.

The students visited the semen production unit Qadirabad, District Sahiwal where they were shown the cryopreservation of semen as this facility is lacking at Department of Theriogenology. DVM students also visited different livestock farms where they witnessed the modern management practices.





### **Creating Knowledge-Based Society through Agricultural Technology Transfer Via FM Radio**

The FM radio has been installed at UAF campus. It was inaugurated on August 14, 2012. Material concerning the assessed needs of the clients in the FM radio area coverage was broadcast. Scientific information related to various disciplines of agriculture, veterinary medicine, agri. engineering, social issues and related sciences was disseminated in the form of talks, discussion, news items and live shows.

Research, education and extension linkages were strengthened by planning and conducting meetings and discussion sessions. Radio programs prepared by the Department of Agriculture (Information), Government of the Punjab, are also being broadcast by FM radio of the University. This is a program of two hours duration. The radio broadcasts developed scientific attitudes among listeners and created thrust of scientific knowledge for solving life problems. The timely supply of information enabled them to cope with emergencies and vulnerabilities. FM radio also served as a laboratory for Agri. Extension students. They were involved in planning, conducting, and broadcasting radio information. Farmers' talks were broadcast to share their knowledge and experience with rest of the community. All this resulted in creation of knowledge based and knowledge led society in the vicinity of UAF FM radio with a frequency of 100.4MHz.



## Technology Transfer through Cyber Extension: Helping Communities to Help Themselves

The Cyber Extension Laboratory has been established at the Institute of Agricultural Extension & Rural Development, UAF. The laboratory is hub of ICT based extension and outreach activities. The online queries received from the farmers are received and sorted-out at this laboratory and then forwarded to the relevant expert(s). The laboratory is also offering SMS services to the farmers.

Two village information centers (VICs) have been established under the project:

- i. Chak # 420 GB Tandlianwala, District Faisalabad
- ii. Pul Rango, District Khanewal (Field Unit Barkat Project, NGO World Foundation)

These VICs are equipped with computer and internet facilities and are providing information to the farmers. VICs are connected with the cyber extension center at the UAF. The farmers register their queries in these centers and the relevant expert from UAF respond these queries in shortest possible time.

An information portal ([www.zaraibaithak.com](http://www.zaraibaithak.com)) has been established in collaboration with M/S Pak Kissan (Pvt.) Ltd., Lahore, and Punjab Agricultural Department (Extension wing). This initiative is a two-way information sharing system. The system is working as follows.

The farmers in the selected villages send their queries and questions through the VICs located in the selected village. The unit operators forward these queries through the information portal to the moderators. The moderators send these queries to the related subject matter experts who post the answers on the portals and moderators inform to the concerned Unit Operator in the village. Computer literate farmers can also directly send their questions. Experts from various disciplines from UAF and Punjab Agri. Department, respond the farmers' queries.





### **Establishment of Mushroom Cultivation Unit for Demonstration and Growth Trials of Wild and Exotic Mushrooms**

Demonstration facilities were established to train people. Building was modified from glass house into 2 mushroom growth rooms, a store room and a pasteurization room. We found and collected about more than fifteen (15) different species of mushroom from Murree, Nathya Gali, Abbottabad and Islamabad while we found different strains of ganoderma mushroom from Changa Manga forest. Pure cultures of six button and six oyster mushroom strains have been imported from Holland by personal efforts of principal investigator, Prof. Dr. Muhammad Asif Ali and are being tested in the facility.

Concurrent with growth trials, training sessions, each of one week, are being organized for willing persons at UAF. Candidates from regular gardener courses, who are willing to learn, are being trained in project. These skilled persons are required by progressive farmers to run their farm activities. About 10 persons have been educated about farm activities and can handle responsibilities of a commercial mushroom farm.

Project team has established four model farms in different cities in private sector and a spawn producing laboratory in Faisalabad. Six commercial button mushroom farms and one mushroom spawn lab. have been established as under:

- i. Margalla mushroom farm
- ii. Zahid mushroom farm
- iii. AANN mushroom farm
- iv. Mellow mushrooms
- v. Anmool Mushroom farm
- vi. Arora mushroom farm
- vii. UA mushrooms spawn lab



**Demonstration and Control of Mango Mealy Bug (*Drosicha stebbingi* Green) at the UAF using Funnel Type Slippery Trap (an innovative technology)**

This project is based on an innovative environment friendly technology which gives complete non-chemical control of mango mealy bug with Funnel Type Slippery Trap (FTS trap) installed on mango tree trunks. In previously used methods (Sticky Bands and Slippery Bands), the bug nymphs were only restricted to reach the tree crowns via stem as control measure. While FTS traps work both ways, effectively restrict crawling up of the bug nymphs toward tree crowns and also entrap the egg carrying mango mealy bug females (each female carry up to 450 eggs) while coming back to the ground for egg laying thus ensure complete control of the pest. Under this project, effective control of this insect pest has been achieved in the area of mango garden Square No. 9, individually grown mango trees in the area of New Campus and along Main University Road.

