

PIR MEHR ALI SHAH
ARID AGRICULTURE UNIVERSITY
RAWALPINDI



SELF ASSESSMENT REPORT 2018-2020

M.SC (HONS) AGRICULTURAL ENGINEERING

FACULTY OF AGRICULTURAL ENGINEERING & TECHNOLOGY

Program Team

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INTRODUCTION

Agricultural Engineering is a discipline of engineering that applies engineering skills to improve agricultural production and processing. The primary concern of agricultural engineering is to solve the problems of providing food and fiber to the world population. These problems include labor intensive methods of agricultural activities, less sophisticated agricultural machinery, conventional sowing and harvesting techniques as well as lack of efficient irrigation systems and drainage practices. All these problems result in lower yields thus raising serious questions on food security. The agricultural productivity depends upon biological, hydrological, chemical and mechanical inputs. Agricultural mechanization, being one of the important links of the crop production cycle, is the process that involves use of agricultural machinery ultimately increasing crop yield. Similarly, efficient irrigation, water management techniques, smart control sheds and use of efficient use of renewable energies are necessary for sustainable agriculture of the country. The knowledge on modern tools/gadgets is necessary to transform agricultural system from conventional to precision /digital based agriculture.

The faculty of Agricultural Engineering and Technology was established at Pir Mehr Ali Shah Arid Agriculture University in 2013. The faculty is offering Ph.D, MSc. (Hons) and B.Sc. Agricultural Engineering programs. The *Master of Sciences (Hons.)* Agricultural Engineering program offered by Faculty of Agricultural Engineering and Technology provide research and education opportunities to students in various fields such as Farm Mechanization and Precision Agriculture, Land and Water Conservation Engineering, Renewable Energy, Farm Structures and Environmental Engineering. The educational objectives of program are based on the intellectual and professional development of graduate students. The degree of M.Sc (Hons) in Agricultural Engineering focus on the attainment of a high level of professional skills and knowledge for independent research and development. These program is conceptualized and designed to produce graduates with the highest level of training, who are expected to contribute towards the goal of realizing the full potential of professionals in Agricultural Engineering and solving the problems in agriculture to attain maximum yield with minimum inputs.

CRITERION-1

PROGRAMME MISSION, OBJECTIVES AND OUTCOMES

Standard 1-1: The program must have documented measurable objectives that support institution mission statements.

VISION STATEMENT:

The vision of Faculty of Agricultural Engineering & Technology is to produce high quality agri. engineering graduates and postgraduates to solve problems of agricultural industry through research for the development of farming community in dry/rainfed and irrigated regions of country to minimize income gap between rich and poor.

MISSION STATEMENT:

The mission of MSc (Hons) program offered by Faculty of Agricultural Engineering & Technology is to deliver and conduct advanced education and research in the field of farm machinery & precision engineering, land & water conservation engineering, energy systems engineering and structures & environmental engineering to ensure scientific management, control and optimum use of the available resources to enhance the agricultural production and address the energy, water and food issues in effective way.

OBJECTIVES:

1. To provide advance knowledge in the field of Agricultural Engineering to produce highly skilled postgraduates.
2. To identify and rectify the problems faced by the farmers and concerned industry regarding engineering related issues in agriculture sectors.
3. To conduct scientific research in agricultural engineering for enhancing agriculture production in Pakistan.
4. To establish linkage between agricultural industry and academia through research and development.

Main elements of strategic plan to achieve mission and objective:

- Development of a sound teaching and training system based on the experience and vision needed to provide a quality education.
- Designing of curricula involving core subjects, elective subjects, specialized areas, internship programs and study tours.
- Training of the students how to apply engineering principles to agricultural mechanization and precision agriculture, crop production, preservation and storage, agricultural water management, irrigation, farm structures and rural electrification.
- Promote awareness of the importance of agricultural engineering disciplines in the economy.
- Establishment of computer lab with internet facility.

- Establishment of well-equipped specialized laboratories for the students and researchers.
- Publication of scientific papers, articles, books, manuals etc.
- Execution of research of research projects funded by the Universities and other agencies.
- Arranging field tours to realize the problems more significantly faced by the farmers related to agricultural engineering discipline.
- Manage or establish agricultural engineering enterprises.
- Integrate agricultural engineering activities within the farming enterprises.
- Promote environmental conservation by effecting sound practices and policies.
- Pursue careers in agricultural engineering and related disciplines.

Table 1: Program Objective Assessment

Sr. #	Objectives	How measured	When measured	Improvement identified	Improvement made
1	To provide advance knowledge in the field of Agricultural Engineering to produce highly skilled postgraduates	Through examinations and students feedback	During and at the end of the semester	NA	NA
2	To identify and rectify the problems faced by the farmers and concerned industry regarding engineering related issues in agriculture sectors.	Field visits, literature review, through public and private reports	After completion of the course work and before starting the research	NA	NA
3	To conduct scientific research in agricultural engineering for enhancing agriculture production in Pakistan	Using different tools, experimental setup, data analyzing and guidelines of the supervisory committee	Synopsis/thesis defense, Oral exams, research publication	NA	NA
4	To establish linkage between agricultural industry and academia through research and development	Through MoU, research collaboration	Continuous process As per requirement	NA	NA

Standard 1-2: The program must have documented outcomes for graduating students. It must be documented that the outcomes support the program objectives and that graduating students are capable of performing these outcomes

PROGRAM LEARNING OUTCOMES

After completing their degree program, the students in Agricultural Engineering should possess the ability of:

1. Sound knowledge and understanding about their field of study
2. How to apply knowledge of agricultural engineering to solve problems
3. Design and conduct experiments, as well as to analyze and interpret data
4. Understand professional and ethical responsibility
5. Communication skills through presentations, oral discussions, review
6. Scientific writing and publication of research papers articles, etc.

Table 2: Program Objectives VS Program Outcomes

Programs Objectives	Program Outcomes					
	knowledge and understanding	Knowledge application	Experiment and Data Analyzing skill	Professional Ethics	Communication Skills	Scientific Writing
Education and Training	+++	++	++	++	++	+
Problem Identification	++	+	+	++	++	++
Research	++	++	++	++	+	+
Industrial Linkage	++	+	+	+	++	+

+ = Moderately satisfactory

++ = Satisfactory

+++ = Highly satisfactory.

PROGRAM ASSESSMENT RESULTS (Proformae 1 & 10)

There are following nine faculty members who teach and supervise M.Sc (Hons) Agricultural Engineering:

1. Prof. Dr. Muhammad Jehanzeb Masud Cheema	Incharge/Professor
2. Prof. Dr. Muhammad Yasin	Subject Expert/Professor
3. Dr. Muhammad Umair	Associate Professor
4. Dr. Tahir Iqbal	Associate Professor
5. Dr. Zia Ul Haq	Assistant Professor
6. Dr. M. Naveed Anjum	Assistant Professor
7. Dr. Muhammad Azam	Assistant Professor
8. Dr. Arslan Afzal	Assistant Professor
9. Dr. Muhammad Usman	Lecturer
10. Dr. Amjad Nabi	Subject Expert

These faculty members are involved in teaching different subjects and by providing guidance to the postgraduate students in their research as supervisor or as member of supervisory committee. These teachers were evaluated by the students at the end of each semester before the final exams according to the Performa 10 and the subject was evaluated according to Performa 1.

The evaluation of courses taught by different teachers in different semester and teacher evaluation by students are given below:

Table: 3 The subject taught in Fall-18

Fall-18			
Course no.	Credit hour	Title	Teacher
LWCE 713	3 (2–1)	Design of Hydraulics Structures	Dr. Amjad Nabi
FMPE 508	3 (2–1)	Harvesting Machinery	Dr. M. Umair
SEE 701	3 (2–1)	Parameters and Methods of Environmental Impact Assessment	Dr. Zia ul Haq

DR. M. Umair

Course: Harvesting Machinery

PERFORMA-1

General Comments

The course was very importing regarding crop harvesting and agricultural machinery used for crop harvesting. The instructor has great experience in this field and he taught this course very effectively. The students learnt useful knowledge and were satisfied with course objectives and contents.

