Annual REPORT 2016-17

ENDOWMENT FUND SECRETARIAT
UNIVERSITY OF AGRICULTURE, FAISALABAD

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Lecturer

Contents

VISION

To assist the agriculture sector in becoming competitive, profitable and sustainable through innovation and commercialization.

MISSION

1. To support UAF faculty and the national scientific community working for the cause of agricultural and rural development.
2. To promote competitiveness in agriculture through competitive/ commissioned Research & Development initiatives.
3. To explore ways and means for strengthening of Endowment Fund for Research & Development.

OBJECTIVES

a. To support UAF programs 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 programs 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.

Introduction

Establishment of Endowment Fund at UAF

The Government of Pakistan and United Staes of America signed a US$ 12.4 million Food for Progress Agreement of September 15, 2013. Under this Agreement, the Syndicate under Section 25(2) (i) of the University of Agriculture, Faisalabad Act, 1973 approved to establish Endowment Fund at UAF. The Ministry of Finance transferred Rs. 650.00 million to UAF in 2006. The principal amount is invested in scheduled banks approved by Board of Directors. The income generated is allocated for different activities in line with the Pakistan's long term goals for the agriculture sector which focus on food security, poverty alleviation and promoting broad based equitable and sustainable agriculture. The Endowment Fund is an independent entity and possess all of the powers necessary to carry out its functions.

Management of the Fund

The Board of Directors (BoD) is the governing body of this Fund and is responsible for its program, 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, UAF (member/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.

1. Executive Director, Professor nominated by Vice Chancellor, UAF
2. Additional Director, Regular (One)
3. Deputy Director, Regular (One)
4. Lecturer, Regular (One)
5. Accounts Officer, Regular (One)
6. Administration/Supporting Staff (4 Nos)

Programs

With the approval of Board the following programms are being sponsored by Endowment Fund Secretariat, UAF

1. Faculty Development
2. Technology Transfer
3. Product Commercialization
4. Research & Development

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 project proposals to TAC along with recommendations of referees.
- Rationalization of the recommended proposals by the Committee constituted by the Chairman BoD.
- Final selection/approval by the Board.
- Signing of Implementation Agreement between the executor/PI and UAF.
- Issuance of Administrative approval of the projects.

FACULTY DEVELOPMENT

Capacity-building in agriculture and allied disciplines has been the prime focus of Endowment Fund, UAF. Further, interaction with the international community and exposure to the developed systems are the additional benefit of this program. A Faculty Development Committee comprising senior teachers evaluates and recommends such applications to the Chairman BoD for approval.

1. Short training (abroad)
2. Short training (inland)
3. Travel grants for presenting papers (abroad)
4. Short visit for institutional collaboration
5. Seminars/Workshops/Conferences organized at UAF

Achievement of the year

Under Faculty Development Component EFS provides opportunity to the faculty members for interaction with the international community and exposure to the developed systems for enhancing their skills.
During 2016-17, following is the achievements under Faculty Development :

1. Short training (abroad)	04
2. Travel grants for presenting papers (abroad)	09
3. Short visit for institutional collaboration	05
4. Seminars/Workshops/Conference organized at UAF	16

1.1 Short Trainings (abroad)

This program has been designed with the objective to accelerate the quantum of research and development in Agricultural Universities through short term trainings that are catalytic to the technological and socio-economic development of the country. Under this program, teachers, scientific and technical staff and researchers of the University of Agriculture Faisalabad can avail the grant for short term local as well as foreign training of their own choice but related to their current field of specialization.

Sr. #	Name /address	Title/Host institution	Duration
1.	Dr. M. Amjad Ali, Assistant Professor, Department of Plant Pathology, UAF	5th International Master Class on Soil Borne Pathogens of Wheat, Venue: CIMMYT, Turkey	July 11-22, 2016
2.	Dr. M. Hammad Nadeem Tahir, Assistant Professor, Department of Plant Breeding & Genetics, UAF	Biotechnology Seed Development, Marketing and Regulation, USDA/FAS Cochran Fellowship Program Venue: USA	July 24-August 07, 2016
3.	Mr. Muhammad Yahya Khan, Lecturer (Soil Science), UAF Sub Campus Burewal-Vehari.	4th International Training Course on "Plant Nutrition and Soil Management" Venue: Izmir, Turkey	September 05-09, 2016
4.	Dr. Rizwana Maqbool, Assistant Professor, Department of PBG, UAF	Licensing Academy: Intellectual Property and Technology Transfer Venue: University of California, Davis, USA School of Law and PIPRA	June 19 to 30, 2017

1.2 Travel Grants for Presenting Paper (abroad)

Endowment Fund Secretariat encourages faculty members to have international exposure by presenting their research findings at various international seminars, conferences, workshops, etc. Following travel grants were provided to faculty members for presenting papers at international events:

Sr. #	Name /Department	Title of Paper/Organizer/Date	Country
1.	Dr. Tariq Aziz, Associate Professor, Institute of Soil & Environmental Sciences, UAF	Differential Phosphorus Utilization Efficiency in Rice Genotypes in 7th International Crop Science Congress Organized by: International Crop Science Society & Chinese Academy of Science and Chinese Crop Science Society August 14-19, 2016	China
2.	Dr. Zain-ul-Abdin, Assistant Professor, Department of Entomology, UAF	Molecular and Physiological Studies of the Host Regulation Factor of Endoparasitoid Aenasius bambawalei Hayat (Hymenoptera: Encyridae) in ICE 2016 XXV International Congress of Entomology Organized by: Entomological Society of America (ESA) September 25-30, 2016	USA
3.	Dr. Aamir Shehzad, Assistant Professor, NIFSAT, UAF	Physico-Chemical and Sensory Attributes of Ginger Based Marmalade in 14th International Conference on Food Engineering Organized by: Editors of Journal of Food Processing and Technology, Journal of Nutrition, Food Sciences, Advances in Dairy Research & Fermentation Technology November 28-29, 2016	Australia
4.	Dr. Hafeez-ur-Rehman, Lecturer, Department of Agronomy, UAF	Nitrogen Splitting; a Strategy to Improve Total Nitrogen Uptake, Apparent Recovery and Grain Yield of Direct Seeded Aerobic Rice in 7th International Nitrogen Initiative Conference 2016 (INI-2016) Organized by: International Nitrogen Initiative; Conference Design Pty Ltd December 04-08, 2016	Australia
5.	Dr. Mashkoor Mohsin Gilani, Institute of Microbiology, UAF	Plasmid Mediated Colistin Resistance has Become Wild: Whole Genome Sequencing of Multidrug Resistant E. coli Strain Revealed Putative Zoonotic Connection in 4th International One Health Congress & 6th Biennal Conference of the International Association for Ecology and Health Organized by: International Association for Ecology and Health December 04-07, 2016	Australia
6.	Dr. Irfan Ahmad, Assistant Professor, Department of Forestry and Range Management, UAF	Fungi Associated with Decline of Kikar (Acacia nilotica) and Red River Gum (Eucalyptus camaldulensis) in Faisalabad in ICASQI-2017: 19th International Conference on Agroforestry and Soil Quality Improvement Organized by: World Academy of Science, Engineering and Technology February 16-17, 2017	UK

Sr. #	Name /Department	Title of Paper/Organize/Date	Country
7.	Dr. Abdul Mateen, Assistant Professor, Department of Zoology, Wildlife and Fisheries, UAF	Comparative Growth and Fatty Acid Profile of Oreochromis niloticus Fed Plant and Animal Origin Fat Supplemented Feed in Aquaculture America-2017 Organized by: World Aquaculture Society & Texas Aquaculture Association February 19-22, 2017	USA
8.	Prof. Dr. Aman Ullah Malik, Institute of Horticultural Sciences, UAF	Postharvest Losses and Management Strategies in Fruit and Vegetable Sector of Pakistan in The 1st All Africa Post Harvest Congress & Exhibition Organized by: 1. Ministry of Agriculture, Livestock and Fisheries, Republic of Kenya 2. University of Nairobi, Kenya 3. World Food Preservation Center March 28-31, 2017	Kenya
9.	Dr. Ateeq-ur-Rehman, Assistant Professor, Department of Physics, UAF-Community College, PARS	Charge Transfer at Hybrid Organic-anorganic Interfaces in 4th International Symposium on Microscopy and Spectroscopy (InterM-2017) Organized by: Gebze Technical University, Turkey April 22-26, 2017	Turkey

1.3 Short Visits for Institutional Collaboration

Travel grants for short visits abroad are provided for strengthening international collaboration and partnerships etc.

Sr. #	Name /Department	Title of Paper/Organize/Date	Country
1.	Prof. Dr. M. Sajjad Khan Faculty of Animal Husbandry, UAF	Farmers Delegation of Pakistan September 16-26, 2016	China
2.	Prof. Dr. Jalal Arif, Department of Entomology, UAF		
3.	Prof. Dr. Ashfaq Ahmad Department of Agronomy, UAF		
4.	Mr. Amir Saeed Rana Land Utilization Officer, Directorate of Farms, UAF		
5.	Dr. Nadeem Akbar, Assistant Professor, Department of Agronomy, UAF	To pay short visit program to attend International Temperate Rice Conference (ITRC)-2017 March 06-10, 2017	Griffith, Australia

1.4 Seminars/Conferences/Workshops/Trainings organized at UAF

Financial support is provided to UAF faculty members to organize seminars/conferences/ workshops at the campus. This includes sponsoring the visits of scientists from abroad to attend such events. Visit of foreign scholars is of utmost importance for faculty development as more people are benefited than the visit abroad of one individual.

During the year 2016-17, EFS sponsored following events.

Sr.#	Organizer	Title of Seminars/Workshops/Conferences
1.	Dr. Muhammad Nazim IBMS & ORIC, UAF	DICE-AFS 2016 (Agriculture and Food Sciences Innovation Event) November 02-03, 2016
2.	Prof. Dr. Muhammad Tariq Javed Department of Pathology, UAF	DNA Fingerprinting Technique-Spoligotyping November 11-12, 2016
3.	Prof. Dr. Muhammad Tahir Siddiqu Department of Forestry and Range Management, UAF.	International Conference on Forestry and Environment: Challenges and Prospects November 21-22, 2016
4.	Prof. Dr. Tahir Zahoor NIFSAT, UAF	International Workshop on Research Methods in Nutrition December 13-14, 2016
5.	Dr. Muhammad Jehanzeb Masud Department of Irrigation and Drainage, UAF	International Conference Sustainable Agriculture November 12 to December 20, 2016
6.	Dr. Zaheer Ahmad Department of PBG, UAF	i. International Conference "Innovative Approaches for the Control of Insect-Pest Infestation, ii. Hands on Training on the Use of Modern Practices in Insect-Pest Management December 02-14, 2016
7.	Dr. Zaheer Ahmad Department of PBG, UAF	Visit of Foreign Delegate from University of Prince Edward Island (UPEI), Canada for Academic Collaboration December 12-17, 2016
8.	Dr. Syed Ashar Mahfooz Department of Clinical Medicine & Surgery, UAF	Internees-Stakeholders Interactive Workshop on the Development of Training Modules January 10, 2017
9.	Prof. Dr. Amer Jamil Department of Biochemistry, UAF	Recent Trends in Molecular Diagnosis of Viral Diseases January 12-14, 2017
10.	Dr. Zulfiqar Ahmad Saqib Institute of Soil & Environmental Sciences, UAF	Phenotyping Cereals in Saline Landscapes of Pakistan January 16-20, 2017
11.	Dr. Zubair Aslam Department of Agronomy, UAF	Systematic and Evolutionary Microbiology in Modern Era February 13, 2017
12.	Prof. Dr. Anas Sarwar Qureshi Department of Anatomy, UAF	Teaching and Research Techniques in Anatomy February 15-16, 2017
13.	Dr. Iftikhar Ahmad Institute of Horticultural Sciences, UAF	Diversification and Value Addition of Floriculture March 01-02, 2017
14.	Dr. Benish Israr Institute of Home Sciences, UAF	Sustainable Approaches to Combat Malnutrition April 03-04, 2017
15.	Dr. Zubair Aslam Department of Agronomy, UAF	International Conference Advances in Agricultural Resource Management April, 05-07, 2017
16.	Dr. Zaheer Ahmad Department of PBG, UAF	Visit of Foreign Delegate from University of Prince Edward Island (UPEI), Canada for Academic and Research Collaboration with UPEI (faculty & student exchange, and 1+3 degree program) May 03-08, 2017