Accordingly, FTS technology was effectively used (demonstration effort) to exterminate mango mealy bugs from the selected gardens of villages i.e. Pundori Chak No. 81 JB, Rehmoana Chak No. 199 JB, Weroana Chak No. 33 JB, Chak No 117 GB, Buralli Chak No. 19 JB and Dhmeray 132 JB in District Faisalabad.





### **Quantification of Agro-Forestry Services and Increment in Agro-Forestry Area in Khushab District through Participatory Approach**

Data regarding the role of agroforestry in farmers' socio-economic conditions have been collected from 200 farmers of project area. Direct services (Wood and non-wood products) and indirect services (environmental benefits at local and regional scale) have been quantified. Farmers are getting 12 times more income from woody plantation on their farmlands as compared to mono gram cultivation. Furthermore, woody vegetation in Noor Pur Thal region have reduced sand dunes and are playing a vital role in the soil conservation and soil amelioration. It was estimated that, in Noor pur Thal region, actual woody plantation (mostly consisting of *Eucalyptus camaldulensis*) has carbon stocks equal to 1.8 Mega tons but has the potential of sequestering 18.5 Mega tons of CO<sub>2</sub> annually worth US\$ 1459 millions.

It was estimated that the selected project area in Khushab District has the woody vegetation cover of 19.47% but has the potential of 55%. Farmers are highly convinced for land use change in favor of woody vegetation. Nursery has been raised and 50,000 plants have been provided to farmers free of cost at their fields for the compact plantations of 68 acres. Planted trees have been monitored regularly. Several Farmers' meetings and Farmers' days have been organized to share the views and to visit the model farmlands. Farmers' trainings have been organized on Nursery raising for *Eucalyptus camaldulensis*. One seminar was organized on 13-05-2015 at UAF, Faisalabad.



### Demonstration of Technology of Silymarin Extraction from Milk Thistle

Evaluation of seed priming techniques and effect of slow release urea on production of milk thistle was conducted during first year of the project. Within 2-3 weeks about 90-95% germination was observed. Nitrogen fertilizers with urease inhibitor significantly affected different growth parameter of the milk thistle plants. To see the growth potential of milk thistle in various zones, the field experiments were planned at UAF, PARS, Farooqabad, AARI, Chakwal and Karor. It is very interesting that the seed of milk thistle at all places were germinated, though the rate and germination varied from one to another place, perhaps due to the effect of temperature, soil characterization etc.

The silymarin was extracted from seeds of milk thistle by applying various techniques and varying different solvents. Extraction with soxhlet and microwave assisted proved better as compared to the other regarding % yield of silymarin. Methanol was solvent of choice for maximum extraction of silymarin. Quantification and characterization of silymarin was performed through Spectrophotometer, HPLC and LC-MS. In both spectrophotometric and HPLC quantification, silymarin contents were found better in extracts prepared with methanol by soxhlet and microwave assisted extraction technique. LC-MS analysis revealed that different flavonoids like silycristin, isosilybin A&B, silydianin, silybin A&B were present in the indigenously extracted silymarin.

The presence of variety of medicinally important flavonoids in the locally extracted silymarin is good index as many of them have been reported in literature possessing hepatoprotective potential. The importance of milk thistle is also endorsed with presence of essential oil being important pharmaceutical entities. In addition to silymarin many beneficial fatty acids were also identified in seeds of milk thistle. Furthermore, fatty acids were identified through GC/GC-MS analysis in seeds of milk thistle. Stability of silymarin is important issue of herbal pharmaceutical industries. Silymarin was found stable at temperature upto 30°C and humidity level upto 30%. Silymarin showed high stability at pH range 6-7. Shelf life of indigenously extracted silymarin was more than six months at room temperature. Furthermore the efforts made for the preparation of nanoparticle and suspension of silymarin is no doubt will be another attraction for herbal pharmaceutical industries.