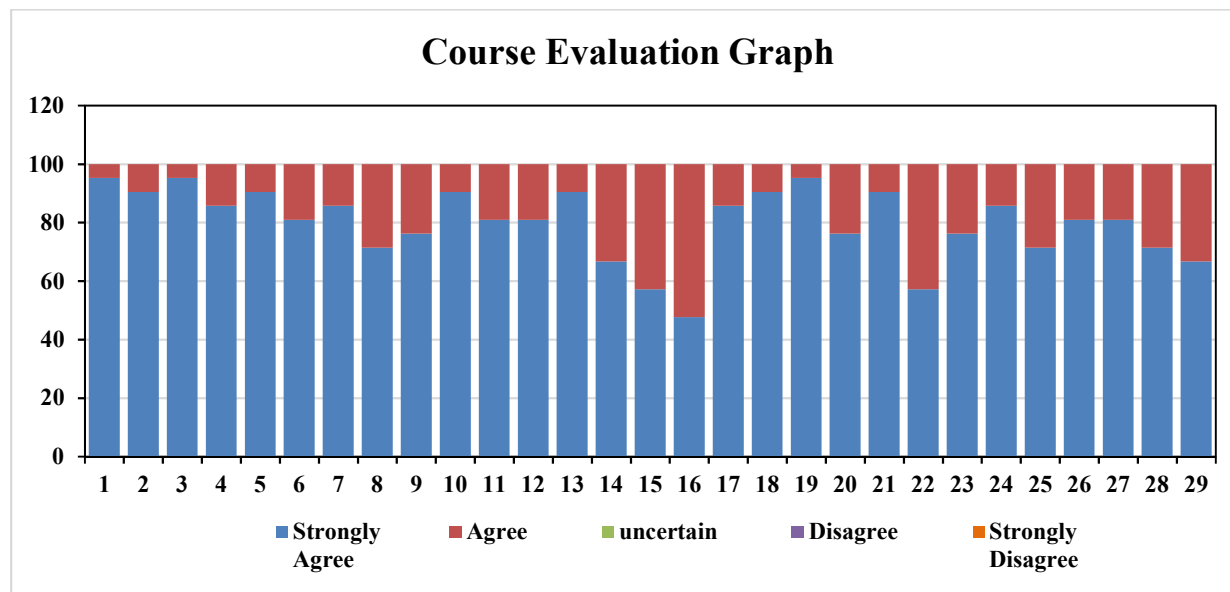


Fig: Course evaluation Harvesting Machinery, Fall-18

Sr. No.	Core Questions
1	The course objectives were clear
2	The Course workload was manageable
3	The Course was well organized
4	Approximate level of your own attendance during the whole Course
5	I participated actively in the Course
6	I think I have made progress in this Course
7	I think the Course was well structured to achieve the learning outcomes
8	The learning and teaching methods encouraged participation
9	The overall environment in the class was conducive to learning
10	Classrooms were satisfactory
11	Learning materials
12	Recommended reading Books etc. were relevant and appropriate
13	The provision of learning resources in the library was adequate and appropriate
14	The provision of learning resources on the Web was adequate and appropriate
15	The Course stimulated my interest and thought on the subject area
16	The pace of the Course was appropriate
17	Ideas and concepts were presented clearly
18	The method of assessment were reasonable

- 19 Feedback on assessment was timely
- 20 Feedback on assessment was helpful
- 21 I understood the lectures
- 22 The material was well organized and presented
- 23 The instructor was responsive to student needs and problems
- 24 Had the instructor been regular throughout the course?
- 25 The material in the tutorials was useful
- 26 I was happy with the amount of work needed for tutorials
- 27 The tutor dealt effectively with my problems
- 28 The material in the practicals was useful
- 29 The demonstrators dealt effectively with my problems

PERFORMA-10

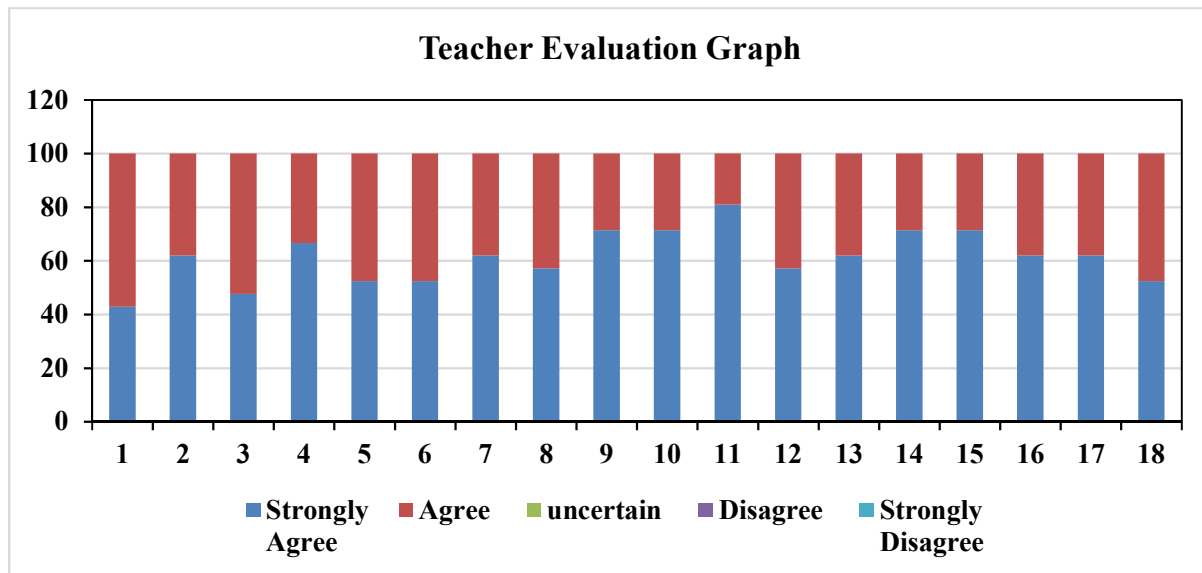


Fig: Teacher evaluation Harvesting Machinery, Fall-18

Sr. No.	Core Questions
1	The Instructor is prepared for each class
2	The Instructor demonstrates knowledge of the subject
3	The Instructor has completed the whole course
4	The Instructor provides additional material apart from the textbook
5	The Instructor gives citations regarding current situations with reference to Pakistani context.
6	The Instructor communicates the subject matter effectively
7	The Instructor shows respect towards students and encourages class participation
8	The Instructor maintains an environment that is conducive to learning
9	The Instructor arrives on time
10	The Instructor leaves on time
11	The Instructor is fair in examination

- 12 The Instructor returns the graded scripts etc. in a reasonable amount of time
- 13 The Instructor was available during the specified office hours and for after class consultations
- 14 The Subject matter presented in the course has increased your knowledge of the subject
- 15 The syllabus clearly states course objectives requirements, procedures and grading criteria
- 16 The course integrates theoretical course concepts with real-world applications
- 17 The assignments and exams covered the materials presented in the course
- 18 The course material is modern and updated

Comments

The graph shows that the teacher was dedicated and conveys the knowledge effectively. He was punctual, friendly and gives respect to the students.

DR. Zia Ul Haq

Course: Parameters and Methods of Environmental Impact Assessment

PERFORMA-1

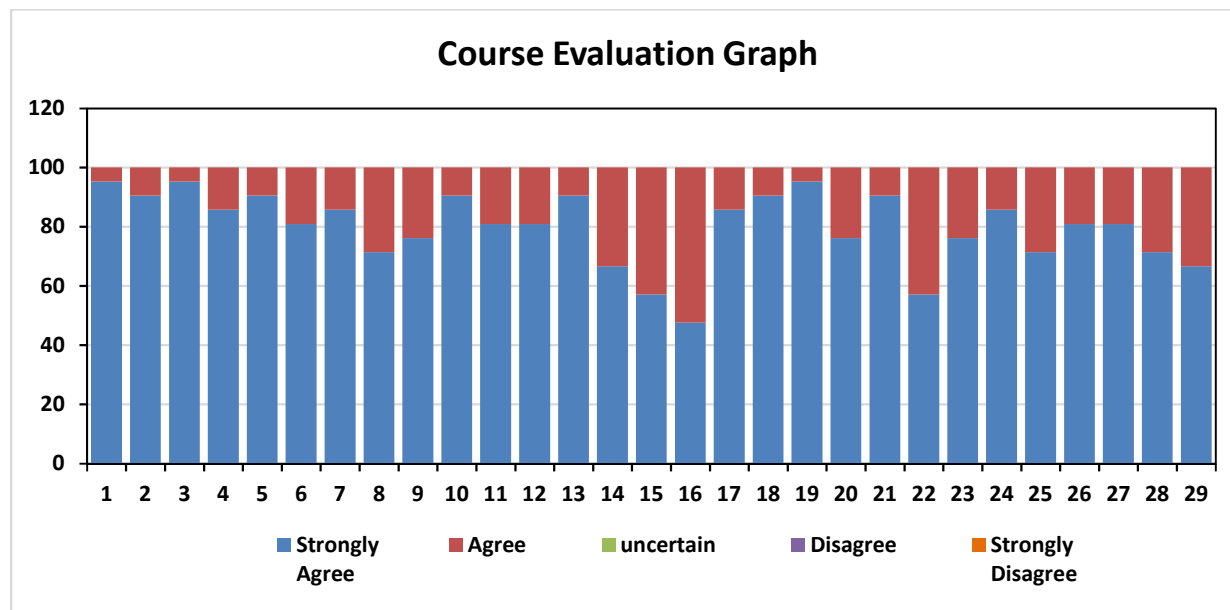


Fig: Course evaluation Parameters and Methods of Environmental Impact Assessment, Fall-18

General Comments/Suggestions

The course was interesting and provides the useful knowledge about environmental impact assessment and its methods used to evaluate engineering projects and their feasibility.