HIGHLIGHTS OF SOME EVENTS

Title of the event: **DICE, 2016 Food & Agriculture, Innovation Event**
November 02-03, 2016
Name of Organizer: **Dr. Muhammad Nazam, IBMS, UAF**

Objectives of the Event:

- To provide a platform to the young entrepreneurs to present their innovative ideas
- To create networking/ connectivity among academia and industry
- To establish relationship with other institutes promoting the entrepreneurship
- To provide an environment for the intellectuals to interact, discuss and solve national issues

Prof. Dr. Iqrar Ahmad Khan, Vice Chancellor in his opening remarks emphasized the scientists to translate research into goods & services for the betterment of society. Despite of variety of surplus food, Pakistanis are under the situation of malnutrition. He urged to curtail postharvest losses and promote value added food products. Mr. Sohail Jamal, Co-Chairman, DICE-USA, Mrs. Najma Afzal MPA, Dr. Habib Aslam Gaba, Chairman Academia Industry Linkages, FCCI, Engineer Ahmad Hassan Vice President FCCI and other distinguished guests accompanied the Vice Chancellor to inaugurate the DICE-2016 Food & Agriculture competition. On the eve of this mega event a seminar on "University Industry Collaboration: Implications for Improving Business Education in Pakistan" was organized on November 2, 2016 at New Senate Hall-UAF. Dr. Habib Aslam Gaba Chairman, Academia Industry Linkages, FCCI, Ms. Sadaf Amir, JK Agri. Farms, Mr. Fritz Bohmler CEO,Solar Company Germany, Dr. Nadeem Tariq CEO, Niha Tech. Pvt. Ltd. shared their findings/ success stories with the audience.
A seminar on "Food security and value addition in Modern World" was organized on 2nd day of this mega event. Ms. Shazia Zahra, Ms. Safeena CEO, School of Nutrition, Clinical Nutritionist Amjid, Dr. Sakhwat Ali, DG, PCSIR lab. And Mr. Muhammad Ahmad Fauji Fresh and Freeze delivered comprehensive presentations and answered the questions of the audience.

Title of the Event: **Training Workshop on "DNA Fingerprinting Technique Spoligotyping"**
November 11-12, 2016
Name of Organizer: **Prof. Dr. Muhammad Tariq Javed, Department of Pathology, UAF**

Spoligotyping is the technique used to strain typing Mycobacterium tuberculosis complex organism understanding the molecular epidemiology of the organism. Twenty participants from the education and research institutes participated in the training. The participants showed deep sense of satisfaction at organizing such a skillful training. They also showed keen interest during the training session and suggested that this kind of trainings should be organized at regular basis.

Title of the Event: **International Conference on Forestry and Environment: Challenges and Prospects**
November 21, 2016
Name of Organizer: **Prof. Dr. Muhammad Tahir Siddiqui, Department of Forestry and Range Management, UAF**

Objectives of the Events:

- To highlight the role of forests on livelihoods
- To discuss impacts of deforestation and suggest measures to combat environmental degradation
- To explore the opportunities of student teacher exchange between university of Agriculture, Faisalabad and Kastamonu University, Turkey

The conference was jointly organized by University of Agriculture, Faisalabad and Kastamonu University, Turkey. Prof. Dr. Seyit Aydun, Rector, Kastamonu University Turkey, and Prof. Dr. Omer Kucuh, Kastamonu University Turkey participated in this event.

The participants were sensitized that environment is under grave pressure because of heavy deforestation and inadequate forestation and reforestation practices. Declaration of the conference emphasized that the policy makers, Forests Professionals and Environmentalists should take steps to curb large scale clearing of wood lands, promote wildlife conservation and sustained forest management. They strongly recommended that Agro-forestry should be promoted to meet domestic requirements of timber and fuel. Big chunks of land are lying barren in Cholistan, Thar, Thal and Chagi Kharan rangelands which needs to be rehabilitated. The vivid challenges for all the concerned departments and authorities are to promote natural vegetation in forests and by turning deserts into productive grazing lands. Livestock production can be increased manifold if all potentials of these rangelands is exploited to the maximum possible.

Title of the Event: **International Conference "Sustainable Agriculture" November 12 to December 20, 2016**

Name of Organizer: **Dr. Muhammad Jehanzeb Masud, Department of Irrigation and Drainage, UAF**

Objectives of the Visit:

- To discussion the role of precision agriculture and ICT in agriculture from industry prospective.
- To discuss the role of each department towards developing and enhancing courses and practical delivered to undergraduate students
- To discuss various projects with undergraduate and post graduate students on agricultural engineering and precision agriculture
- To discuss with Director Water Management Research Center (WMRC) for setting goals and vision of the Center.

Detailed Proceedings of the Event:

Dr Qamar Zaman, Engr Peter Swinkels and Wyne Edison visited UAF November 12 to December 20, 2016 to participate in the following activities:

Visit to Local Industry

Before the conference, the delegation was taken to various industries to show them how agricultural industry is being run in Pakistan. Local industry was visited to see the potential of developing new machinery locally. For the purpose, PAMICO Industry, Shadab Colony was visited and its chief executive, Mr Arshad briefed about the equipment that was being made by PAMICO.

Meeting with Progressive Farmer

A meeting was arranged with the CEO of Farmers Associate Pakistan, Mr Afaq Ahmad Tiwana, at USPCAS-AFS office. Discussion was made on cropping systems of both countries and Potential of introducing precision agriculture technologies in Pakistan. A visit was arranged to AARI and WMRC to show the potential of various technologies introduced in field regarding water conservation and precision agriculture.

Conference on Sustainable Agriculture
November 17 – 19, 2016

National and International Speakers from various academic institutions/ organizations presented their papers and attended the conference. Dr Qamar, Peter and Edison presented their work in the session dedicated to Precision Agriculture and ICT for Agriculture. They emphasized on using precision agriculture technologies and showed the audience potential benefits of using variable rate technologies. The farmers and industry people were very much interested to use these technologies in Pakistan.

Visit of Dr. Christopher Cutler, December 02 to December 14, 2016
Name of Organizer: Dr. Zaheer Ahmad, Department of PBG, UAF (Focal Person)

Objectives of the Event:

2+2 Joint Degree Program with Dalhousi University

The 2+2 joint degree was launched successfully and in this connection 32 students have applied under this program. The applications of these students have been submitted to Dalhousie University and was under review. This interaction may create possible opportunities for research collaboration between UAF, and Dalhousie University, Canada in the field of sustainable agriculture production for future food security.

Entomology Conference and Hands on Training

A seminar and training on the use of modern practices in insect-pest management utilizing the expertise of Dr. Christopher Cutler was arranged for the faculty and students to learn on innovative approaches for the control of insect-pest infestation.

Visit of Field Area, HEC and NARC

Dr. Cutler visited UAF, Burewala sub-campus, interacted with the faculty members and students and attended annual farmer's convention there. Dr. Cutler along with the Vice Chancellor, UAF and faculty members visited citrus farm maintained by a progressive farmer from Mianchanu. Dr. Cutler briefed audience about his expertise and measures which might be taken to improve the citrus farm.During this visit Dr. Cutler met various scientists and researchers from UAF, other universities and the research institutes. This has increased the intellectual interaction between Dalhousie University and various institutes in Pakistan. This visit helped in strengthening UAF international ties and provided UAF students new academic and research collaborations. Dr. Cutler also visited Higher Education Commission of Pakistan (HEC) and National Agricultural Research Centre (NARC), Islamabad.

Title of the event: **Visit of delegation from the University of Prince Edward Island (UPEI), Canada May, 3-5, 3017**

Name of Organizer: **Dr. Zaheer Ahmad, Department of PBG, UAF**

Objectives of the Event:

- Signing of MoU between UAF and UPEI for collaboration on academics and research activities.
- Discussion on 1+3-degree program between UAF and UPEI
- To interact with the faculty members of different departments

Detailed Proceedings of the Visit

During this visit, academic and research collaboration MOU was signed between UPEI and UAF. Dr. Nick gave a presentation about UPEI and possible avenues of collaboration between two institution. The delegation met with the Vice Chancellor and discussed about joint degree programs and other areas of collaborations where, faculty and students of both institutes can get benefits. In the meeting, delegates highly appreciated the efforts of UAF towards internationalization and acknowledged the educational and research achievement of UAF.

The delegation visited Faculty of Agricultural Engineering and Technology, faculty members and students and shared their experiences. The delegation also visited other faculties and met with faculty members and students.

The delegation visited higher education commission of Pakistan and met with different officials to discuss about their activities at UAF. The HEC official appreciated the efforts of UAF and UPEI for academic and research collaboration. The delegation also visited PCRWR and PEC. During this visit, they discussed about different opportunities of collaboration.

MoU between both universities was signed and the availability of academics and research opportunities at both institutes were discussed.

During this visit the delegates met various scientists and researchers from UAF, other universities and the research institutes. This has increased the intellectual interaction between UPEI and various institutes in Pakistan. After this visit various opportunities for faculty and student exchange between both institutes were explored.

Title of the Event: **Internees-Stakeholders Interactive Workshop**
January 10, 2017
Name of Organizer: **Dr. Syed Ashar Mahfooz, (Focal Person)**
Department of Clinical Medicine & Surgery, UAF

Objectives of the Event:

- Professional training of outgoing graduates and to identify the job opportunities for them in the industry.
- To strengthen the linkage with industry stakeholders

Detailed Proceedings of the Event:

The private and public stakeholders from all over the Punjab participated in the workshop. Dr. Muzzamil Hussain presented the learning objectives of the internship to the stakeholders and internees. Dr. Muhammad Munir Ahmad Shami, Divisional Director, L&DDD Faisalabad Dr. Khurram Shahzad from MAM Dairy, Dr. Awais from J K Dairy, Dr. Natasha from Nishat Dairy, Dr. Zargham Khan from Faisal Chicks and Dr. Saluman from Sadiq Brothers Poultry also commented on the internship program and its future strategy.

Title of the event: **Workshop on Recent Trends in Molecular Diagnosis of Viral Diseases**
January 12-14, 2017
Name of Organizer: **Prof. Dr. Amer Jamil, Department of Biochemistry, UAF**

Objectives of the Event:

1. To serve community with accurate, reliable and modern diagnostic services
2. To enhance the caliber of plant scientist and healthcare professionals regarding molecular diagnosis of diseases.
3. To train young professionals regarding molecular diagnosis under strict IVD environment.

Detailed Proceedings of the Event

Thirty participants (young faculty/postgraduate students) of the workshop were from different institutions viz NUST and NARC Islamabad, University Medical and Dental College (UMDC), Independent Medical University, Punjab Medical College, GC University, GC Women University and University of Agriculture Faisalabad.

Prof. Dr. Qaiser A. Khan, Principal Aziz Fatimah Medical and Dental College Faisalabad and Prof. Dr. Munir A. Sheikh Chairman Dept. of Biochemistry UMDC Faisalabad were Chief Guest and Guest of Honor of the workshop respectively. Invited speaker was Prof. Dr. Abdul Haque Director ORIC UMDC, who delivered talk on importance of molecular diagnosis. Dr. Nighat Aslam demonstrated about nucleic acid extraction and analysis. After the lunch break practical session was held on extraction of DNA/RNA from serum in Molecular Biochemistry Lab. The day was concluded by demonstration on primer designing by Dr. Ghulam Mustafa.

Morning session of second day of the workshop was held in Punjab Medical College Faisalabad. Prof. Dr. Sardar Alfareed Zafar, Principal PMC was the Chief Guest and Prof. Dr. Muhammad Ashraf, Chairman Dept of Biochemistry PMC was the guest of honor. Two talks were presented; by Dr. Romena Qazi Consultant Molecular Biologist Shaukat

Khanum Research Center and Cancer Hospital Lahore, and Dr. Rubina Siddiqui, Deputy Chief Scientist, PINUM Faisalabad. The talk covered different aspects of the quality controls in molecular diagnosis. Further sessions were conducted at UAF. Mr. Imtiaz Tahir gave demonstration on biosafety in diagnosis labs followed by demonstration on Real-time PCR. Practical session was conducted on analysis of nucleic acids on agarose gel.
Final day of the workshop was held at UAF. The session was chaired by Prof. Dr. Iqrar A. Khan, Vice Chancellor UAF. Prof. Dr. Zahid Yaseen Hashmi delivered a talk on viral diseases and their diagnosis. Practical was conducted on master-mix preparation and amplification by real-time PCR. Data interpretation and discussion followed the lunch.