## Development, Fabrication, Installation and Operation of Biogas Plants at UAF

The biogas system comprised of two cylindrical fermentation chambers/digesters (floating drum type) having capacities of 40 and 25 m<sup>3</sup>. The height and depth of 40 m<sup>3</sup> fermentation chamber are 4.1 m and 3.8 m while the height and depth of 25 m<sup>3</sup> digester are 3.8 m depth and 3.2 m dia. The daily feeding rate (animal dung) of 40 and 25 m<sup>3</sup> fermentation chambers are 650 kg and 400 kg, respectively. Total biogas produced per day was found to be 36.75 m<sup>3</sup> under the existing condition of the plant. In order to purify the gas from water contents and H<sub>2</sub>S, the system is equipped with dehumidifier and scrubbing unit to prevent the engine from corrosion effects. About 20 kg Silica gel is used in dehumidifier which absorbs the moisture from the biogas while 10 kg iron wool is used to absorb H<sub>2</sub>S from the gas. A reciprocating compressor is used to suck the biogas from the plants and stored at 5 bar pressure in the two gas storage tanks. These two tanks are sufficient to run the 20 hp tubewell for 6 hours continuously at 70:30 biogas-diesel ratio and discharge of the pump was recorded as 0.75 cusec. The specific gas consumption of the biogas plant is 0.3 m<sup>3</sup> hp<sup>-1</sup> h<sup>-1</sup> at 70:30 biogas–diesel ratio. This biogas operated tubewell is used to irrigate the farm area of the University. In addition to biogas, slurry benefits are additional and used as a farmyard manure to promote organic farming. A 12 kW dynamo is also coupled with the diesel engine to generate the electricity for farm electrification.



## 2.5 Outreach Activities during 2014-15

The University Outreach Program initiated as a project during 2010-11 was converted into a Program with recurring budget under Technology Transfer Component. Under this program, faculty members submit a proposal for an activity ranging from one day to one week. Under outreach program, proposals may cover hands-on trainings, demonstrations, farmers' gatherings, exhibitions and lectures/seminars for the awareness/sensitization of the community.

These programs have received enormous response and have been highly admired. The outreach activities conducted during the year 2014-15 are as under:

Sr.#	Name & Department	Title	Venue
1.	Prof. Dr. M. Aslam Pervez Institute of Horticultural Sciences, UAF	Distribution of Vegetable Seeds in Flood Affected Area at Two Sites (18 Hazari & Bhawana) November 11-14, 2014	Iqbal Auditorium UAF
2.	Dr. Sajid Mahmood Nadeem Sub-Campus Burewala	Wheat Crop Management for Enhanced Productivity November 29, 2014	Burewala
3.	Mr. Mudassar Nazar UAF Sub-Campus Burewala	Livestock Management for Enhanced Productivity March 16, 2015	Burewala, Vehari
4	Dr. Waseem Ahmad Business Incubation Center, UAF	Horse & Cattle Show 2015 March 05-08, 2015	Race Course, Lahore
5.	Dr. Waseem Ahmad Business Incubation Center, UAF	The Dawn Sarsabz Pakistan Agri Expo 2015 March 19-20, 2015	Johar Town Expo Center, Lahore
6.	Prof. Dr. Muhammad Amjad Director, I.H.S, UAF	Distribution of Vegetable Seeds to Farmers in Kisan Mela March 21-23, 2015	UAF
7.	Mr. Farooq Hassan Business Incubation Center, UAF	The News Education Expo 2015 May 30-31, 2015 The News Education Expo 2015 June 2, 2015	Pearl Continental, Lahore Garvesh Hotel, Fsd.
8.	Prof. Dr. Tanweer Khaliq Institute of Pharmacy, Physiology and Pharmacology, UAF	Rational & Irrational Use of Drugs June 12, 2015	District Hafizabad

## HIGHLIGHTS OF SOME EVENTS

**Title of Event:** Distribution of Vegetable Seeds  
in Flood Affected Area

**Name of Organizer:** Dr. Muhammad Aslam Pervez,  
Institute of Horticultural  
Sciences, UAF

**Date:** November 11-14, 2014

**Location:** UAF

Seed of vegetables (radish, spinach, carrot, turnip) were distributed among farmers of flood affected area in 18-Hazari and Bhawana. Heavy flood destroyed large cropped and vegetable area. University of Agriculture, Faisalabad continued its services to help farmer/vegetable growers of flood affected area who were invited at Main Campus in Rabi Kissan Mela.



**Title of Event:** Wheat Crop Management for Enhanced Productivity  
**Name of Organizer:** Dr. Sajid Mahmood Nadeem, Sub-Campus, UAF, Burewala, Vehari  
**Date:** 29<sup>th</sup> November, 2014  
**Location:** Burewala, Vehari

The seminar was organized at sub-campus UAF, Burewala, Vehari. The objectives were to introduce modern technologies regarding wheat production to increase efficient use, conservation of resources for improved wheat production to meet food security and enhancing fertilizer use efficiency. Wheat management through modern weed and disease control was also discussed.



**Event:** Horse & Cattle Show 2015, Lahore  
**Team Leader:** Dr. Waseem Ahmad, Business Incubation Centre, UAF  
**Date:** March, 05-08, 2015  
**Location:** Lahore

Horse & Cattle Show 2015 was organized by Agriculture Department, Government of Punjab, at Lahore from March, 05-08, 2015. The inauguration was done by Secretary Agriculture, Government of Punjab, Lahore. The objectives of participation in the event were to attract the farming community through showcasing agriculture innovations and display of university technologies. UAF component in the event created awareness among community about agriculture through a documentary showing use of university technologies and to commercialize university products at national level.