PERFORMA-10

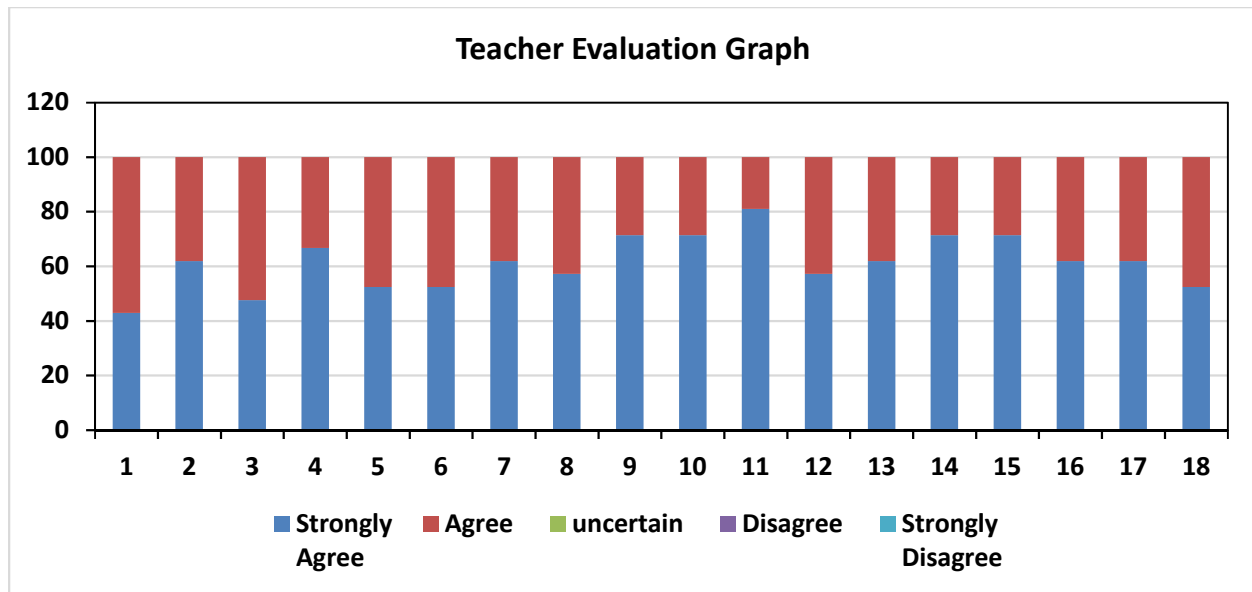


Fig: Teacher evaluation Parameters and Methods of Environmental Impact Assessment, Fall-18
Comments

The graph shows that the teacher was dedicated and conveys the knowledge effectively. He was punctual, friendly and gives respect to the students.

DR. Amjad Nabi

Course: Design of Hydraulics Structures

PERFORMA-1

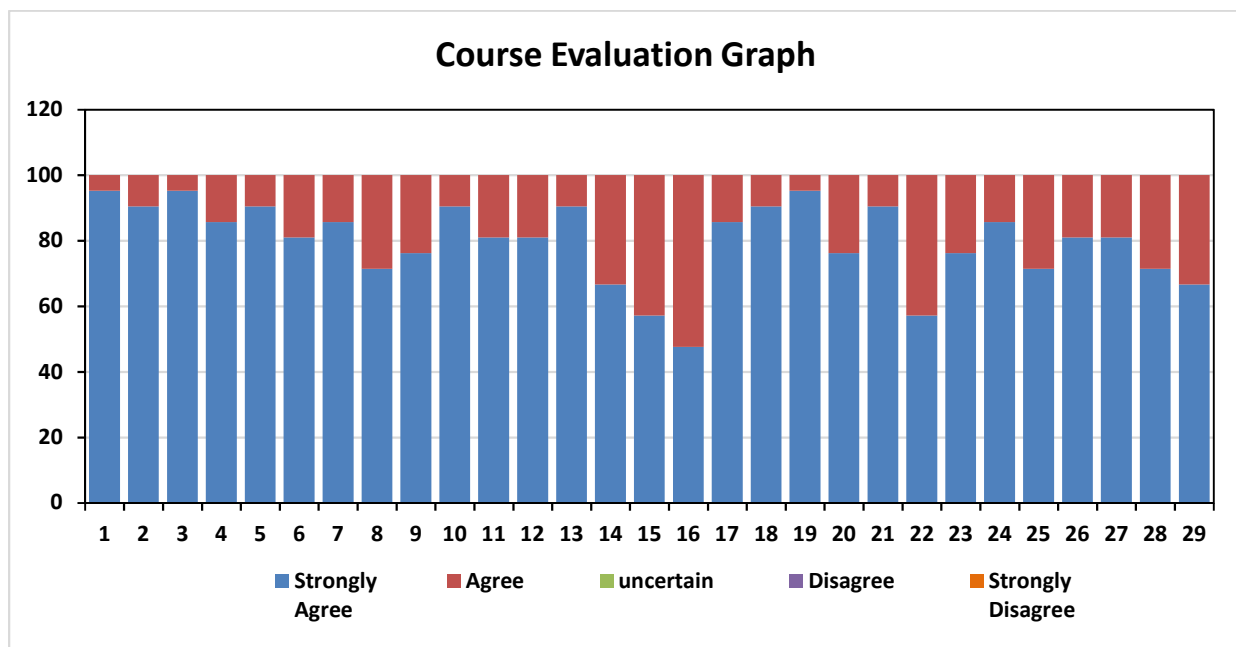


Fig: Course evaluation Design of Hydraulics Structures, Fall-18

General Comments

The course was interesting and provides the useful knowledge about hydraulic structure designs. Students were satisfied with course contents and objectives.

PERFORMA-10

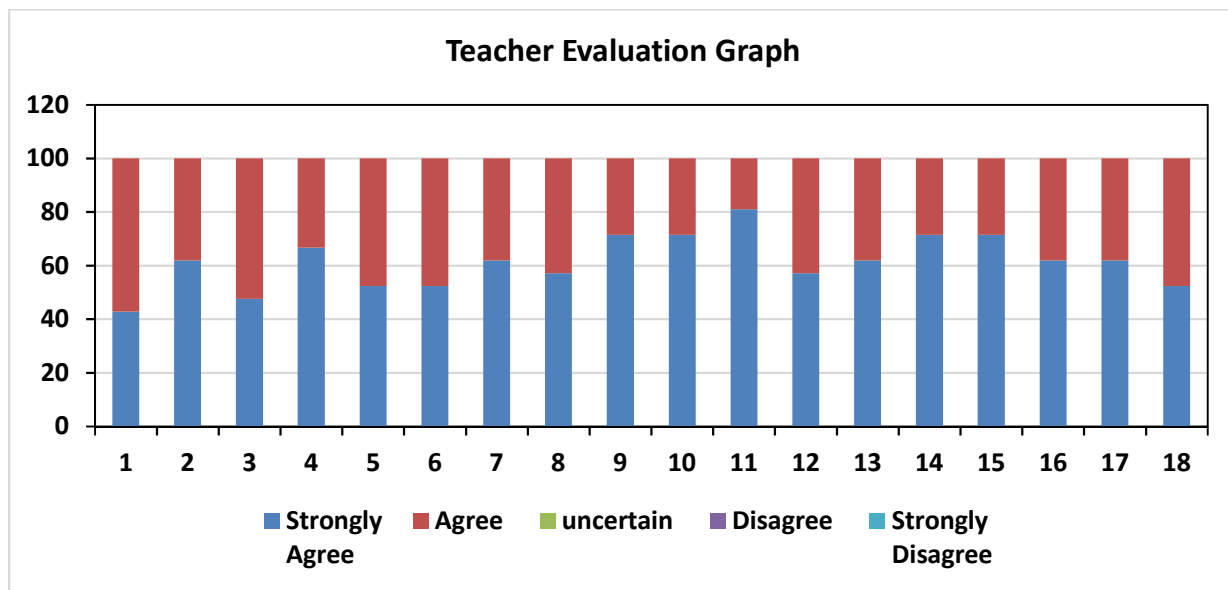


Fig: Teacher evaluation Design of Hydraulics Structures, Fall-18

Comments

Teacher remained prepared, regular in the class and showed respect for the students. Moreover teacher was available all the time for guidance and marks the papers without any biasness.