Title of the event: **Phenotyping Cereals in Saline Landscapes of Pakistan**
January 16-21, 2017
Name of Organizer: **Dr. Zulfiqar Ahmad Saqib, Inst. of Soil & Environmental Sci., UAF**

This course developed a foundation for a future ACIAR project focusing on the phenotyping of cereal genotypes for salt tolerance in Pakistan. We were able to advance this expectation by arranging meeting with Dr Munawar Kazmi (Country Manager for ACIAR) and Dr M. Imtiaz (Country Representative for CIMMYT) after the course had been completed. This meeting resulted in the development of a 2-page outline for a potential ACIAR Project that might start as early as mid-2018. The course also introduced Pakistani plant breeders to our ideas regarding the opportunity for a project based around better phenotyping and the introgression of Nax genes for salt tolerance into adapted Pakistani wheat varieties. These breeders would be important potential partners in a future project.
Wheat is a staple crop in Pakistan and its production is severely affected by salinity. There is a major need to breed more salt tolerant cereals for Pakistan. Although researchers have identified and introduced genes for salt tolerance into crops, proving their adaptation in spatially variable fields is difficult. Our training course focused on a key question, "How it can be assured that the better growth of genotype is only due to soil salinity".
Electromagnetic induction (EMI) is a means for rapidly measuring variation in the apparent electrical conductivity (ECa) of the soil profile. (Forexample taking 400 measurements of variation in ECa by hand is a task that can be completed in a few hours.) Soil ECa is affected by the presence of salt, clay and water in the profile. If soil samples are taken on the day of survey then calibration equations can be established between ECa and estimators of salinity like the EC1.5 and the salinity of the soil solution.

Title of the event: International Workshop on Diversification & Value Addition of Floriculture
March 01-02, 2017

Name of Organizer: Dr. Iftikhar Ahmad, Institute of Horticultural Sciences, UAF

Detail of the Event:

The objective of the event was to disseminate the knowledge about different new trends in floriculture promotion, introduce new crops and varieties and explore possibilities to reduce postharvest losses. Keynote address was made by Prof. Dr. John M. Dole (Associate Dean and Director Academic Programs, North Carolina State Univ., USA), in which he took the audience to a virtual tour of global floriculture industries. In the inaugural address, reverend Vice Chancellor highly appreciated the idea of organizing the workshop and bridging gaps between academia and industry to work collaboratively for the promotion of Floriculture in Pakistan. He also emphasized on branding of floriculture products for earning more. Dr. Wim Van Kester (PUMs Netherlands Senior Experts, Netherlands) presented his first talk on EU floriculture Industry followed by Prof. Dr. John M. Dole who gave his presentation on bedding plant production. Presenters from around the world shared their expertise and experience in floriculture. Among the resource persons, were Dr. Wim Van Kester (PUMs Netherlands Senior Experts, Netherlands), Dr. Kamani Ratanyke (Senior Lecturer, Wayamba University of Sri Lanka, Makandura, Sri Lanka), Mr. Helder Fontinha (A Portuguese national, Course Superintendent, DHA Raya Golf and Country Club, Lahore), Dr. Mansoor Hameed (Associate Prof., Deptt. of Botany, UAF), Dr. Riaz Ur Rehman (Floriculture Research Institute, Orchard Scheme, Islamabad), Dr. Muhammad Javed Tareen (Director General, Agriculture Research Institute, Quetta), Dr. Syed Atif Mehdi (Asstt. Prof., University of Central Punjab, Lahore), Dr. Muhammad Saeed (Directorate of Floriculture, T&R, Punjab), Mr. Saleem Ahmad (CEO, Greenworks, Lahore), Mr. Raheel Sultan Khan (Chief Executive, Best Garden Nursery, FSD), Mr. Shahid Nadeem (Scientific officer, Floriculture Research Institute, NARC, Islamabad), Mr. Ghulam Mustafa Shad (Deputy Director, PHA, Lahore), Mr. M. Behzad Rafiq (Horticulturist, Specialty Cut Flowers Farm and Al-Musavar Landscape, Lahore),

Outcome of the Event:

Workshop provided so many learning opportunities for the local growers, stakeholders, floriculture researchers, and students for future research and business development. As an outcome, we were able to develop a baseline for signing an MoU (Tripartite Agreement) between IHS-UAF, Greenworks (A private company PUM Senior Experts, Netherland) for capacity building of floriculture stakeholders in future. Future collaborative programs were discussed with US and Sri Lankan Invited Resource persons and opportunities were explored for future potential studies. New ideas for diversification and value addition were shared with researchers, growers and students. A separate meeting was also arranged for growers with invited international resource persons.

Title of the Event: **International Seminar, Systematic and Evolutionary Microbiology in Modern Era February 13, 2017**

Name of Organizer: **Dr. Zubair Aslam, Department of Agronomy, UAF (Focal Person)**

Objectives of the Event:

- To bring the awareness and importance of taxonomy of microbiology to the faculty members, students and other stakeholders.
- To explain the theoretical and practical issues dealing with classification and taxonomy
- Innovations in Taxonomy

Dr. Wan Taek Im also explained the importance of Microbiology and Taxonomy and said that it is applied in Bio energy, vaccine development and in agriculture, so we have to identify the basic microbes which are active and playing a mega role in agriculture. Mr. Zubair has explained all the details of isolation and characterization of metabolites isolated by microbes from Korean red ginseng and its medicinal benefits. Dr. Mansoor explained about the Plant Taxonomy and details about methodology and future strategies.

Title of the Event: **National Workshop on the Teaching and Research Techniques in Anatomy February 15-16, 2017**

Name of Organizer: **Prof. Dr. Anas Sarwar Qureshi, Department of Anatomy, UAF**

Dr. Sohail Hameed, Deputy Chief Scientist at PAEC, Director, Academics and Coordination (Biology) Islamabad, former Director at NIBGE Faislabad, delivered his keynote address on "Imaging techniques of electron and confocal microscopes for anatomical studies".

Dr. Wael A Khamas, Director College of Veterinary Medicine, Western University of Health Sciences, California, USA, delivered a lecture on "Problem Based Learning (PBL) curriculum delivery to DVM students" on skype.

Technical Sessions - Day I:

The trainees were given practical demonstration of Bone/ Skeleton preparation for anatomical studies, and Histological and Histochemical Techniques. They were also trained about the Embalming of animals, morphometric analysis, electron microscopy and real time PCR used in anatomical studies.

Prof. Dr. Talat Naseer Pasha, VC, UVAS, Lahore said that this training has strengthened the skills/capabilities of young anatomists that will ultimately improve the Veterinary education in Pakistan.

Title of Event: **Sustainable Approaches to Combat Malnutrition**
April 03-04, 2017
Name of Organizer: **Dr. Benish Israr, Institute of Home Sciences, UAF**

Speakers of the conference from national and international universities including Lahore, Karachi, Islamabad, UK and South Korea reviewed prevalence of malnutrition in Pakistan and suggested strategies to overcome existing condition. Conference platform also provided a valuable networking opportunity and set the stage for further cooperation among government universities, research institutes and international stakeholders. Malnutrition causes death of around one million children every year.

Following Topics were covered by the Eminent Scientist and Speakers:

1. Gut microbiota and human health by Dr Gemma Emily Walton, University of Reading, UK about prevalence of malnutrition, its seriousness and severity of the problem that may affect growing children as well as mother. According to them improving life style pattern regarding to intake of food, education of mother and effective implementation of nutrition policies by government are key and areas that need focused work in order to eradicate problem.
2. Recent advances in public health nutrition by Dr Nilofer Fatimi Safder from Dow University, Karachi
3. Bio fortification: Step forward to eradicate malnutrition by Dr Khawaja Masood Ahmed, National fortification alliance, Islamabad.
4. Stunted growth pattern in children by Dr Riffat Ayesha Anis from SAARC, Islamabad
5. Recent advances in nutrition I: Sustainable solution for malnutrition by Prof Jahen Kim, Chungnam National University, South Korea
6. Recent advances in nutrition II: Sustainable solution for malnutrition by Dr Jawad Hussain from University of Faisalabad
7. Way to improve nutritional status of low income group by Fayza Khan, President, Pakistan Nutrition and Dietetic Society, Karachi
8. Health Survey: Step forward for malnutrition by Nida Javed President, Pakistan Nutrition and Dietetic Society, Karachi.
   Dr Nancy J Allen, University of California, Davis representative, Centre for Advanced Studies-Food Security and Agriculture at University of Agriculture, Faisalabad

Title of the Event: **International Conference on Advances in Agricultural Resource Management April 05-07, 2017**

Name of Organizer: **Dr. Zubair Aslam, Department of Agronomy, UAF**

The Ambassador from Argentina told the story of his farming managed by his wife and what the innovations and advances they are doing on rain fed areas. Prof. Dr. Iqrar Ahmad Khan has said that we have to focus on the farming system and commercial value of agriculture and it is the need of the time. There were around six international participants and speakers in the the opening ceremony (Ambassador from Argentine, two speakers and one participant from Turkey, one speaker from Czech Republic and one speaker from Australia). Two Korean scientists joined next day and their presentations were also excellent. This conference has covered not only local developments but also the present and future scenario of world Agriculture.

1.5. List of Foreign Visitors/Experts Invited

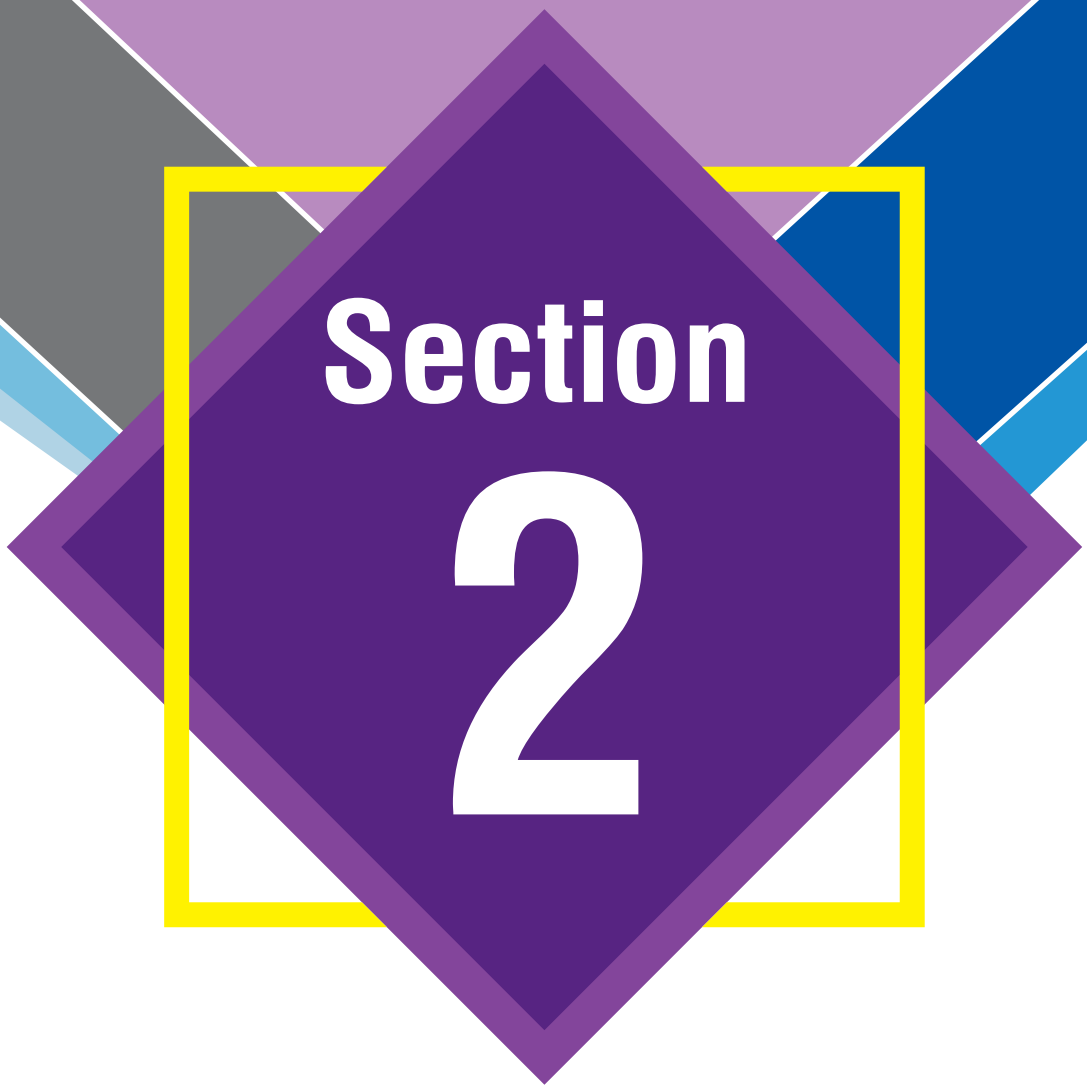
Visit of foreign scholars is of utmost importance for faculty development as more people are benefited than the visit abroad of one individual. Foreign experts invited in training workshops/seminars/conferences are sponsored partially/fully as per requirement. Following Foreigner Scientists were invited during 2016-17:

Sr.#	Name of Visitors	Date	Event
1.	Mr. Fritz Bohmler CEO, Solar Company Germany	November 02-03, 2016	DICE, 2016 Food & Agriculture, Innovation Event Organized by: Prof. Dr. Zahir Ahmad Zahir, Director, ORIC, UAF
2.	Dr. Guilhem Bourrié, UMR 1114 Emmah, INRA, Avignon, France	November 21-22, 2016	International Conference on Forestry and Environment: Challenges and Prospects Organized by: Prof. Dr. Muhammad Tahir Siddiqui, Department of Forestry and Range Management, UAF
3.	Kerim Güney, Faculty of Forestry, Kastamonu University, Turkey		
4.	Mıraç Aydın, Faculty of Forestry, Kastamonu University, Turkey		
5.	Türkan Aydın, Faculty of Forestry, Kastamonu University, Turkey		
6.	Osman Topacoglu, Faculty of Forestry, Kastamonu University, Turkey		
7.	Miraç Aydin, Faculty of Forestry, Kastamonu University, Turkey		
8.	Ahmet Duyar , Karabuk University, Turkey		
9.	Mahmut Gür, Faculty of Forestry, Kastamonu University, Turkey		
10.	Sabri Ünal , Kastamonu University, Turkey		
11.	Omer Kucuk, Dean, Faculty of Forestry, Kastamonu University, Turkey		
12.	G. A. Parray, Sher-e-Kashmir University of Agriculture Sciences and Tech. J&K, India		
13.	Korhan Enez , Faculty of Forestry, Kastamonu University, Turkey		
14.	Gökhan Sen, Faculty of Forestry, Kastamonu University, Turkey		
15.	Hakan Sevik, Faculty of Forestry, Kastamonu University, Turkey		
16.	Tayyibe Altunel, Kastamonu University, Turkey		
17.	Gonca Ece Özcan, Kastamonu University, Turkey		
18.	Burak Aricak, Kastamonu University, Turkey		
19.	Erol Akkuzu, Kastamonu University, Turkey		
20.	Mehmet Çetin , Kastamonu University, Turkey		
21.	Haci Ismail Kesik, Kastamonu University, Turkey		
22.	Ahmet Sivacioglu, Kastamonu University, Turkey		

Sr.#	Name of Visitors	Date	Event
23.	Ça ğrı Olgun , Kastamonu University Turkey	November 21-22, 2016	International Conference on Forestry and Environment: Challenges and Prospects Organized by: Prof. Dr. Muhammad Tahir Siddiqui, Department of Forestry and Range Management, UAF
24.	Gulnur Mertoglu Elmas, Istanbul University, Turkey		
25.	S. Naseem ul Zafar Geelani, Sher-e-Kashmir University, J&K, India		
26.	Zöhre Polat, Aydin, Turkey		
27.	Ahmet Celik , Ministry of Forestry and Water Affairs, GDF, Turkey		
28.	Prof. Dr. Seyit Aydin, Rector, Kastamonu University, Turkey		
29.	Prof. Dr. Basma Ellahi University of Chester, UK	December 13-14, 2016	International Workshop on Research Methods in Nutrition Organized by: Prof. Dr. Tahir Zahoor, Director General, NIFSAT, UAF
30.	Dr. Vimal Karani Assistant Professor, University of Reading, UK		
31.	Dr A.W.Jasra, ICIMOD	November 12 to December 20, 2016	International Conference Sustainable Agriculture Organized by Dr. Muhammad Jehanzeb Masud, Department of Irrigation and Drainage, UAF
32.	Dr Jim Hill, UCDavis, USA		
33.	Dr Ford Denison, Prof.(Emeritus) UC Davis/Uni. of Minnesota, USA		
34.	Prof. Dr. Kate Scow, Department of Land, Air and Water Resources, UC Davis, USA		
35.	Dr Dionyssia Lyra, Susan ICBA, Dubai		
36.	Wang Xuechun, China		
37.	Dr. Andy Macdonald, RothamSted, Harpenden, U.K		
38.	Dr. Shagufta Gill, ICBA, Dubai		
39.	Prof. Dr. Kulvinder Singh Gill (WSU, USA)		
40.	Prof. Dr. Kent Bradford, University of California Davis, USA		
41.	Dr. Douglas R Cook, UC Davis, USA		
42.	Prof. Dr. Qamar uz Zaman, Dalhousie Uni., Canada		
43.	Dr. Jan W Hopmans, UCDavis, USA		
44.	Engr. Peter Swinkels, Doug Bragg Ent. Canada		
45.	Dr. Christopher Cutler, The Dalhousie University, Canada	December 02-14, 2016	International Conference Innovative Approaches for the Control of Insect-Pest Infestation, hands on Training on the Use of Modern Practices in Insect-Pest Management Organized by: Dr. Zaheer Ahmed, Department of PBG, UAF

Sr.#	Name of Visitors	Date	Event
46.	Nicholas Krouglicof, Associate Dean, School of Sustainable Design Engineering, Canada	December 12-17, 2016	Visit of Foreign Delegate from University of Prince Edward Island (UPEI), Canada for Academic Collaboration Organized by: Dr. Zaheer Ahmed, , Department of PBG, UAF
47.	Mr. Allan Dale, Director of Industrial Partnership, School Sustainable Design Engineering		
48.	Dr. Aitazaz A. Farooque, Assistant Professor, School of Sustainable Design Engineering		
49.	Dr. Ed Barrett-Lennard (Foreign Lead Trainer) Associate Professor, School of Plant Biology, The University of Western Australia	January 16-20, 2017	Training Workshop on Phenotyping Cereals in Saline Landscapes of Pakistan Organized by: Dr. Zulfiqar Ahmad Saqib, Institute of Soil & Environmental Sciences, UAF
50.	Dr. Wan Taek Im, Hankyong National University, Department of Biotechnology, Anseong, Gyeonggi-do, South Korea	February 13, 2017	Seminar on Systematic and Evolutionary Microbiology in Modern Era Organized by: Dr. Zubair Aslam, Department of Agronomy, UAF
51.	Prof. Dr. Wael A. Khamas, Department of Anatomy, Faculty of Veterinary Science, Western University of Health Sciences, Pomona, CA, USA	February 15-16, 2017	Training workshop Teaching and Research Techniques in Anatomy on Organized by: Prof. Dr. Anas Sarwar Qureshi, Department of Anatomy, UAF
52.	Prof. Dr. John M. Dole, Interim Associate Dean and Prof. Floriculture, College of Agriculture & Life Sciences, North Carolina State University, USA	March 01-02, 2017	International Workshop Diversification and Value Addition of Floriculture Organized by: Dr. Iftikhar Ahmad, Institute of Horticultural Sciences, UAF
53.	Dr. Wim Van Kester (PUMs Netherlands Senior Experts, Netherlands		
54.	Dr. Kamani Ratanyke (Senior Lecturer, Wayamba University of Sri Lanka, Makandura, Sri Lanka		
55.	Prof. Jahean Kim, Dean, Chungnam National University, Daejoen, South Korea	April 03-04, 2017	International Conference Sustainable Approaches to Combat Malnutrition Organized by: Dr. Benish Israr, Lecturer, Institute of Home Sciences, UAF
56.	Dr. Gemma Emily Walton, University of Reading, UK		
57.	Prof. Dr. Che Ok Jeon, Department of Life Science, Chung-Ang University, Seoul 06974, Korea	April, 05-07, 2017	International Conference Advances in Agricultural Resource Management Organized by: Dr. Zubair Aslam, Department of Agronomy, UAF
58.	Prof. Dr. Chae Jong-Chan, Division of Biotechnology, College of Environmental & Bioresource Sciences Chonbuk National University Gobong-ro 79, Iksan 54596, South Korea		
59.	Prof. Dr. Mehmet Rüştü Karaman, Afyon Kocatepe University Healthy Life Afyon –Turkey		
60.	Prof. Dr. Korkmaz Bellituerk, Department of Soil Science and Plant Nutrition, Faculty of Agriculture, Namık Kemal University, 59030, TEKIRDAG/TURKEY		

Sr.#	Name of Visitors	Date	Event
61.	Dr. Zhongbing Chen, Department of Applied Ecology, Faculty of Environmental Sciences, Czech University of Life Sciences Prague, Kamýcká 129, 16521, Prague, Czech Republic	April, 05-07, 2017	International Conference Advances in Agricultural Resource Management Organized by: Dr. Zubair Aslam, Department of Agronomy, UAF
62.	Ivan Ivanissevich (Ambassador of Argentina)		
63.	Dr. Nicholas Krouglicof, Associate Dean, School of Sustainable Design Engineering, UPEI, Canada	May 03-08, 2017	Visit of Foreign Delegate from University of Prince Edward Island (UPEI), Canada for Academic and Research Collaboration with UPEI (faculty & student exchange, and 1+3 degree program) Organized by: Dr. Zaheer Ahmed, Department of PBG, UAF
64.	Mr. Allan Dale, Director of Industrial Partnership, School of Sustainable Design Engineering, UPEI, Canada		
65.	Dr. Barbara Campbell, Director, International Relations		
66.	Dr. Aitazaz A. Farooque, Assistant Professor, School of Sustainable Design Engineering, UPEI, Canada		
67.	Miss Laura Whalen, Undergraduate Student, School of Sustainable Design Engineering, UPEI, Canada		
68.	Miss Tiffany Cameron, Undergraduate Student, School of Sustainable Design Engineering, UPEI, Canada		



TECHNOLOGY TRANSFER

Endowment Fund Secretariat provides an opportunity for the scientists to get financial support for transfer of technologies to the stakeholders. 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.

The technologies disseminated so far relate to Animal Nutrition Strategies, Livestock Management through IT, Animal Disease Control, Water Use Strategies, Drip Irrigation, Policy Studies, Fruit Germplasm Collection, Soil Reclamation Strategies, Propagation of Floriculture, Reverse Engineering, Citrus Diagnostic Services and Nursery, Food Quality, Silk Production, Precision Agriculture, Seed Production Technologies, Cyber Extension, FM Radio, Integrated Farming, Gender Empowerment and use of ICT in Agriculture.