**Title of Event:** Livestock Management for Enhanced Productivity  
**Name of Organizer:** Mr. Mudassar Nazar, Lecturer (Veterinary Sciences),  
Sub-Campus UAF, Burewala, Vehari  
**Date:** 16th March, 2015  
**Location:** Burewala, Vehari

The seminar was organized in the Iqbal auditorium of sub-campus UAF, Burewala, Vehari. The objectives were to introduce modern technologies regarding livestock production for improved milk, meat and eggs production to manage food security and enhance livestock efficiency by adopting best practices and modern techniques. Calf and heifer management and disease control was also discussed.

**Event:** The Dawn Sarsabz Pakistan Agri Expo and Conference 2015  
**Team Leader:** Dr. Waseem Ahmad, Business Incubation Center, UAF  
**Date:** March, 19-20, 2015  
**Location:** Lahore

The Dawn Sarsabz Pakistan Agri Expo and Conference 2015 was organized by The DAWN media group, at Lahore from March, 19-20, 2015. The inauguration was done by Minister of Agriculture. The objective of participation was introduction of UAF innovations to community for attraction and to commercialize university products at national level. The event was helpful to develop networking with agricultural stakeholders.





**Event:**

**The News Education Expo 2015**

**Team Leader:**

**Mr. Farooq Hassan,  
Business incubation Centre, UAF**

**Dates/Locations:**

**1. May 30-31, 2015 at PC, Lahore  
2. June 02, 2015 at Garvaish Hotel, Faisalabad**

UAF was represented in the News Education Expo-2015 at PC Lahore & Garvaish Hotel Faisalabad.

The objectives at both events were to enhance university outreach and to promote new degree programs like BBA (Agri. Business), D-pharma etc. among students. Awareness regarding different scholarship schemes and other services offered at UAF was created to attract the best material in the university to develop a future leadership in agriculture sector.



**Title of the event:** **UAF/FAP Collaborative Outreach for Agro security in Pakistan**

**Organizer:** **Prof. Dr. Asif Ali, Director, ORIC, UAF**

**1. Rice Production Technology**

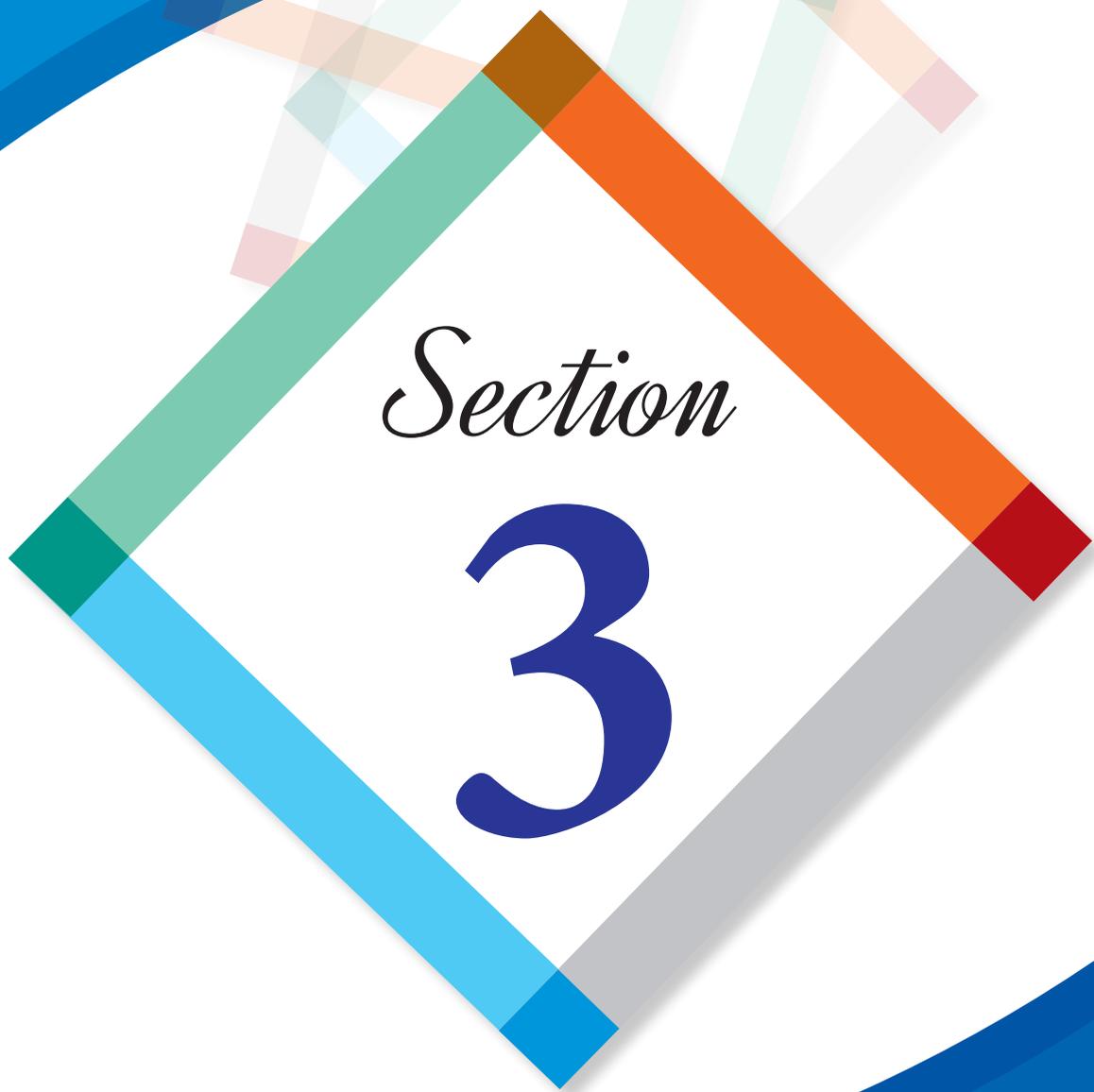
**Date/ Location:** **May 9, 2015 at Hafizabad**