Spring-19
In this semester, the enrolled students finished their course work and started the research work and thesis.
Fall-19
There was no fresh enrollment of students in this semester.
Spring-20
There was no enrollment in this semester.

PERFORMA-2: Faculty course review report

Evaluation Questionnaire were filled by each faculty member regarding his course and then analyzed and presented in the table given below. The internal evaluation was done through with mid and final term examinations for all courses offered by department. It was observed from evaluation that the faculty is satisfied with curriculum. The filled Performa-2 are given in Annexure-A.

Table: 7 Course assessment evaluation based on performa 2

Course code	Credit value	Title	Class	Semester	Assessment Methods	No. of students	Grades					Course Instructor
							A	B	C	D	F	
LWCE 713	3 (2-1)	Design of Hydraulics Structures	MSc (Hon) Agri Engg	Fall-18	Mid &Final Exams	10	0	4	6	0	0	Dr. Amjad Nabi
FMPE 508	3 (2-1)	Harvesting Machinery	MSc (Hon) Agri Engg		Mid &Final Exams	2	0	2	0	0	0	Dr. M. Umair
SEE 701	3 (2-1)	Parameters and Methods of Environmental Impact Assessment	MSc (Hon) Agri Engg		Mid &Final Exams	16	3	8	5	0	0	Dr. Zia ul Haq

Standard 1-3: The results of Program's assessment and the extent to which they are used to improve the program must be documented.

The department has recently started regular assessment process and in future assessments results will be incorporated accordingly. Following are the strength and weaknesses identified.

Strengths of the Department

1. All faculty members for postgraduate programs is foreign qualified with great national and international experience of teaching, research, field and projects implementation in the field of Agricultural Engineering.
2. The department has won number of national projects in the field of precision agriculture, drip irrigation, biogas production, solar drying, and mechanization.
3. The faculty has won following projects in the history of University
 - a. Design and Operation of Indigenous hydroponic Agriculture system
 - b. Rain water harvesting at campus and its efficient use through drip irrigation system.
 - c. Design of solid waste disposal plant utilizing solid waste generated at campus
 - d. Establishment of Faculty of Agricultural Engineering and Technology at PMAS-Arid Agriculture University, Rawalpindi.
 - e. Big Data Agriculture Repository (BDAR), Center for Precision Agriculture, FAE&T, PMAS-AAUR
 - f. Smart IoT Farm of FAE&T at URF, Koont
 - g. Establishment of National Center of Industrial Biotechnology for Pilot Manufacturing of Bio-products Using Synthetic Biology and Metabolic Engineering Technologies

Standard 1-4: The department must assess its overall performance periodically using quantifiable measures

Present Performance Measures for Research Activities

Faculty	Experience	Journal Publication	Conferences Publications	Projects	Ph.D/M.Sc. Supervising
Prof. Dr. M. Jehanzeb Masud Cheema	20 years	70+	30+	10+	3
Dr. Muhammad Umair	14 years	20	07	3	3
Dr. Tahir Iqbal	11 years	25	09	2	3
Dr. Zia ul Haq	10 years	06	02	1	2
Dr. Arslan Afzal	08 years	18	06	2	3
Dr. M. Naveed Anjum	10 years	50+	10+	-	3
Dr. Muhammad Azam	06 years	35+	12+	-	2
Dr. Shoaib Saleem	07 years	20+	15+	1	1
Dr. Fiaz Hussain	05 years	30+	10+	-	2
Dr. Muhammad Usman	08 years	07	03	1	2

PERFORMA-3: SURVEY OF GRADUATING STUDENTS

The evaluation Performa 3 was filled by MSc graduating students. The filled Performa are given in Annexure-B.

PERFORMA-4: RESEARCH STUDENTS PROGRESS REVIEW

The evaluation Performa 4 was filled by MSc students. The filled Performa are given in Annexure-C.

PERFORMA-5: RESULTS OF FACULTY SURVEY

Evaluation Questionnaire (Performa-5) was filled by each faculty member on annual basis. Most of the faculty members reported that they are satisfied with the administrative support. The filled questionnaires are attached in Annexure-D

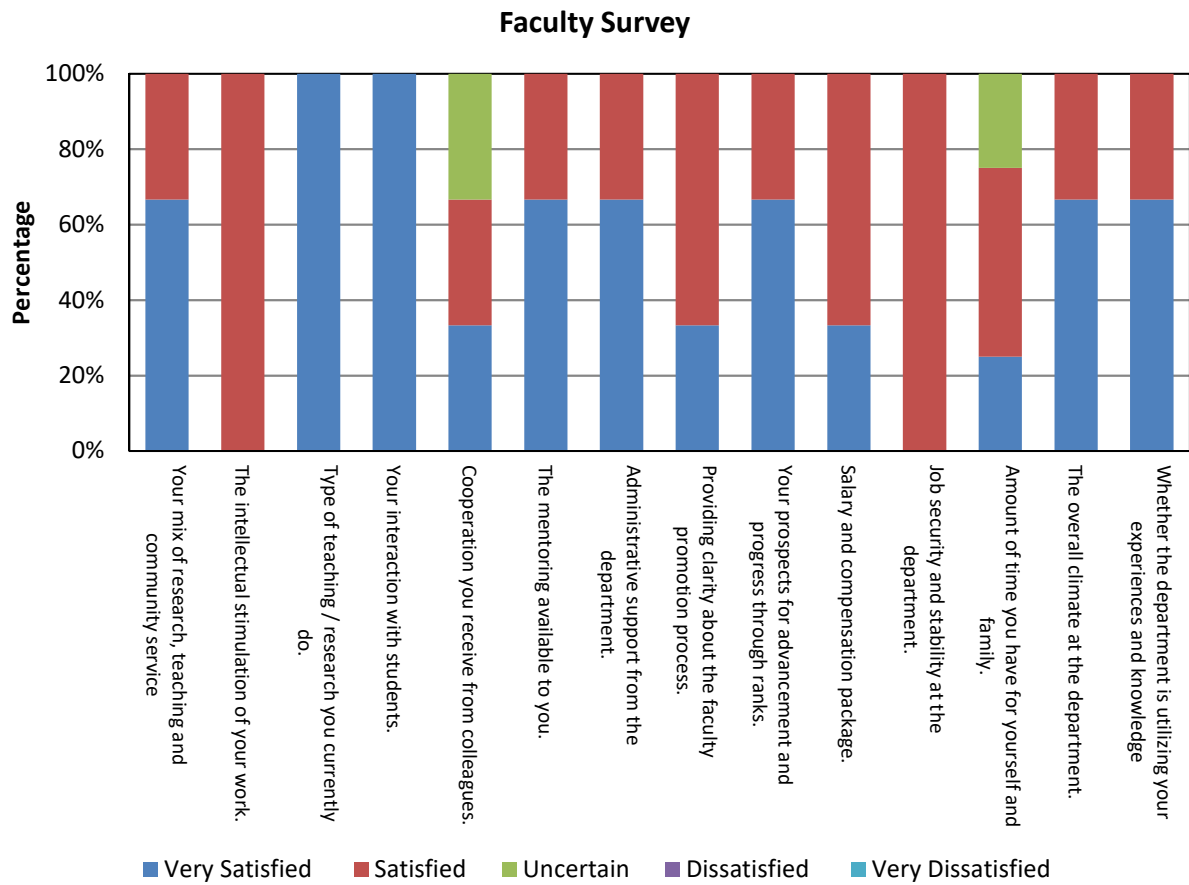


Fig. Faculty survey (results of Performa-5)

CRITERION 2

CURRICULUM DESIGN AND ORGANIZATION

Standard 2-1: The curriculum must be consistent and support the program's documented objectives.