2.1 Projects Initiated during 2016-17

Sr.#	Title of the Project	Name of the PI	Duration
1.	Improvement of Rural Poultry through Technology Transfer	Dr. Zia-ur-Rehman, Assistant Professor, UAF Sub-Campus Toba.Tek Singh	1 Year
2.	Promotion of Solar Cookers for Changing the Energy Use Behaviors of Communities	Dr. Naveed Farah Department of Rural Sociology, UAF	2 Years
3.	Processing and Preservation of Fruits and Vegetables at Domestic Level to Reduce their Losses through Successful Approaches and Trainings	Dr. M. Asif Khan, Assistant Professor, UAF Sub-Campus, Burewala	2 Years
4.	Reducing Rind Blemishes in Kinow Mandarin for Improving Cosmetic Quality and Farm Gate Income	Prof. Dr. Aman Ullah Malik, Institute of Hort. Sciences, UAF	3 Years
5.	Establishment and Demonstration of Model Papaya Orchard for Technology Transfer at PARS for Growers	Dr. M. Azam, Assistant Professor, Institute of Hort. Sciences, UAF	3 Years
6.	Punjab Agriculture and Dairy Leadership Programme (PADLP)	Prof. Dr. Aman Ullah Malik, Institute of Hort. Sciences, UAF	1 Year
7.	Dissemination of Farmer Friendly Diagnostic Techniques for the Control of Mastitis in Selected Districts of Punjab-Pakistan	Dr. M. Ijaz Saleem, Lecturer, Department of CMS, UAF	2 Years

2.2 Projects Completed during 2016-17

Sr.#	Title of the Project	Name of the PI	Duration
1.	Dissemination of Seed Production Technology of Important Crops. (Component I: Vegetable Seed Production)	Dr. Khuram Ziaf, Assistant Professor. Institute Hort. Sciences, UAF	3 Years
2.	Dissemination of Seed Production Technology of Important Crops. (Component B: Dissemination of Seed Production Technology of Alfa Alfa Crop)	Dr. Qamar Shakeel AARI, Faisalabad	3 Years
3.	Establishment of date palm germplasm unit	Mr. Summar Abbas Naqvi, Institute of Hort. Sciences, UAF	3 Years
4.	Technology transfer to citrus growers in relation to changing cultivars in existing citrus orchards through top working	Dr. Muhammad Jafar Jaskani, Institute of Hort. Sciences, UAF	3 Years

5.	Improvement of Beetal Goats and Indigenous Chicken Through Availability of Superior Sires	Prof. Dr. Muhammad Sajjad Khan, Department of Animal Breeding and Genetics, UAF	3 Years
6.	Agricultural Technology Transfer Through Mobile Applications (Apps)	Prof. Dr. Tanvir Ali. Institute of Agri. Extension & Rural Development, UAF	1 Year
7.	Low Cost Agrowaste Biosorbent Technology for Removal of Heavy Metals	Dr. Raziya Nadeem. Department of Chemistry, UAF	1 year
8.	Transfer of Viticulture Technology to the Farmers to Pothwar Region	Prof. Dr. Nadeem Akhtar Abbasi PMAS-Arid Agriculture University, Rawalpindi	2 Years
9.	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

2.3 Ongoing Projects during 2016-17

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, Assistant Professor, Institute of Horticultural Sciences, UAF	3 Years
2.	Site-Specific Wheat-Crop Management for High Yield Using UAVs & Spectral-Sensors	Dr. Ahsan Latif. Department of Computer Science, UAF	2 Years
3.	Multiplication and High Density Plantation of Fig Fruit Plants in Saline Soil (at Proka-2 Farms)	Dr. Saeed Ahmad, Associate Professor, Institute of Horticultural Sciences, UAF	3 Years
4.	a. Fabrication and Adoption of Multi Crop Reaper for Harvesting Different Crops b. Gasifier for Tube Well Operation to Save Energy	Dr. Manzoor Ahmad, Farm Machinery & Power, UAF	2 Years
5.	Establishment of Community Oriented Modern Fruit Plants Nursery System at UAF Sub-Campus Burewala	Dr. Muhammad Fakhar-ud-Din Razi, Assistant Professor, UAF Sub-Campus, Burewala	3 Years
6.	Time Efficient, Cost Effective and Stand Alone Nano photocatalytic Wastewater Treatment Technology for Irrigation	Prof. Dr. Ijaz Ahmad Bhatti, Department of Chemistry, UAF	3 Years
7.	Dietary Modification with the Addition of Kitchen Gardening at Household Level through Technology Transfer in Burewala	Dr. Muhammad Asif Khan, Lecturer, UAF Sub-Campus, Burewala-Vehari	3 Years
8.	Uplifting the Socioeconomic Conditions of Farming Communities by Promoting Forestry/Agroforestry on Problematic Soils in Faisalabad and Adjoining Districts	Dr. Irfan Ahmad, Department of Forestry & Range Management, UAF	3 Years
9.	Meadow Orcharding System in Guava at PARS, UAF.	Dr. Rashad Waseem Khan, Assistant Professor, Institute of Horticultural Sciences, UAF	3 Years

PROGRESS AND ACHIEVEMENTS FROM SOME SIGNIFICANT PROJECTS

IMPROVEMENT OF BEETAL GOATS AND INDIGENOUS CHICKEN THROUGH DISSEMINATION OF SUPERIOR SIRES

The objective of this project was to provide selected superior cocks and bucks to farmers for improvement of indigenous chicken and goats. The focus is to attain sustainability and self-sufficiency in egg laying village chicken as well as improvement in the growth potential of indigenous Beetal goat strains. Selected cocks were procured from PARB funded project and distributed to indigenous chicken farmers during first year of the project. For this purpose 100 selected cocks of UniGold breed were distributed among 100 indigenous chicken raising farmers. Moreover, 400 hens and 50 cocks in a set of (4 hens +1cock) were distributed to UAF employees. For second component of project, 60 kids of Beetal goat (30 Makhi-Cheeni and 30 Desi/ Faisalabadi) were purchased from goat breeders of Faisalabad, Sahiwal and Bahawalpur. All selected animals were of age between three to six months. Goat kids were selected on the basis of Breed/Strain specific characteristics like coat color, ear length and body size. Animals were reared on the Livestock Farm of University of Agriculture, Faisalabad. All kids were vaccinated against specific diseases. Body weight along with different body measurements were recorded fortnightly. These data of weight gain were used to select animals with high growth potential while data of different body measurement were used to determine relationship of body weight with different body measurements. After one and half year of rearing and selection of bucks, 30 selected bucks were distributed to poor women goat keepers at Bahawalpur (registered with a NGO, Khwateen Council) through Agricultural Innovation Program (AIP), PARC, Islamabad. Two bucks were transferred to Directorate of Breed Improvement and Farms, L&DD, KPK for breeding of goat flocks under that directorate. While 13 bucks were transferred to Directorate of Farms (UAF) for dissemination to local goat breeders. Effective utilization of these selected bucks in field is expected to bring desirable genetic improvement in goat populations at target sites.

TRANSFER OF VITICULTURE TECHNOLOGY TO THE FARMERS IN POTHWAR REGION

In pakistan table grapes are traditionally being grown in Baluchistan and Khyber Pakhtunkhwah. With provision of new varieties which have wide adaptability to soil and climate, a significant part of Punjab province including Pothwar region has become suitable for commercial production of certain grape varieties. Currently in the Pothwar region the grapes are gaining momentum with an area of more than 600 acres. A number of commercial growers like Izhar Group, UMMA Grapes Farms etc. have established grape orchards of more than 20 acres. Grape clusters are developing in Tehsil Hazro (District Attock), in few pockets of Sangjani, Baharakahu (Distt. Islamabad) and Tehsil Talla Gang (District Chakwal). However, adoption of viticulture amongst farmers is slow due to lack of awareness about its production technology and high initial cost. As being new crop, farmers are not aware about cultural practices like irrigation requirements, nutritional and pest management. Canopy management is highly technical job, and farmers have no idea about this aspect of production technology. Realizing the importance of the issue, this project was designed in order to resolve these problems by providing latest production technology to the farmers. The project emphasized the growers training by arranging the farmers' day in different vineyards, to correct the faulty practices in the light of survey.

REMOVAL OF EARLY FRUITING BRANCHES (REFB) AT HIGHER N DOSE IMPROVES GROWTH, YIELD AND INSECT CONTROL IN Bt COTTON BY ALTERING ITS SENESCENCE AND Cry1AC EXPRESSION PATTERN

Cotton "white gold" is the leading fibre crop worldwide. Pakistan is one of the largest cotton producing and consuming countries in world. Cotton has played significant role in agriculture, employment, industrial development, financial stability and economic viability ever since the country attained the independence. Bt cotton is rapidly dominating world cotton production due to tolerance against insects.

Bt varieties have a drawback of slow emergence but first true leaf appearance is earlier than conventional cultivars. Premature senescence in Bt cotton is a persistent constraint in achieving yield potential around the globe. Source-sink relation in cotton imperatively depicts an inclusive illustration about vegetative and reproductive parts, roots and canopy and carbon and nitrogen metabolism. Therefore, a good synchronization of source and sink affirms normal maturity while disruption of balance consequences in premature senescence. Forfeits of early senescence are diminished capability of boll opening, total bolls and ultimately lesser seed cotton yield.

Secondly, the main objective to provide Bt cotton to farmers was more environment friendly and efficacious insect control at a reduced cost. But it has now been realized that Bt cotton cannot fully control all lepidopteran insect pests; in some cases this control is less than 50 %; the reason might be uneven expression of Bt gene toxins (Cry1 Ac proteins). So, there is need to modify/increase translocation of this toxin from source to sink at flowering time.

To address above-mentioned issues, field experiments were conducted, at University of Agriculture Faisalabad, on growth manipulation of cotton. It was found that removal of two early fruiting branches (REFB) declined sink capacity enhanced soluble sugars and leaf nitrogen. Therefore, leaves stay green for longer duration at terminal stages and senescence is delayed.

Moreover, Bt protein (Cry1Ac) contents in Bt cotton were significantly reduced by nitrogen deficiency. It is well documented that the nitrogen metabolism of Bt cotton affects Cry1Ac content, while removal of early flower buds changes the nitrogen metabolism.

REFB is quick and easy to understand agronomic approach having no damaging impact on environments. In quantitative terms, we can summarize our results that REFB under recommended P (115 kg ha-1) and K(95 kg ha-1) with some higher N dose (225 kg ha-1) delayed senescence by increasing number of nodes for first fruiting branch (11-18%), first fruiting branch height (6%), days taken to nodes above white flower = 5 (14%), nodes above cracked boll (23%) and plant height (3-4%). Furthermore, REFB improved number of monopodial branches (12%), sympodial branches (12%), total bolls (9%), opened bolls (13%), boll weight (9-13%) and ultimately seed cotton yield per hectare (17-18%). REFB also manifested 15-17% uplift for N accumulation in cotton leaves and boosted Cry1Ac by 32-35% in boll pericarp causing a significant decrease in insects' damaged bolls per plant (14% in 2015 and 47% in 2016).

It is also worth mentioning that REFB involved an additional cost of Rs. 7000/- per hectare however, income generated from increased yield was quite higher than the additional expenditure.

USE OF DRONES FOR SITE-SPECIFIC WHEAT-CROP MANAGEMENT

To map the crop-health from different perspectives, the airborne and satellite systems have played a pivotal role in shaping modern agriculture. In this domain, the satellites have been the major source of data to monitor the crops at large scale. Despite their dominance especially during the last two decades, the image acquisition through satellites come with certain problems, i.e., susceptibility to the weather conditions, low temporal and spatial resolutions, delay in the results, etc. The data acquisition through manned aircrafts do solve these issues but this comes with very high expenses In contrast to the satellites and manned aircraft, the unmanned aerial vehicles (UAVs) offer a great deal of flexibility in performing a variety of tasks related to agriculture all at very affordable cost.

The key objectives of this project were to assess the potential of the UAVs to monitor the health of the wheat crop, to study the impact of different treatments of nutrients, irrigation and other input ingredients on the wheat, to detect the weeds within the crop-field during the early season, to analyze the impact of the height of aerial operations on the quality of the results, etc. A number of aerial operations have been successfully performed on agronomy research farms over a variety of crop-fields. The images acquired are being processed in sequence and significant results have been obtained. Our preliminary results indicate the following:

1. The different treatments of nitrogen and water applied in different subplots can be mapped considerably. This further leads to estimate the yield and biomass accordingly.
2. Certain types of the weeds within the wheat crop are successfully detected during the early-season through aerial images.
3. The height of the aerial platform has a significant effect on the quality of the results.
4. Different types of the crops can be distinguished through high-resolution aerial imagery which is generally not possible through low-resolution satellite based imagery.

It is pertinent to note that the UAV being used comprised of a low-cost quadrotor that is indigenously equipped with a multispectral camera to work for applications in agriculture. This is a very light-weight aerial platform able to deliver high-resolution multispectral imagery with a flying time of 15-minutes.