Farmers Associates Pakistan (FAP) in collaboration with University of Agriculture Faisalabad (UAF) arranged the subject activities at Hafizabad and Sadiqabad, respectively. The objective was to create awareness among the farmers to adopt best practices of soil preparation, sowing, transplanting (rice) and harvesting. Thus farmers can manage the whole cultivation cycle of the crop in a profitable manner which will help farmers to get better yield along with high quality of crop.

**2. The Profitable Management of Cotton Crop**

**Date/ Location** **April 26, 2015 at Sadiqabad**

The subject activity for the crop season 2015-16 was arranged at Sadiqabad on Sunday, 26<sup>th</sup> April, 2015 under the UAF/FAP Collaboration. The goal of the event was to create awareness among the farmers to adopt best practices of soil preparation, cotton sowing and harvesting as well as to promote the better cotton standard system, so that farmers can manage the whole cultivation cycle of cotton crop in a profitable manner which will help farmers to get better yield along with high quality of cotton. Ultimately, this will improve the living standard of the farming community.



*Section*

3

**RESEARCH & DEVELOPMENT**

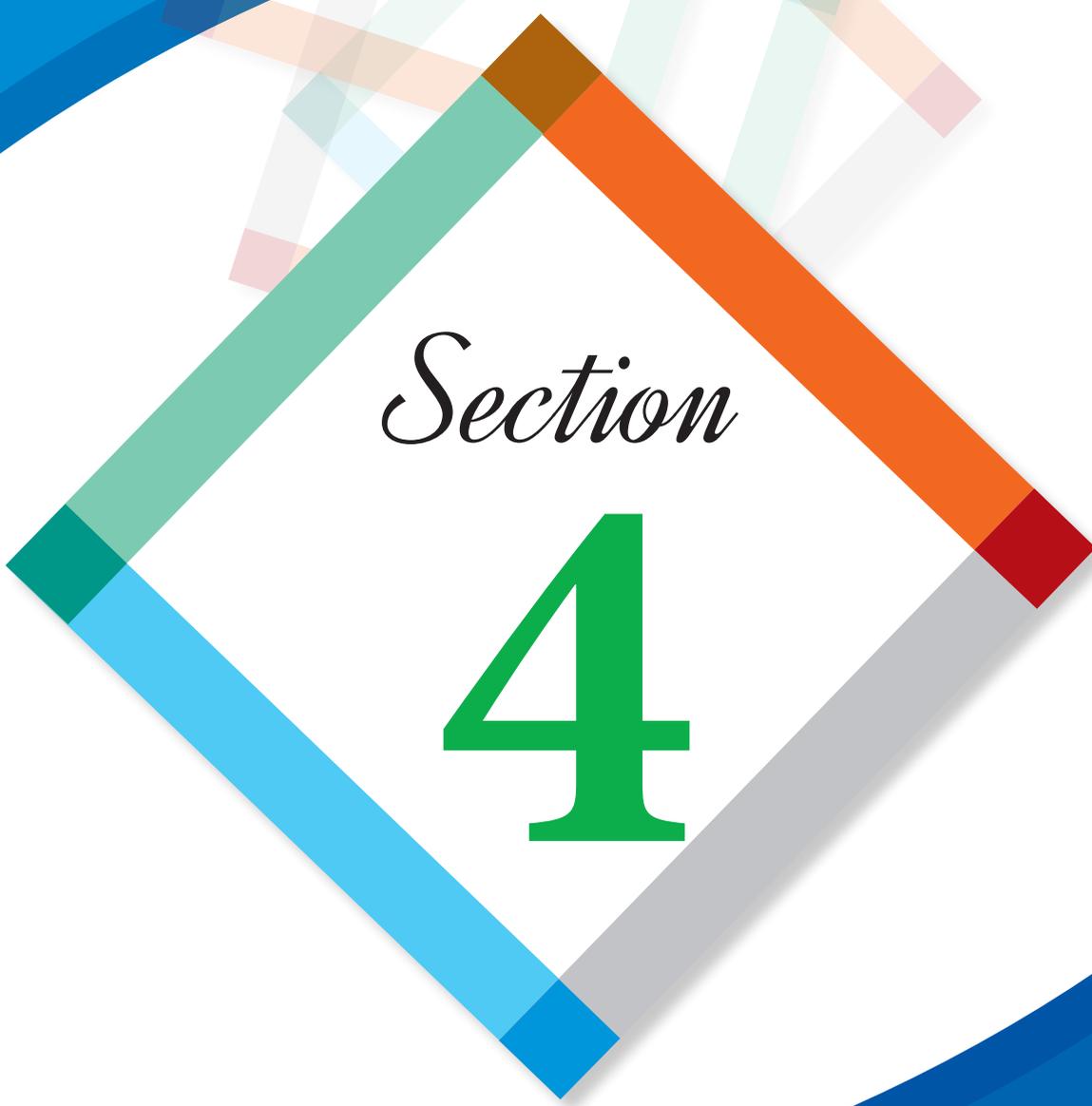
### 3.1 Establishment of BSL-3 Lab.