Brief Introduction

The M.Sc (Hons) Agricultural Engineering programs by Faculty of Agricultural Engineering and Technology offers students the opportunity for study and research in fields including Farm Machinery and Precision Agriculture; Land and Water Conservation Engineering; Energy Systems Engineering; Structures and Environmental Engineering. The educational objectives of this program are based on the intellectual and professional development of graduate students. This programs is designed to produce graduates with the high level of training, who are expected to contribute towards the goal of realizing the full potential of professionals in Agricultural Engineering and solving the problems in agriculture to attain maximum yield with minimum inputs.

Objectives

The general objectives of this program are to equip graduates with the high level of research training, which is essential for effective performance of research, teaching and management in agricultural industry. On completion of degree programs, graduates should be able to do the following in best way possible:

- Capable of applying engineering principles to agricultural mechanization, crop production, preservation and storage, agricultural water management, irrigation and farm structures.
- Promote awareness of the importance of agricultural engineering disciplines in the economy.
- Manage or establish agricultural engineering enterprises.
- Integrate agricultural engineering activities within the farming enterprises.
- Pursue careers in agricultural engineering and related disciplines.

Entry requirement

M.Sc. (Hons.) Agricultural Engineering (2-4 years)

The faculty admits the candidates to M.Sc. (Hons.) Agricultural Engineering programs with the following qualifications;

- i. Sixteen years of education with the last degree in B.Sc. Agricultural/Mechanical/Civil/Electrical/Food/Energy/Mechatronics Engineering.
- ii. The minimum CGPA should be 2.5 (out of 4.0 in the Semester System) in the last degree.
- iii. Entry test score conducted by the University with a minimum 60% will be required at the time of admission.

Duration of the Programs and Semester-wise worked load

M.Sc. (Hons.) Agricultural Engineering

Duration

The minimum duration (residency) of M.Sc (Hons) Agricultural Engineering shall be 4 semesters and maximum duration shall be 68 semesters.

Course Workload

The requirements to be completed by each student for award of M.Sc (Hons) Agricultural Engineering degree shall be:-

- a) A minimum of 30 credits, and consisting of 24 credits of course work, and 06 credits of research thesis/dissertation based on approved research topic/project.
- b) A minimum cumulative grade point average (CGPA) of 2.5 will be required in the course work.

Admission Authority:-

- i. The admission to the course may be made by the Director Advanced Studies on the recommendations of the Admission Committee constituted by the Competent Authority.
- ii. The Admission Committee shall consider the applications for admission and formulate its recommendations according to the prescribed formula approved by the Academic Council and submit to the Director Advanced Studies.

Course of Study:-

- (i) The students will pursue the scheme of study as approved/amended by the Academic Council from time to time.
- (ii) All students are required to submit their Synopsis before the start of the 3rd semester.

Compulsory Courses:-

“Statistics” will be compulsory for M.Sc (Hons) Agricultural Engineering Students.

Supervisory Committee:-

- (i) Each student enrolled will have a supervisory committee to advise him/her in his/her program of studies and research.
- (ii) The supervisory committee will be constituted and submitted along with the title to the directors before mid-term examination of 2nd semester.
- (iii) The committee and the research title will be approved by the respective Dean of the Faculty and notified by the Director Advance Studies.
- (iv) The Supervisory Committee shall consist of at least three faculty members (the Supervisor, one faculty member from the major field of study and another member from any other allied subject/department). In addition a co-supervisor can be appointed if necessitated by any lack of expertise at the institute.

- (v) One of the faculty member from the major field of study will be designated as Chairperson of the Supervisory Committee.

Academic Standing:-

- a) Maximum Grade Point Average = 4.00
b) Minimum Grade Point Average for obtaining degree = 2.50

To remain on the roll of the university a student shall be required to maintain the following GPA/CGPA in each semester:

Semester	1 st	2 nd	3 rd	4 th
CGPA	1.5	1.75	2.00	2.50

Note: An academic year includes Fall and Spring Semesters only.

- (i) A student will be required to repeat courses failed in a previous semester at the first available opportunity provided that the maximum work load including the courses being repeated does not exceed the normal work load.
- (ii) A student, who obtains CGPA of 2.00 or above but less than 2.50, upon the completion of entire approved course work, may be allowed to repeat the courses of the previous semesters in which he/she had obtained the lowest grades, in order to improve the CGPA so as to obtain the minimum of 2.50 within the maximum time allowed for award of degree, failing which he/she shall cease to be on the roll.

Dissertation/Thesis:-

- (i) A student shall be entitled to submit thesis for examination after he/she has passed all the final examinations in the approved courses and comprehensive examination provided he/she has also fulfilled the minimum residency requirements.
- (ii) The thesis shall be prepared and presented in the manner laid down in the instructions approved by the Advanced Studies and Research Board.
- (iii) The unbound thesis shall be referred to the examiners for evaluation duly certified by the Supervisory Committee that the contents and form of the thesis are satisfactory for submission.
- (iv) The hard bound copies of corrected/modified final version of the thesis shall have to be submitted as defined in the university rules/regulation.

Evaluation:-

- (i) The thesis shall be evaluated by a Board of examiners comprising of the members of the supervisory committee and an external member appointed in accordance with the university rules and regulations.

- (ii) At least three members of the Board of Examiners, of whom one must be the external examiner, for the purpose of evaluating the thesis, must hold a viva-voce examination.
- (iii) The date, time, and venue of examination must be notified at least one week before the examination and the faculty and students interested to participate in the oral presentation may be allowed. The notification to this effect may be made by the Dean/chair person with intimation to the Director Advanced Studies, Controller of Examinations, Quality Enhancement Cell, and any other relevant office/department.
- (iv) The controller of examination shall get the thesis evaluated within three months after the date of its submission/resubmission in his office. Any delay beyond three months must be brought to the notice of the Vice Chancellor.
- (v) The thesis shall be evaluated by the Board of Examiners on Pass and Fail basis, which shall not be counted towards the calculation of CGPA.
- (vi) All the members of Supervisory Committee present shall sign the thesis after the viva-voce examination after making necessary corrections and incorporating therein any suggestions by the Board of Examiners.
- (vii) All the members of the Board of Examiners present shall sign the result sheet prescribed for this purpose at the end of the examination. The supervisor will submit the results to the Director of Advanced Studies and Controller of Examination within 24 hours.
- (viii) In case of disagreement among the examiners regarding the acceptance of the thesis, it shall be referred to another external examiner appointed by the Vice Chancellor whose decision shall be final.

LIST OF PROPOSED POST GRADUATE COURSES

DEPARTMENT OF LAND AND WATER CONSERVATION ENGINEERING		
Course No.	Course Title	C. Hours.
LWCE -701	Computational Methods in Water Resources Engineering	3(3-0)
LWCE-702	Advance open Channel Hydraulics	3(2-1)
LWCE-703	Advanced Hydrology	3(2-1)
LWCE-704	Advanced Groundwater Hydrology	3(2-1)
LWCE-705	Groundwater Modeling	3(2-1)
LWCE-706	Advanced Drainage Engineering	3(2-1)
LWCE-707	Resource Conservation Engineering	3(3-0)
LWCE-708	Planning and Design of Irrigation Systems	3(2-1)
LWCE-709	Irrigation Scheduling	3(2-1)
LWCE-710	Surface Irrigation Modeling	3(3-0)
LWCE -711	System Analysis of Integrated Water Resources Engineering	3(2-1)
LWCE -712	Spate Irrigation Practices and Management	3(2-1)
LWCE -713	Design of Hydraulics Structures	3(3-0)
LWCE-714	Water Quality Management	3(2-1)
LWCE-715	River Engineering	3(3-0)
LWCE -716	Water Resources Management	3(3-0)
LWCE-717	Climate Change and Water Resources	3(2-1)
LWCE-718	Watershed Management	3(2-1)
AET -719	Special Problems	1(1-0)
AET -720	Seminar	1(1-0)

DEPARTMENT OF STRUCTURES AND ENVIRONMENTAL ENGINEERING		
Course No.	Course Title	Credit hours
SEE-701	Parameters and Methods of Environmental Impact Assessment	3(2-1)
SEE -702	Contamination Transport in Soils	3(2-1)
SEE -703	Design of Water Supply and Sewage	3(2-1)
SEE -704	Energy and Environment	3(2-1)
SEE -705	Environmental Control in Farm Structures and Landscaping	3(2-1)
SEE -706	Environmental Health Engineering	3(2-1)
SEE -707	Farm Waste Disposal	3(2-1)
SEE -708	Geo Environment	3(2-1)
SEE -709	Land Surveying	3(2-1)
SEE -710	Machine and Environment	2(2-0)
SEE -711	Air and Noise Pollution Control	3(3-0)