FIG PLANTATION IN SALINE SOIL AT PAROKA-2 FARMS, UAF

Five different cultivars of fig (selection 1, 2, 3, 4 and 5) were collected from Soan Valley, Horticulturist AARI, Pattoki and Peshawar University. The canopy management was adopted and plants were transplanted at High Density Planation (HDP). The cuttings of promising cultivars were transplanted in the Month of February- March and more than 5000 plants were prepared during the two years. Four acres' saline soil at Paroka 2 was selected for the establishment of Fig orchard. Farmers days was managed and approximately more than 100 farmers attended the workshop and got the training of canopy management and multiplication. The raised plants were distributed to the farmers to encourage them to establish the orchards on their saline soil. An Urdu Brochure about the production technology of Fig was distributed to the farmers.

PROMOTION OF KITCHEN GARDENING IN BUREWALA, VEHARI

An extensive kitchen gardening project funded by EFS, UAF is running at UAF Sub-campus Burewala since February, 2016. Project aims to promote kitchen gardening in urban and rural areas of Burewala. For this purpose, twenty three (23) field days has been conducted in various villages. Comprehensive lectures about health and importance of kitchen gardening has been delivered to the farmers along with printed booklets (in Urdu language). During October, 2016, A seminar was organized at UAF Sub-campus Burewala where invited participants (almost 400) were not only provided with vegetable seeds and kitchen gardening booklets but a comprehensive demonstration sessions was also carried out. For this purpose a kitchen garden was designed to provide sufficient vegetables to the common staff mess run at the campus. Project has successfully registered 1000 families which intends to practice kitchen gardening at their own. Among these total 177 plots completed with the Installation process and remaining plots are in the process of completion. Eighty-seven (87) beneficiaries have already harvested the winter vegetables including carrot, radish, turnip, Spinach, Corriander and Fenugreek. There was a lot of enthusiasm among the participants of the kitchen gardening program.

NANOPHOTOCATALYTIC WASTEWATER TREATMENT TECHNOLOGY FOR IRRIGATION

Encompassing research on Advanced Oxidation Processes (AOP) , especially photocatalysis has provided the background for developing effective water treatment systems, where no external addition of costly and potentially dangerous oxidants are needed and no secondary pollutants are produced. In the present project Solar photocatalytic reactor has been setup at pilot scale to treat municipal and industrial wastewater, containing natural organic matter, dyes, surfactants, heavy metals etc. Wastewater after the removal of these water pollutants can be utilized for irrigation and industrial operations.

Nanoscaled solar photocatalysts capable of degradation of water pollutants have been grown on diverse substrates to get them immobilized keeping in mind the cost effectiveness, photoactivity and reusability. The substrates used were polyester, polypropylene, nonwoven polypropylene, carbon fabric, glass and ceramic. The nanomaterials of 2D morphology have been grown using three different methods and got characterized before using them as solar photocatalyst. The scrutinized substrate i.e., ceramic tiles (Fe doped ZnO) were fixed in the open inclined plane solar photocatalytic reactor, constructed at Agronomy farms, UAF. Under the batch process municipal wastewater of hostels of UAF and industrial effluents from Rajawala main drain, Maqbool road and Sargodha road textile mills i.e. Noor Fatima Textile, Sitara textiles, Cresent textiles were collected in drums and pumped through the reactor continuously till it turned free of odor and color. The treated water has been analyzed by different techniques to assure the removal of specific pollutants. Water quality parameters were also determined, before and after treatment of wastewater till they fall in the permissible range fixed by World Health Organization (WHO). According to the results obtained, within 4-6 hours wastewater of all kinds can be rendered reusable on exposure to natural sunlight having solar flux in the range of of 5-6 kwh/ m2/day. The reusability of photocatalyst bearing substrate has also been determined to recommend the experimented substrate fit for use at pilot scale.

In future other substrates and nanomaterials would also be experimented to select the most cost effective, efficient and durable prototype photocatalyst reactor. The treated wastewater is being planned to be used for watering of pot plants. The effect of treated water on plant growth, flowering and yield would also be determined. Analysis of soil being irrigated by treated wastewater would be tested regarding the levels of nutrients and toxicity. For this purpose, collaboration with Department of soil science is also under consideration.

PROMOTING FORESTRY/AGROFORESTRY ON PROBLEMATIC SOILS IN FAISALABAD AND ADJOINING DISTRICTS

It is estimated that 40,000 hectares of land were being lost due to salinity and water logging every year in Pakistan. The area affected by waterlogging (water table within 5 feet) is 2.339 mha, while area affected by soil salinity is about 2.55 mha. Out of four provinces Punjab is severely affected by salinity (43.2%). In the current scenario biological approach through agroforestry practices is the best solution for the reclamation of such sites.

Forest nursery at Proka-I farm of UAF and the Department of Forestry has been completed and planting stock of both nurseries is available. Different cultural operations related to forest nurseries are in progress in both nurseries. Problematic soils and model farmlands were selected from Satiana (Faisalabad), Sangla hill (Nankana Sahib) and Gojra (T.T.Singh) with the cooperation of agriculture officers. Questionnaire was prepared at first in English then keeping in the view the education level of farmers it was translated in urdu. Data was collected by visiting the farmers. Farmer days were organized to transfer the technology of soil reclamation through biological approach. Planting was carried out during July-August, 2016 (Moonsoon) and February-March, 2017 (Spring season). The planting stock of Proka nursery was used for Proka farm area.

ESTABLISHMENT OF COMMUNITY ORIENTED MODERN FRUIT PLANTS NURSERY SYSTEM AT UAF SUB-CAMPUS BUREWALA

In june, 2016 2000 seedings of rough Lemon rootstock were managed from Citrus Research Station Sahiwal and were containerized in polybags (Maust, and Williamson, 1994). The success rate was over 90 percent and plants are expected to be ready for grafting in March 2017. Fresh Seeds of Jaman were sown during second half of June 2016 showing very promising germination (>80%) which produced 230 plants after 9% mortality during transplanting. Mango seedlings were purchased and transplanted in polybags during different months of the year. The success rate was found to be inversely proportional to the atmospheric temperature during the trial months. About 20000 seeds of Rough Lemon rootstock were sown during September and October 2016 as per viability of fruit for seed extraction from the only regional authentic source of Citrus Research Station Sahiwal. Fig cuttings were cultivated during December/January showing significant variation in sprouting in relation to cutting sizes. Grape (Cultivar Thompson Seedless) cuttings were arranged during December/January 2017 and were planted resulting in 300 vines from a total of 600 cuttings. One water reservoir with dimensions of 16×16×6 feet and a total capacity of more than 1400 cubic feet water was constructed from other than project sources. Similarly, a brick-concrete dugout of 16×16×5 feet (1280 cubic feet) was built for dumping, decomposition and enrichment of different organic media. Currently sugarcane byproduct known as bagas is in this storage and being used for filling the polybag containers for transplant of mango, citrus, and other fruit species. Trials of falsa are also going on,

35

DEMONSTRATION OF IN VITRO CLONAL PROPAGATION SYSTEM IN ELITE GUAVA CULTIVARS

Guava is known for its higher nutraceutical properties and richness in ascorbic acid content. Among fruit crops, global production and marketing of guava is expanding rapidly due to its early production in response to pruning and recurrent fruit production. This trait expands the harvesting span and enables farmers fetching better prices in the market. Sadabahar selections in the white fleshed Gola (Round) and Surahi (Pyriform) cultivars offer 7-8 months regular production which is highly attractive for the farmers. Cultivar Chinese gola has also emerged as candidate cultivar for high density plantations due to its heavy bearing habit. Pakistan stands second after India in terms of annual production however its per hectare yield (7.5 tons h-1) is lowest in the Asian region. Key factors involve seedling based industry, heterogeneous plant population, lack of efficient clonal propagation system and low planting density. Commercialization of asexual propagation technologies is yet to be achieved. Asexual propagation in field is season dependent and require more plant material. Using plant tissue culture tools, plant material can be multiplied round the year using little plant material under aseptic environment. Development of cost-effective tissue culture technology in the elite indigenous plant material is also desired for biotechnology applications in future. The development and demonstration of clonal guava nursery production system has been fascinating and inspiring for different stakeholders in guava plant industry. Hence, the project was initiated with following aims.

Objectives:

- Morphological screening, collection and selection of elite guava cultivars fruit/germplasm
- Establishment of in vitro propagation in superior plants from vegetative tissues and their subsequent clonal multiplication
- Demonstration of technology to progressive growers, nurserymen and other stakeholders involved in guava fruit plant production.

Accomplishments:

Higher morphological and physico-chemical diversity was observed in elite strains of Gola (24) and Surahi (28) cultivars. Surahi strains showed more diversity in physical and chemical traits compared with Gola strains. Leaf biochemical analysis for antioxidant activity revealed higher variability in similar strains collected from different localities including traits like total phenolics and flavonoids. Combined use of sodium hypochlorite (commercial bleach) and mercuric chloride have been effective in elimination of microbial contamination. Polyvinylpyrrolidone (PVP) effectively reduced phenolic exudation in the nodal segments excised from field. Phenolic exudation and explant browning was less in juvenile plants compared with mature plants. Nodal position in the plant showed variable response for phenolic exudation. Shoot induction (%) and rooting (%) was higher in explants collected from juvenile plants/tissues compared to mature plants. Shoot induction has been higher in both Gola and Surahi strains at higher levels of BAP. Varietal screening for shoot induction (%) revealed higher shoot induction, number of leaves and plant survival (%) in SBSM and BWS Surahi strains compared with strains from Sindh region in media containing BAP alone and in combination with other PGRs. In cv. Gola strains, shoot induction (%) was not much variable in different strains and shoot induction was higher at higher levels of BAP. Both in vitro developed and field grown mother plants have been used for plant multiplications. The acclimatized plant material is being transferred to green house. The developed in vitro plant multiplication system has been demonstrated. The collected strains in different guava cultivars have been established in guava germplasm resource in University gardens for future studies. The technology is being demonstrated and disseminated to progressive growers and other stake holders through participation in exhibitions, festivals, conferences, workshops and using web resources and published literature.