The Board approved to establish Bio Safety Lab. (BSL-3) in UAF at total estimated cost of Rs. 33.749 million, by pooling the funds from the allocation under R&D Component, EFS and the grant funds (cash prize) received under IDB Science & Technology Award-2012. The construction work started during 2012-13. Some work is pending due to HVAC installation.



### 3.2 R & D Projects initiated during 2014-15

Sr.#	Title of project	Name of PI	Duration
1.	Antibiotic Resistance Profiling of Salmonella Serovars Isolated From Local Poultry Farms	Dr. Aamir Ali NIBGE, Faisalabad	2 Years
2.	In-Vivo Safety Evaluation of Synthetic Food Coloring Compounds	Dr. Zulfiqar Ahmad University College of Agriculture & Environmental Sciences, The Islamia University of Bahawalpur, Bahawalpur.	2 Years
3.	Establishment of Cotton Wild Species Living Herbarium for Demonstration and Research Purpose.	Dr. Amir Shakeel Department of Plant Breeding & Genetics, UAF	3 Years
4.	Varietal Identification and Purity Checking of Wheat Cultivars/ Hybrids Through PCR Based DNA Fingerprinting	Dr. Zulfiqar Ali Department of Plant Breeding & Genetics, UAF	1 Year
5.	Refusal of Cottonseed Cake by the Ruminant Livestock: Is Bt-Cotton the Culprit?	Dr. Iqrar Ahmad Rana CABB, UAF	1 Year



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4

**PRODUCT  
COMMERCIALIZATION**

Commercialization is to convert ideas, research, or prototypes into viable products that retain the desired functionality. Commercialization also involves formulating the manufacturing and supply chain strategies, devising plans, and implementing such plans. For commercialization of cutting edge products and technologies, concept papers are invited from scientists working in the public sector agricultural organizations.

#### 4.1 Project Completed during 2014-15

Sr.#	Title of the Project	Name of PI	Duration
1.	Exhibition Center	Executive Director, EFS	--
2.	Development and Fabrication of Biomass Compactor Machine as Source for Producing Bio Fuel Energy	Dr. Abdul Nasir Department of Structures & Environmental Engineer, UAF	1 year

#### Development and Fabrication of Biomass Compactor Machine as Source for Producing Bio Fuel Energy

In this study, durability, density and compression strength of sawdust, cotton stalks, maize straw and rice straw briquettes at different levels of moisture content, particle size and compression ratio was determined. Maximum durability, density and compression strength of sawdust (94%, 1005 kg<sup>-1</sup> m<sup>-3</sup>, 9.8 MPa), cotton stalks (91%, 1001 kg<sup>-1</sup> m<sup>-3</sup>, 9.5 MPa), maize straw (85%, 998 kg<sup>-1</sup> m<sup>-3</sup>, 8.2 MPa) and rice straw (78%, 975 kg<sup>-1</sup> m<sup>-3</sup>, 7.7 MPa), respectively, was at 12% moisture content, 1:10 compression ratio and 3 mm particle size. The effect of compression ratio was Maximum as compared to moisture content and particle size. It was also found that durability and compression strength of rice straw briquettes was minimum as compared to sawdust, cotton stalk and maize straw briquettes.