SEE -712	Theory and Design of Structures	3(2-1)
SEE -713	Wastewater Engineering	3(2-1)
AET -719	Special Problem	1(1-0)
AET -720	Seminar	1(1-0)

DEPARTMENT OF FARM MACHINERY AND PRECISION ENGINEERING		
Course No.	Course Title	C. Hours.
FMPE -701	Advanced Power and Machinery	3(2-1)
FMPE-702	Agricultural Storage Engineering	3(2-1)
FMPE-703	Computer Modeling of Engineering Systems	3(2-1)
FMPE-704	Experimental Stress Analysis	3(2-1)
FMPE-705	Farm Machinery and Environment	3(2-1)
FMPE-706	Grain Preservation and Processing	3(2-1)
FMPE-707	Hydraulic Control Systems	3(2-1)
FMPE-708	Harvesting Machinery	3(2-1)
FMPE-709	Instrumentation and Machine Automation	3(2-1)
FMPE-710	Operations Research	3(2-1)
FMPE -711	Product Design and Development	3(2-1)
FMPE-712	Renewable Energy Engineering	3(2-1)
FMPE -713	Finite Element Analysis	3(2-1)
FMPE-714	Tillage and Traction Dynamics	3(2-1)
FMPE-715	Theory of Manufacturing Processes	3(2-1)
FMPE-716	Advanced Engineering Mathematics	3(3-0)
AET -719	Special Problems	1(1-0)
AET -720	Seminar	1(1-0)

DEPARTMENT OF ENERGY SYSTEMS ENGINEERING		
Course No.	Course Title	C. Hours.
ESE-701	Applied Solar Energy	3(2-1)
ESE-702	Energy Systems Modelling and Simulation	3(2-1)
ESE-703	Energy Audit and Management	3(2-1)
ESE-704	Computer Modeling of Engineering Systems	3(2-1)
ESE-705	Bio Energy Engineering	3(2-1)

ESE-706	Hydro Power Plants	3(2-1)
ESE-707	Wind Energy Engineering	3(2-1)
ESE-708	Instrumentation in Energy Systems	3(2-1)
ESE-709	Refrigeration And air Conditioning	3(2-1)
ESE-710	Fuels And Combustion	3(2-1)
ESE-711	Advanced Clean Coal Technologies	3(3-0)
ESE-712	Renewable Energy Engineering	3(2-1)
ESE-713	Hydrogen Technologies and Fuel Cells	3(2-1)
ESE-714	Energy Management in Buildings	3(2-1)
ESE-715	Energy Economics and Management	3(3-0)
ESE-716	Biofuels Engineering	3(2-1)
ESE-717	Nuclear Power Plant Engineering	3(3-0)
AET -719	Special Problems	1(1-0)
AET -720	Seminar	1(1-0)

Table: Courses Taught during the semesters Versus Outcome

Groups	Program Outcomes					
	knowledge and understanding	Knowledge application	Experiment and Data Analyzing skill	Professional Ethics	Communication Skills	Scientific Writing
SEE-701	++++	++	+++	++	+++	+++
FMPE-708	++++	+++	+++	++	++	+++
LWCE-713	++++	++++	++++	+++	+++	++++

+ = Relevant

++ = Relevant & satisfactory

+++ = Very relevant & Very satisfactory

++++ = Highly relevant & Highly satisfactory

- The curriculum fits very well and satisfies the core requirements for the program, as specified the respective accreditation body.

- The curriculum satisfied the general arts and professional and other discipline required for the program according to demands and requirements set by the Higher Education Commission.

Standard 2-2: Theoretical backgrounds, problem analysis and solution design must be stressed within the program's core material.

Element	Course	Course name
Theoretical Background	LWCE-707	Resource Conservation Engineering
	LWCE-717	Climate Change and Water Resources
	FMPE-705	Farm Machinery and Environment
	FMPE-707	Hydraulic Control Systems
	FMPE-708	Harvesting Machinery
	FMPE-709	Instrumentation and Machine Automation
	FMPE-715	Theory of Manufacturing Processes
	SEE -704	Energy and Environment
	SEE -705	Environmental Control in Farm Structures and Landscaping
	SEE -712	Theory and Design of Structures
Problem Analysis	LWCE-705	Groundwater Modeling
	LWCE-710	Surface Irrigation Modeling
	LWCE -712	Spate Irrigation Practices and Management
	FMPE -701	Advanced Power and Machinery
	FMPE-702	Agricultural Storage Engineering
	FMPE-703	Computer Modeling of Engineering Systems
	FMPE-704	Experimental Stress Analysis
	FMPE-710	Operations Research
	FMPE -713	Finite Element Analysis
	FMPE-714	Tillage and Traction Dynamics
	FMPE-716	Advanced Engineering Mathematics
	SEE-701	Parameters and Methods of Environmental Impact Assessment
	SEE -702	Contamination Transport in Soils
	LWCE-702	Advance Open Channel Hydraulics
Solution Design	LWCE-703	Advanced Hydrology
	LWCE-704	Advanced Groundwater Hydrology
	LWCE-706	Advanced Drainage Engineering
	LWCE-708	Planning and Design of Irrigation Systems
	LWCE-709	Irrigation Secluding
	LWCE -713	Design of Hydraulics structures

	LWCE-714	Water Quality Management
	LWCE -716	Water Resources Management
	LWCE-718	Watershed Management
	FMPE-706	Grain Preservation and Processing
	FMPE-712	Renewable Energy Engineering
	SEE -703	Design of Water Supply and Sewage
	SEE -709	Land Surveying
	SEE -710	Machine and Environment
	SEE -711	Air and Noise Pollution Control

Standard 2.4: The curriculum must satisfy general education of arts, professional and other discipline requirement of the program

Not applicable

Standard 2.5: Information technology component of the curriculum must be integrated throughout the program:

The students are given assignments and class projects where necessary to solve the engineering problems using advanced computer technologies

Standard- 2.7: Oral and written communication skills of the student must be developed and applied in the program.

- One seminars and one special problem each one credit hour are compulsory at the Post-graduate level.
- Assignments are given to students on specific titles (part of the course) which are presented orally and are submitted as written report, to increase their oral and written communication skills.
- Project presentations and Competitions are held to improve communication skills and presentation abilities.
- Regular research meeting are scheduled and research progress of post graduate students are evaluated in form of presentation and reports.

CRITERION 3

LABORATORIES AND COMPUTER FACILITIES

Standard-3.1: Laboratory manuals/documentation/instructions for experiments must be available and easily accessible to faculty and students

The faculty of Agricultural Engineering and Technology has newly established Labs. with the latest and state of the art equipment and lab manuals. The following labs are available in the faculty;

1. Hydrodynamics Lab.
2. Irrigation & Drainage Lab.
3. Soil Mechanics Lab.
4. Fluid Mechanics Lab.
5. I.C & Tractor Lab.
6. Food Engineering & Processing Lab.
7. Thermodynamic Lab.
8. Renewable Energy Lab.
9. Bio Energy lab.
10. Mechanics Lab.
11. Survey & Leveling Lab.
12. Water Quality and Environment Lab.
13. CAD/CAM Lab.
14. Geo-Informatics Lab
15. Farm Machinery and Implements Lab.
16. Material Testing Lab.
17. Precision Agriculture Lab.
18. Machine Workshop

Standard-3.2: There must be support personal for instruction and maintaining the laboratories.

Lab engineers are appointed for that purposes.

Standard-3.3: The University computing infrastructure and facilities must be adequate to support program's objectives.

Besides these labs there is an independent faculty library having a wide range of curriculum books with sufficient seating capacity in a comfortable air conditioning environment. Further, the library is equipped with internet and computer facility. High-speed internet is provided in all offices, lecture rooms, and labs and in the building of the Faculty of Agricultural Engineering & Technology.

CRITERION 4

STUDENT SUPPORT AND ADVISING

Directorate of Students Affairs of the University organizes support programs, cultural activities for students and guides them in case of any problem. The university staff provides information regarding admission, scholarships, career opportunities, etc. The university arranges orientation programme for new students and guided tours to various departments.