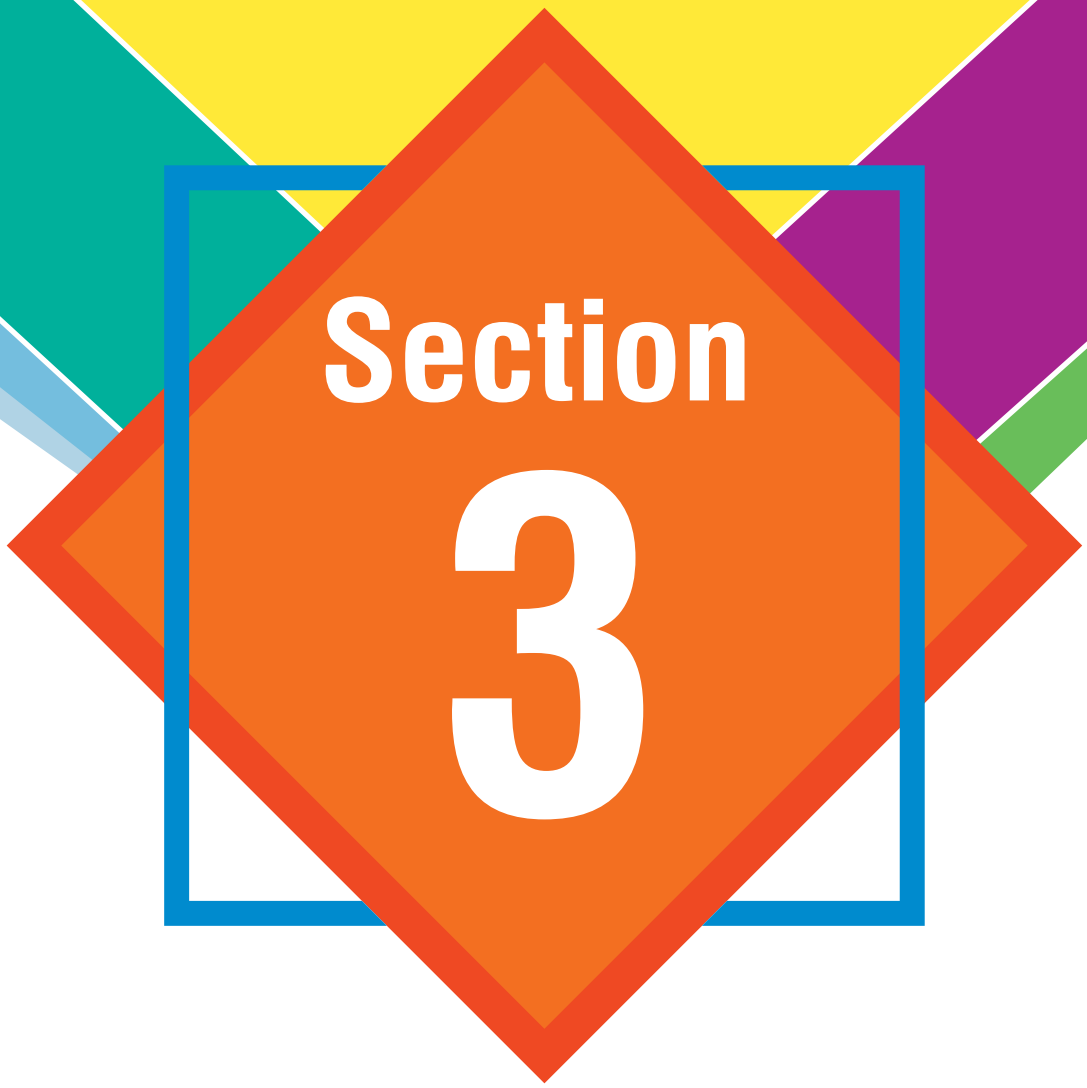
2.4 Outreach Activities during 2016-17

One outreach project started in 2011 was converted into a regular program by the Board and approved its SoPs under which faculty members submit a proposal for an activity ranging from one day to one week. These proposals are processed through a fast track system, through a committee and approved by the Chairman BoD/ Vice Chancellor. The outreach program comprises of hands-on trainings, demonstrations, farmers gathering, exhibition and lectures/seminars for the awareness/sensitization of the community for development of agriculture and livestock in Pakistan. The major issues addressed were Kitchen Gardening, Biogas Production, Milking Methods, Food Preservation, Child Care, Dying and Stitching, Dairy Farming, Silage making and Awareness about Dengue, Flood Relief Program etc. These programs have received enormous response and have been highly admired.

The activities are often performed at the community doorstep. However, farmers and other community groups may be invited at campus or any central place for the outreach activities. Further it is preferred to involve govt. departments or NGOS in organizing these events.

The outreach activities conducted during the year 2016-17 are as under:

Sr.#	Name & Department	Title	Location
1.	Dr. Sohail Sajid, Assistant Professor, Department of Parasitology, UAF	Congo Virus: Prevention and Eradication	September 08-09, 2016. UAF
2.	Dr. Tariq Aziz, Project Director, UAF Sub-Campus Depalpur, Okara	National Potato Seminar for farmers.	September 28,2016 at Okara
3.	Dr. Faqir Muhammad, Associate Professor, Institute of Pharmacy, Physiology and Pharmacology, UAF.	Drug Residues, Use of hormones and Reproductive health in animals	November 30, 2016 at Village Sayyed, Tehsil Kot Momin, District Sargodha
4.	Dr. Sajid Mahmood Nadeem, Associate Professor, UAF Sub-Campus Burewala, Vehari	Revival of Cotton in District Vehari/ Enhancing Agriculture Productivity	January 15, 2017 at UAF Sub-Campus Burewala, Vehari,
5.	Dr. Adnan Younis, Assistant Professor, Institute of Horticultural Sciences, UAF.	Promotion of Edible Landscape in Urban Areas	February 5, 2017 at Qadar Bakhsh Farm, Chak No. 199 RB near Gatwala forest
6.	Dr. Adnan Younis, Assistant Professor, Institute of Horticultural Sciences, UAF.	Cultivation and Propagation of Cacti and Succulents	March 5, 2017 at Qadar Bakhsh Farm, Chak No. 199 RB near Gatwala forest
7.	Dr. Beenish Israr, Lecturer, Institute of Home Sciences, UAF	Maternal and Child Nutrition	Feb to April, 2017 at chak no. 272 JB Jhang Road (near Pansera)
8.	Dr. Aysha Sameen, Assistant Professor NIFSAT, UAF	Nutrition Screening and awareness campaign	April to May, 2017 (1) Jhumra, (2) Tandlianwala (3) Okara.
9.	Dr Aysha Riaz, Asst. Prof. Institute of Home Sciences, UAF	Creative Skill Enhancement	May 3-5,2017 The knowledge Inn School System. Chak No. 219/R.B Talianwala,



RESEARCH & DEVELOPMENT

3.1. Projects Initiated during 2016-17

S.#	Title of the Project	Name of the PI	Duration
1.	Identification of Lytic Phages and Cloning Lytic Enzymes Against Multidrug Resistant Staphylococcus Aureus From Mastitis Cases.	Dr. M. Aamir Aslam, Assistant Professor, Institute of Microbiology, UAF	2 Years
2.	Evaluation of Dietary Probiotics and Zinc for Production of Antimicrobial Residue-free Broiler Meat in Heat Stressed Broilers	Dr. Hafsa Zenab, Associate Professor. Department of Anatomy & Histology, University of Veterinary & Animal Sciences, Lahore	1 Year
3.	Evaluation of Novel Inoculants of plant Growth Promoting Rhizobacteria for Biofortification of Cereals	Dr. Maqshoof Ahmad, Lecturer, Deartment of Soil Science, Univ. College of Agri. & Envir. Sciences, Islamia University of Bahawalpur.	2 Years
4.	Evaluation of Cell Mediated Immune Responses (CMI) as a Diagnostic Marker for Field Diagnosis of Latent Bovine Brucellosis	Dr. Al-Hafizah Shafia Tehseen Gull, Assistant Professor, Department of Pathology, UAF	2 Years
5.	Synthesis Characterization and Applications of Nanomaterials to Inhibit the Growth of Bacteria	Dr. M. Yaseen, Assistant Professor, Department of Physic, UAF	1 Year
6.	Epidemiology and Characterization of Bacterial Pathogens Associated with Epizotic Ulcerative Syndrome (EUS) and Motile Aeromonas Septicemia (MAS) from Pakistani Farmed Fish	Dr. Shahzad Ali, Assistant Professor, Faculty of Fisheries and Wildlife, University of Veterinary & Animal Sciences, Lahore	2 Years

3.2. Projects Completed during 2016-17

S.#	Title of the Project	Name of the PI	Duration
1.	Antibiotic Resistance Profiling of Salmonella Serovars Isolated from Local Poultry Farms	Dr. Aamir Ali, Junior Scientist, 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.	Refusal of Cottonseed Cake by the Ruminant Livestock: Is Bt-Cotton the Culprit?	Dr. Iqrar Ahmad, Rana, Assistant Professor, CABB, UAF	1 Year

3.3. Ongoing Projects during 2016-17

S.#	Title of the Project	Name of the PI	Duration
1.	Establishment of Cotton Wild Species Living Herbarium for Demonstration and Research Purpose.	Dr. Amir Shakeel, Department of Plant Breeding & Genetics, UAF	3 Years
2.	A Clinical Study to Investigate the Liver Specific microRN as Non-Invasive Biomarkers of Hepatitis: A Novel Diagnostic Tool	Dr. Muhammad Imran Arshad, Assistant Professor, Institute of Microbiology, UAF	2 Years
3.	Development of a local and sustainable potting substrate for containerized nursery production	Dr. Iftikhar Ahmad Assistant Professor, Institute of Hort. Sciences, UAF	3 Years

ANTIBIOTIC RESISTANCE PROFILING OF SALMONELLA SEROVARS ISOLATED FROM LOCAL POULTRY FARMS

The bacteria, Salmonellaare responsible for moderate to severe gastroenteritis in poultry and are one of the major bacterial diseases of chicken particularly in most of developing countries. Salmonella infection has been a continuous problem in the poultry sector and is potentially transmissible to human. The precise diagnosis of these infections is usually not practices in current local diagnostic settings and the estimate diagnosis is mainly made by opening the dead birds and observing the postmortem signs. This project is aimed to optimize the isolation and precise detection of Salmonellain suspected clinical chicken samples using advanced diagnostic tools. During the project different poultry samples (n=340) belonging to different poultry farms of Faisalabad region which were suspected to have Salmonella infection were collected and processed for growth through different microbiological media which specifically encourage the growth of Salmonella bacteria. Bacterial colony morphology and biochemical tests which are less sensitive and specific resulted in probable identification of 255 bacteria as Salmonella (Fig.1).

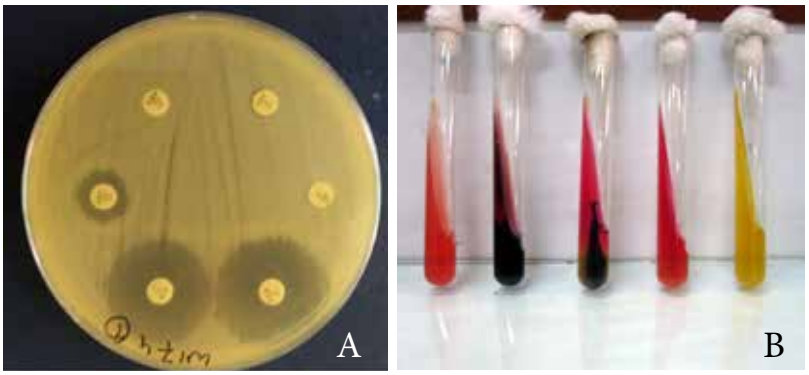


Fig.1 Biochemical identification of *Salmonella*
A: Typical colonies of *Salmonella*
B: Characteristic reaction of *Salmonella*

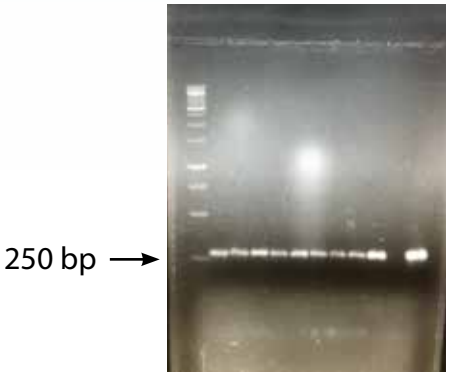


Fig.2 PCR based detection of *Salmonella*.Lane M: Molecular weight Marker. **Lane 1-4:** Amplification of gene fragment (invA) 284 base pairs
A: Typical colonies of *Salmonella*

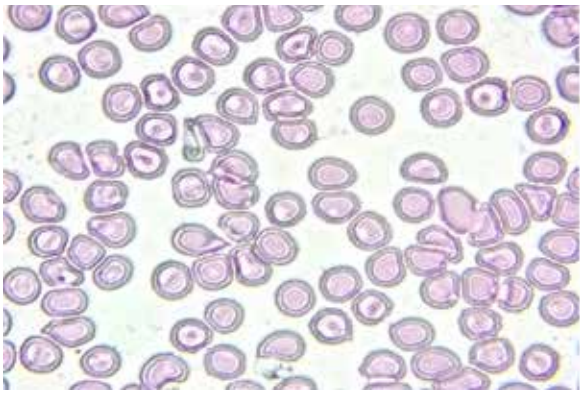
The advanced diagnostic test named polymerase chain reaction (PCR), which specifically detect the genetic material (DNA) of different types of Salmonella, was optimized by applying different experimental conditions so that the test can now be performed with better reliability and reproducibility. The optimized test confirmed 255 of the samples as Salmonella. The test PCR has been optimized for Salmonella genus (Fig. 2) and each of the four most common types of Salmonella (for poultry) including S. Typhimurium, S. Infantis, S. Enteritidis and S. Gallinarum. The number of Salmonella identified belonging to each of these are S. Typhimurium (n=51), S. Infantis (n=38), S. Enteritidis (n=4) and S. Gallinarum (n=2). The particular fragments of DNA (16S rRNA gene) of the representative S. Typhimurium and S. Enteritidis have also been sequenced from a commercial company, Macrogen, Korea. The sequencing results not only confirmed our Salmonella detection but also showed relatedness of these bacteria with other bacteria isolated from different parts of the world by phylogenetic analysis. The well identified Salmonella were checked for their susceptibility or resistance against commonly used antibiotics in second year of the project so that drug of choice against Salmonella can identified to facilitate the designing of highly targeted antibiotic therapy against Salmonella infections in poultry.