#### 4.2 Exhibition Center

Establishment of Exhibition Center is a big milestone of EFS, which was started at Main Campus UAF in December, 2011. This is meant for display/demonstration of developed and tested innovative and cost effective technologies to attract the stakeholders of agricultural industry in the country. The themes of exhibitions will generally be pertinent to educational, economic, social or technological developments. The centre will act as incubator of scientific knowledge. The exhibits will serve as excellent material for complementing science teaching.





#### 4.2.1 Events (rented out)

Following were the commercial activities in the Expo Center:

**Title of the event:** Pakistan HVACR Society Expo  
**Date:** April 2-4, 2015  
**Organizer:** Pakistan HVACR Society, Lahore Chapter  
**Rental Amount Rs.** 16,81,500/-

#### 4.2.2 Events (free of cost)

During the year 2014-15 following events were organized by UAF in the Expo Center free of cost:

**Title of the event:** Iqbal Ka Pakistan  
**Date:** November 10, 2014  
**Organizer:** Miss Uzma Sattar  
**Department:** Computer Science, UAF



**Title of the event:** Food Festival  
**Date:** November 12-14, 2014  
**Organizer:** Dr. Moazzam Rafiq Khan  
**Department:** National Institute of Food Science and Technology, UAF



**Title of the event:** Prime Minister Laptop Scheme Ceremony  
**Date:** November 28, 2014  
**Organizer:** Prof. Dr. Zafar Iqbal Qureshi  
**Department:** Financial Assistance and University Advancement



**Title of the event:** DICE-2015  
**Date:** January 29, 2015  
**Organizer:** Prof. Dr. Asif Ali  
**Department:** Office of Research Innovation & Commercialization, UAF