Standard-4.1: Courses must be offered with sufficient frequency and number for students to complete the program in a timely manner

- Courses are taught as per strategy and guidance provided by HEC.
- Subject courses are offered as per scheme of study of the department after approval of Academic Council of the university. Courses are offered by faculty trained in the relevant subject and as per their availability.
- Elective courses and minor courses are offered as per policy of HEC and University.

Standard-4.2: Courses in the major area of study must be structured to ensure effective interaction between students, faculty and teaching assistants.

- Courses are structured and decided among the faculty members in the departmental board of study meeting.
- Courses to be offered are decided before the commencement of semester
- The faculty members interact frequently among themselves and with students.
- Emphasis is given on effective interaction between the students and between students and teachers.
- Students are encouraged to ask question, give comments and take part in the discussions in the class.

Standard-4.3: Guidance on how to complete the program must be available to all students and access to qualified advising must be available to make course decisions and career choices.

- Students are informed about program requirements through office of chairperson of the department and through personal communication of teachers with them.
- The counseling of students is continuous process and students are free to contact relevant teachers whenever they face any professional problem.
- Students are also facilitated for interaction with faculties/scientists in other universities and research organizations whenever they need and there is open option for the students to get membership of professional societies.

CRITERION 5

PROCESS CONTROL

Standard-5.1: The process by which students are admitted to the program must be based on quantitative and qualitative criteria and clearly documented. This process must be periodically evaluated to ensure that it is meeting its objectives.

- The process of admission is well established and followed as per rules and criterion set by University both for undergraduate and post graduate programs.
- Admission criteria is revised every year before the announcement of admissions

Admission Requirements

M.Sc (Hons.) Agricultural Engineering (2 year)

Faculty admits the candidates to M.Sc. (Hons.) Agricultural Engineering program with the following qualifications:

- i. Sixteen years of education with the last degree in B.Sc Agricultural/Mechanical/Civil/Electrical/Food/Energy/Water Resource Engineering.
- ii. The minimum CGPA should be 2.5 (out of 4.0 in the Semester System) in the last degree.
- iii. Entry test score conducted by the University with a minimum 60% will be required at the time of admission.

Standard-5.2: The process by which students are registered in the program and monitoring of students progress to ensure timely completion of the program must be documented. This process must be periodically evaluated to ensure that it is meeting its objectives

- Registration of students is done once every year at the time of admission through a well-managed comprised system called “Campus Management System (CMS)”.
- Students are evaluated through Mid, Final and Practical exams and through written assignments and oral presentations.
- Students are evaluated through the result of each course for each semester. If the students fulfill the criteria of the University (a specific CGPA after each semester) they are promoted to the next semester.
- In general, the students are registered on competition bases keeping in view the academic and research standards.

Standard-5.3: The process of recruiting and retaining highly qualified faculty members must be in place and clearly documented. Also processes and procedures for faculty evaluation, promotion must be consistent with institution mission statement. These processes must be periodically evaluated to ensure that it is meeting with its objectives

- The University follows the recruitment policy and rules recommended by HEC.

- Posts are advertised in national newspapers and university website, and applicants are short-listed on the basis of experience, qualification, publications and other qualities / activities as fixed by the University.
- The candidates are interviewed by the University Selection Board and principal and alternate candidates are selected.
- Selection of candidates is approved by the Syndicate for issuing orders to join within a specified period.
- Induction of new candidates depends upon the number of approved vacancies.
- Inductions are being done on Tenure Track System (TTS) as well as on BPS.
- HEC also supports appointment of highly qualified members as foreign faculty professor, national professors and deposes them in various departments.

Standard 5-4: The process and procedures used to ensure that teaching and delivery of course material to the students emphasizes active learning and that course learning outcomes are met. The process must be periodically evaluated to ensure that it is meeting its objectives

- Periodical update of curriculum is done depending upon the requirements, innovations and new knowledge generated.
- Books related to various filed of agricultural engineering are available in University library where documentation, photocopying and internet facilities are also available. The faculty library is under construction, where all the curriculum and helping books will be available with internet faculty.
- Students are provided class notes, photocopies of slides/transparencies and soft copies of helping materials as well.
- All efforts are made to impart the course material and knowledge to meet the objectives of the curriculum.

Standard 5-5: The process that ensures that graduates have completed the requirements of the program must be based on standards, effective and clearly documented procedures. This process must be periodically evaluated to ensure that it is meeting its objectives.

- The evaluation is conducted according to the examination system of the University which is clearly documented.
- The evaluation procedure consists of quizzes, mid and final examinations, practical, assignments and reports, oral and technical presentations.
- The controller of examinations announces the date regarding commencement of examination and other relevant information. After each semester, the controller office notifies results of the students.

- The minimum pass marks for each course is 40% for Master of Philosophy degree in theory and practical, separately.
- In theory, weightage to each component of examination is as prescribed here under:

Mid Examination	30%
Assignments	10%
Final Examination	60%

- Grade points are as follows

Marks Obtained	Grade	Grade point	Remarks
80-100 %	A	4	Excellent
65-79 %	B	3	Good
50-64 %	C	2	Satisfactory
50-40 %	D	1	Pass
Below 40 %	F	0	Fail

- Gold medals are awarded to the students who secure highest marks.
- Degrees are awarded to the students on the convocation that is held every year

CRITERION 6

FACULTY

6-1: There must be enough full time faculty who are committed to the program to provide adequate coverage of the program areas/courses with continuity and stability. The interests and qualifications of all faculty members must be sufficient to teach all courses, plan, modify and update courses and curricula. All faculty members must have a level of competence that would normally be obtained through graduate work in the discipline. The majority of the faculty must hold a Ph.D. in the discipline.

Currently there are eleven faculty members available for M.Sc. (Hons) programs. All these faculty members are foreign PhD except two with great experience of teaching and research in field.

Standard 6-2: All faculty members must remain current in the discipline and sufficient time must be provided for scholarly activities and professional development. Also, effective programs for faculty development must be in place. Effective Programs for Faculty Development

- In each semester mixed courses are offered according to work load of faculty members
- Division of students for supervision is made on the basis of faculty expertise and research interests
- Two faculty members are on leave for Ph.D. under faculty development program.
- Faculty members attended workshops/seminars outside and within university
- Library and internet facilities are available for scholarly work and academics improvement
- Support for attending conferences can lead to enhancement of research initiatives at the university.
- There is university-funded program, which provides financial support for research projects by the young faculty members and almost all faculty members heading some research projects.
- Faculty program is evaluated as per requirement or when needed.
- Faculty members are provided with different academic, research and training facilities as per availability in the university system.

Standard 6-3: All faculty members should be motivated and have job satisfaction to excel in their profession.

- The young faculty is mobilized by timely back up and appreciation by the senior faculty members. Avenues for research funding are provided through university research fund.
- Motivation and encouragement are among the main tools for the better performance of the faculty team members. Faculty members are contented by the initiatives undertaken

by the management in this regard. Formal and informal coaching by the senior faculty members, different entertainment events, field visits and excursions etc. play a vital role in motivating the young faculty members.

Name	PROF. DR. MUHAMMAD JEHANZEB MASUD CHEEMA Date of Birth: July 31st, 1976 Domicile: Sargodha, Punjab, PAKISTAN 
Personal	Professor/Incharge Faculty of Agricultural Engineering & Technology, PMAS Arid Agriculture University, Rawalpindi, Pakistan Address (Postal): Faculty of Agricultural Engineering & Technology, PMAS Arid Agriculture University, Rawalpindi, Pakistan Cell: +92 336 8303500 E-Mail: mjm.cheema@uaar.edu.pk
Experience	• Professor and Incharge, Faculty of Agricultural Engineering and Technology PMAS-Arid Agriculture University Rawalpindi (01-04-2022 to date) • Associate Professor and HoD, Department of Land and Water Conservation Engineering, Faculty of Agricultural Engineering and Technology PMAS-Arid Agriculture University Rawalpindi (01-11-2019 to 31-03-2022) • Academic Editor, PLOS-Water Journal (June 10, 2021 to date) • Program Chair, Digital and Precision Agriculture. Center for Agriculture Strategy and Development, PMAS-Arid Agriculture University Rawalpindi. • Program Chair, Precision Agriculture (January 7, 2015 to October 2019) Center for Advanced Studies in Agriculture /Food Security, U.A. Faisalabad • Director, Water Management Research Center (August 26, 2014 to April 12, 2015), University of Agriculture, Faisalabad • Section Editor (Engineering), Pakistan Journal of Agriculture Sciences (2012 – 2019, April 2022 to date). • Assistant Professor on Tenure Track (02-08-2013 to 31-10-2019), Department of Irrigation and Drainage, Faculty of Agricultural Engineering and Technology, University of Agriculture, Faisalabad. • Visiting Fellow (April 2014 to June 2014), Stimson's Center Environmental Security Program, Indus Basin Science Policy, Washington D.C, USA. • Lecturer (April 2005 to July 2013), Department of Irrigation and Drainage, Faculty of Agricultural Engineering and Technology, University of Agriculture, Faisalabad. • Guest lecturer, UNESCO-IHE, Delft, the Netherlands. • PhD researcher (November 2007 to May 2012), Department of Water Management, Faculty of Civil Engineering and Geo Science, Technical University, Delft, The Netherlands.