IN-VIVO SAFETY EVALUATION OF SYNTHETIC FOOD COLORING COMPOUNDS

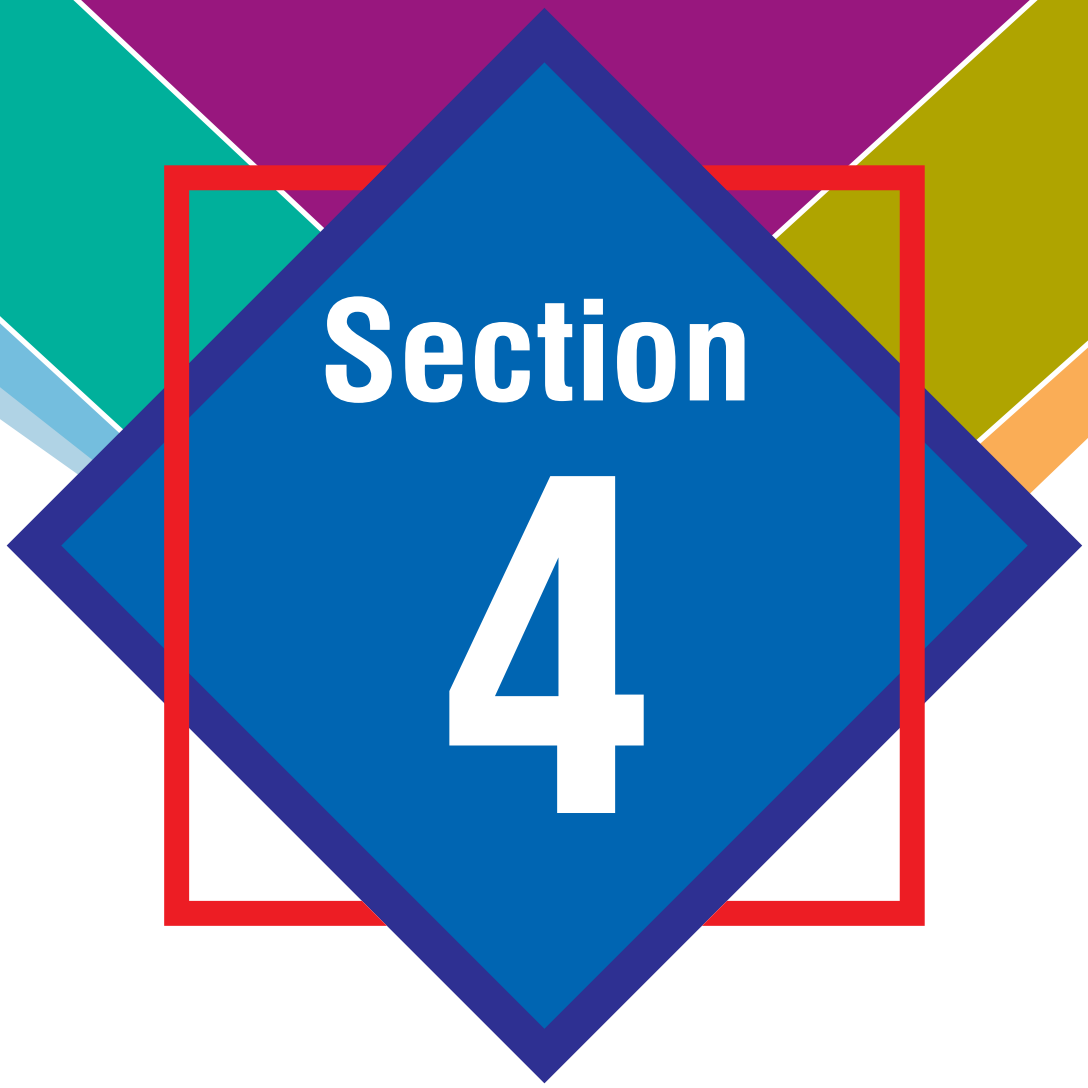
Synthetic food colors are being used in the manufacture of numerous food items. These food items may be beverages, ice-creams, sweets, bakery and confectionary products. However, these synthetic food coloring compounds have been under debate regarding their safety for human consumption. As these foods colors are considered harmful and have detrimental effects on human health; thus, the current study was carried out to investigate any harmful effects of these food coloring compounds utilizing experimental animals (rats). For the purpose, various food colors with their generic names such as sunset yellow, lime yellow, apple green and raspberry red produced by two manufacturers (A & B) of Pakistan were given orally to experimental animals for a period of 30, 60 and 90 days. At the end of these intervals different physical, hematological and serological parameters were studied. In case of every food coloring compound it was found that these compounds had negative impact on the heath of animals.

Dissection of experimental animals to study the effect of different food coloring compounds on various body organs

Preparation of samples to study erythrocyte morphology of treated animals



Erythrocyte morphology of blood samples of animals treated with different doses of food colors



PRODUCT COMMERCIALIZATION

Commercialization is the process that converts ideas, research outcome, or prototypes into viable products that retain the desired functionality. In this regard EFS has established an independent facility "Business Incubation Center" in 2009, with the joint support of Competitive Support Fund (CSF) and Higher Education Commission (HEC), Islamabad. Another milestone is the construction of Exhibition Center which is meant for display/ demonstration of developed and tested innovative and cost effective technologies to attract the stakeholders of agricultural industry in the country. Endowment Fund has also established a Farmers' Market at University of Agriculture, Faisalabad.

- For small farmers (vegetable growers, poultry formers
- To sell their produce directly to the consumers

4.1. Project Initiated during 2016-17

S. #	Title of the Project	Name of the PI	Duration	Budget
1.	Processing of Raw Turmeric Using Newly Developed Dryer and Tumbler to preserve Curcumin.	Dr. M. Azhar Ali, Department of Structure & Environmental Engineering, UAF	2 Years	2.913

4.2. Project Completed during 2016-17

S. #	Title of the Project	Name of the PI	Duration	Budget
1.	Commercialization of IC Engines for Power Generation from Agri. Watse Using Gasifire	Dr. Anjum Munir, Department of Farm Machinery and Power, UAF	1 Year	2.167

Commercialization of IC Engines for Power Generation from Agricultural Waste using Gasifier

This study was carried out for the commercialization of I.C. engine for power generation from agri. waste using gasifier. Keeping in view the high temperature and pressure rages of the gasifier, the suitable material has been procured from the local market. The reactor is made of mild steel and combustion chamber of stainless steel because 1200 oC temperature is mostly produced in the oxidation zone of the gasifier. After the successful design of the gasifier, the development and fabrication of reactor, cyclone separator, wet scrubber, water separator, biomass filter and heat exchangers were carried out using local resources and manufacturing facilities. The reactor comprises four zones viz. drying zone, pyrolysis zone, oxidation zone and reduction zone. The initial ignition of biomass is done in oxidation zone under starved oxygen condition while the producer gas is finally produced in the reduction zone. A cyclone separator is used for ash removal from producer gas under centrifugal action while wet scrubber is used for washing of gas. The moisture in the gas is removed in water separator and biomass filter is used to remove remaining fine ash and tar particulates from the gas as well as cooling of gas. After the development of different components of the gasifier, the parts are assembled to make it a compact and easily portable unit. A 15 kW gen-set has been redesigned in order to couple with biomass gasifier and run on producer gas for power generation. For the installation of gasification unit, all the necessary civil work were finalized and the complete gasification unit has been installed at Agricultural Engineering Workshop, University of Agriculture, Faisalabad.

Gasifier Specifications

Gas output	20-24kWe	Fuel consumption	1:1
Thermal	90000kcal/hr	Feeding	Manual/Automatic
Gas production	90 m3	Gas Cooling	Refrigeration System
Parasitic load	5.5 hp	Biomass to Power	1.25 kg/kW

Height of the gasifier	= 2438mm.
Diameter of the gasifier	= 635mm.
Length of drying zone	= 660mm
Length of pyrolysis zone	= 722mm
Length of combustion zone	= 9 inches
Length of reduction zone	= 228mm
Diameter of throat	= 203mm
Number of nozzles	= 7

FINANCIAL REPORT

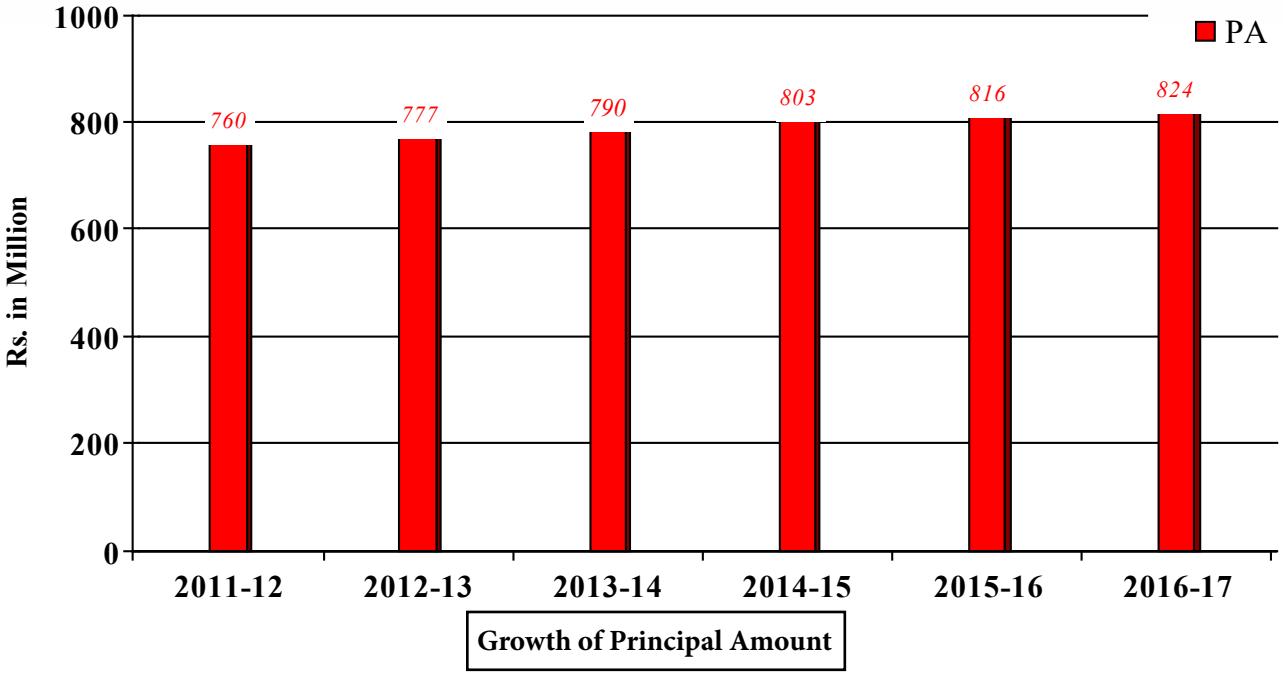
5.1 INCOME FROM ENDOWMENT FUND'S INVESTMENT

The Principal amount was invested in approved banks. A portion of its profit is retained for adding in the principal amount @ 15% of the profit to counter the impact of inflation/devaluation of rupee. The volume of principal amount at the start of financial year 2016-17 was Rs.816 million which was available for investment.

(Rupees in Million)

Description	Amount	Profit
Investments in Banks	816.000	38.846
Total:	816.000	38.846

The principal amount enhanced to Rs.824 million at the end of the financial year 2016-17



Expenditure

The allocation for the year, 2016-17 was originally made as Rs. 73.500 million for the five components, however the expenditure remained as Rs. 50.020 million. The break ups of income and expenditure is given in Table-I & II respectively.

TABLE-I

(Rupees in Million)

RECEIPTS	Actual
Opening Balance 1st July, 2016	31.337
Income from Investment 2016-2017	38.846
Other Receipts *	06.479
Total Receipts	**76.662**

***Income from Exhibition Center, ongoing projects and savings from completed projects.**

TABLE-II

(Rupees in Million)

EXPENDITURE/CASH OUTLAY	Actual
Faculty Development	07.451
Technology Transfer	12.966
Product Commercialization	10.121
Research & Development	05.491
Operation EFS	05.991
Transfer to Principal Amount (15% of the Income from investment)	08.000
TOTAL EXPENDITURE/CASH OUTLAY(a)	**50.020**
SURPLUS / SAVINGS(b)	**26.660**
Total (a+b)	**76.662**


EXHIBITION CENTRE