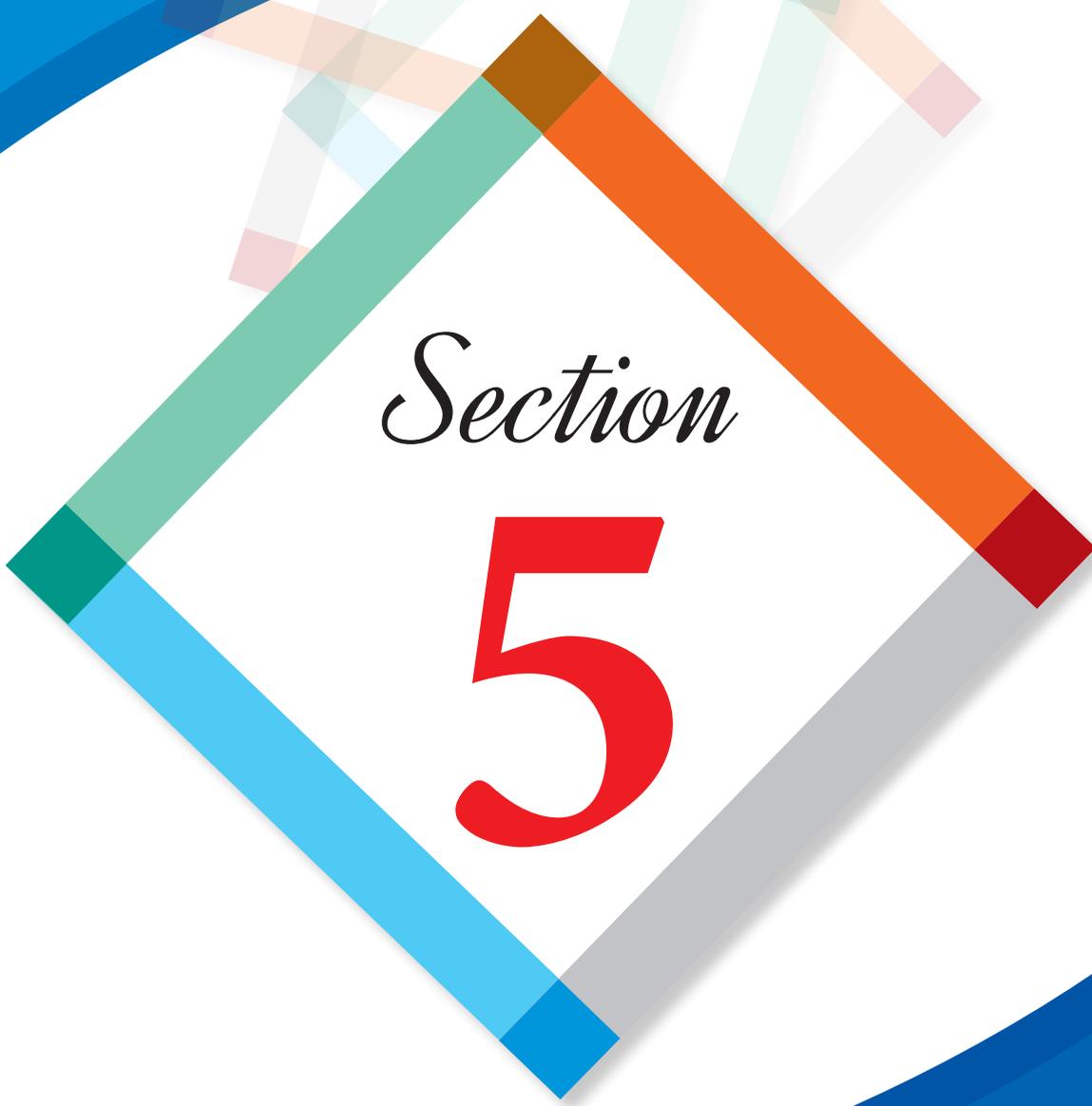


**Title of the event:** University Spring Festival/Kisan Mela-2015  
**Date:** March 20-23, 2015  
**Organizer:** Endowment Fund Secretariat, UAF

### 4.3 Farm Market

Four sheds of Farm Market/Sasta Bazar were established in 2014 and made operational. Director Farms is running the facility.





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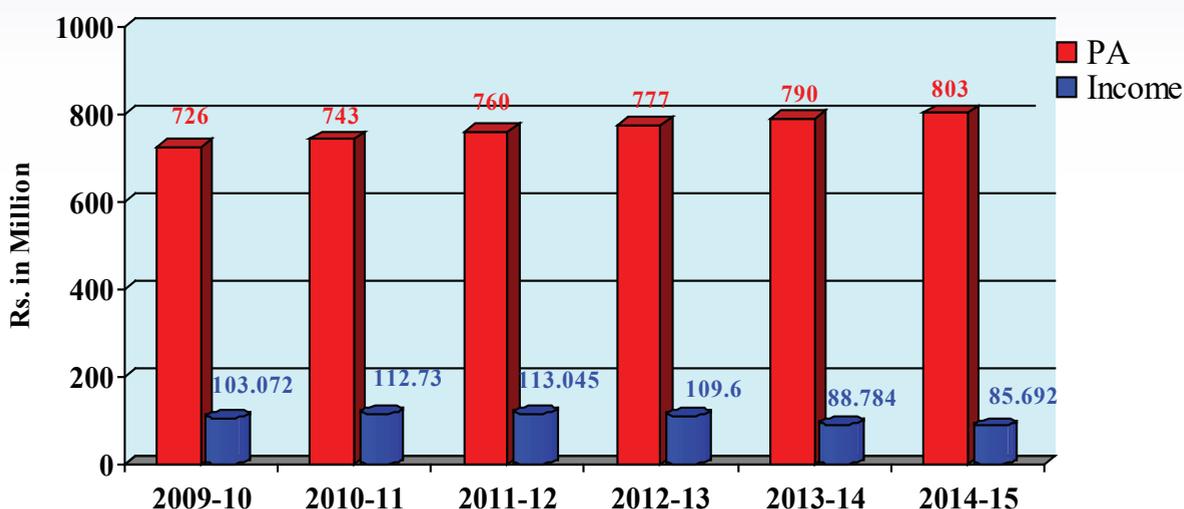
5

**FINANCIAL REPORT**

## 5.1 Investment of Funds

The principal amount of Rs. 650.0 million was invested during 2006-07, which has increased to 803.0 million during the year 2014-2015 as a result of yearly addition @ 15% of the profit on investments to the principal amount to counter the impact of inflation/devaluation of rupee.

Description	Financial Year	
	2013-14	2014-15
Principal Amount	790.000	803.000
Income	88.784	85.692



**Figure 1: Growth of Principal Amount (PA) and Income from Investment**

## 5.2 Expenditure

The Expenditure for the year 2014-15 was originally estimated at Rs. 110.903 million for the five components. However, it is expected to remain at Rs. 69.00 million with savings of Rs. 20.000 million. The less expenditure of Rs. 20.000 million is due to savings in the Exhibition Center and some pending works (HVAC system etc) of Bio Safety Lab-III.

The detail of Revised Estimates for the financial year, 2014-15 are shown as under:

(Rupees in Million)

RECEIPTS	Revised Estimates	ALLOCATION / EXPENDITURE	Revised Estimates
Opening Balance 1st July, 2014	9.611	Faculty Development	4.000
Profit (Investments)2014-2015	86.427	Technology Transfer	20.000
Other Receipts *	5.962	Product Commercialization	19.000
Total	102.000	Research & Development	16.000
Transfer to Principal Amount (15% of the Income from investment)	13.000	Operation EFS	10.000
TOTAL	89.000	TOTAL	69.000
		SURPLUS / SAVINGS	20.000

\*Income from Exhibition Centre, Farmers' Market, ongoing projects and savings from completed projects.