	• Scientific Officer/ A.A.E. (December 2002 to December 2004), Rod Kohi System Development & Management Project (WRRI, NARC) (D.G.Khan Component). D. G.Khan
Honor and Awards	• Best Teacher Award 2020-21 by PMAS Arid Agriculture University, Rawalpindi-Pakistan. • Research Productivity Award 2017-18 (Sci ID 1537) by Pakistan Council of Science and Technology, Islamabad-Pakistan. • Stimson Centre Fellowship on Indus Basin Water Policy at Stimson's Centre, Washington D.C. USA. • HEC Overseas Scholarship for PhD research in the Netherlands. • 1st position in B.Sc. Agricultural Engineering (2000) from University of Agriculture, Faisalabad. • University Merit Gold Medal in B.Sc. Agricultural Engineering (2000) from University of Agriculture, Faisalabad, Pakistan. • S.M.Elahi Gold medal in B.Sc. Agricultural Engineering (2000) from University of Agriculture, Faisalabad, Pakistan.
Memberships	• Pakistan Engineering Council, Islamabad. (agri/2189) • International Society of Precision Agriculture, USA. (ISPA-131144). • American Society of Agricultural and Biological Engineers, USA (M1035867) • International Association of Hydrological Sciences, (11860).
Graduate Students Postdocs Undergraduate Students	PhD: (Supervisor/Co-Supervisor) = 04 (Member supervisory committee) = 08 MSc: (Supervisor) = 55
Publications	Papers published in peer reviewed International/ National IF journals: 1. Fiaz Hussain, Gokmen Ceribasi, Ahmet Iyad Ceyhunlu, Ray-Shyan Wu, Muhammad Jehanzeb Masud Cheema, Rana Shahzad Noor, Muhammad Naveed Anjum, Muhammad Azam, Arslan Afzal. (2022). Analysis of precipitation data using innovative trend pivot analysis method and trend polygon star concept: A case study of Soan River Basin, Potohar Pakistan. Journal of Applied Meteorology and Climatology, https://doi.org/10.1175/JAMC-D-22-0081.1 2. Muhammad Adeel Afzal, Sikandar Ali, Aftab Nazeer, Muhammad Imran Khan, Muhammad Mohsin Waqas, Rana Ammar Aslam, Muhammad Jehanzeb Masud Cheema, Muhammad Nadeem, Naeem Saddique, Muhammad Muzammil, Adnan Noor Shah. (2022). Flood Inundation

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	Potash application on Growth and Yield of Onion Crop with Drip System”. In abstract book of 2nd International Conference on Horticulture Sciences, held at institute of Horticulture Sciences, University of Agriculture, Faisalabad, Pakistan. February 18-20, 2016. 29. Waqas , M.S. M.J.M Cheema, A. Waqas, S. Husain,. (2016). “Effect of Deficit Irrigation on Potato Physical and Chemical Characteristics under Different Planting Patterns”. In abstract book of 2nd International Conference on Horticulture Sciences, held at institute of Horticulture Sciences, University of Agriculture, Faisalabad, Pakistan. February 18-20, 2016. 30. Cheema, M.J.M. and R.H. Arshad (2014). Measurement of solar radiation using remote sensing. In Abstract Book of “International Workshop on Renewable Energy Technologies in Pakistan” held at University of Agriculture, Faisalabad, Pakistan, December 16-18, 2014, ISBN 978-969-9035-01-04. 31. Cheema, M.J.M. 2013. Estimation of Spatio-Temporal Solar Radiation from Satellite Imagery in Data Scarce Environment. In Abstract Book of “International Conference on Renewable Energy Technologies in Pakistan” held at University of Agriculture, Faisalabad, Pakistan, October 1-3, 2013, ISBN 978-969-9035-05-0. 32. Pelgrum, H., I.J. Miltenburg, M.J.M. Cheema, A. Klaasse and W.G.M. Bastiaanssen (2012) ETLook: A novel continental evapotranspiration algorithm. Remote Sensing and Hydrology 2010, Proceedings of a Symposium held at Jackson Hole, Wyoming, USA, September 2010, IAHS Publ. 352. 33. M.J.M. Cheema (2009). Contribution of remote sensing to solve international water management issues in the Indus Basin. DRUPPEL, Dispuut Watermanagement Magazine, (19) pp. 18-19.
Research Grants and Contracts	Project Director, Establishment of National Center of Industrial Biotechnology for Pilot Manufacturing of Bio-products Using Synthetic Biology and Metabolic Engineering Technologies, PSDP funding of 1439 million PKR. Project Investigator, Precision Agriculture Section, in National Center of Industrial Biotechnology for Pilot Manufacturing of Bio-products. Project Investigator of Higher Education Commission funded Technology Development Fund (TDF02-053) Project entitled “multi-tasking machine for precision sowing of row crops” for two years of worth 13.734 million PKR. Project Investigator of Higher Education Commission funded Technology Development Fund (TDF-047) Project entitled “Sensor based unmanned aerial agro-chemical spraying (UAAS) system” for

	two years of worth 12.811 million PKR. 5. Project Investigator of Asian Development Bank funded Project entitled “Field Evaluation and refinement of DSR Drill and Production Technology for Basmati Rice in selected Pilot Sites in Basmati Rice Tract of Punjab, Pakistan” (ADB TA-8578 PAK) a One and half year project of worth 4.9 million PKR (Completed) 6. Project Investigator of Public Private Partnership Project entitled “Improving farmer income and productivity through provision of financial & technical services and adoption of good practices using UAVs and remote sensing” a six-month project of worth 2.9 million PKR (Completed). 7. Project Investigator of USPCAS-AFS, CGP funded project entitled "Sensor based precision irrigation systems for improving water productivity" a three-year project of worth 32,000 USD (Feb 2016 – Feb 2019) 8. Project Investigator of USPCAS-AFS, CGP funded project entitled "Variable rate agro-chemical application system in citrus orchards " a three-year project of worth 28,000 USD (Feb 2016 – Feb 2019) 9. Project Investigator of IFPRI-PSSP CGP Award 470 entitled “Formulating water policy based on rationalization of water allocations using remote sensing and GIS modeling”. A One-year project of worth 49,990 USD. (Completed) 10. Project Investigator of IFPRI-PSSP CGP Grant 682 “Developing near real time water distribution system using remote sensing and modeling”, One year project of worth 32,300 USD (Completed) 11. Project Coordinator CSIRO funded project “Strategic Basin Assessment, Indus Pakistan” Two year project of worth 36,000 AUD. (Completed) 12. Indus River Basin research activities under the framework of the GEOSS Asian Water Cycle Initiative with the Collaboration of University of Tokyo, Japan, and Pakistan Meteorological Department and Pakistan Agricultural Research Council under the framework of the GEOSS Asian Water Cycle Initiative (AWCI). 13. Co-P.I. National project entitled “Developing a Flying Sensor to Manage the Crops and the Resources for Better Yield by Observing the Crop phenology through RGB Sensors (a Low Cost Solution for Precision Agriculture)” funded by NRPU, Higher Education Commission, Islamabad (Amount: 1.54 million PKR), (Status: In Progress; Co-PI, PI: Dr Ahsan Latif). 14. Co-P.I. National project entitled “Site-specific wheat crop management for high yield using UAVs and Spectral Sensors” funded by Endowment Fund-UAF (Amount: 2.94 million PKR), (Status: In Progress; Co-PI, PI: Dr Ahsan Latif).
Other Research	• Training for Direct Seeded Rice Consortium Technology from June 03 – 13,

or Creative Accomplishments	2018 at International Rice Research Institute (IRRI), Los Banos, Philippines. • International Training Workshop on Silk Road BDS precision agriculture, August 14 – September 2, 2017. At BDS Precision Agriculture Industry Technology Innovation Strategic Alliance, XPCC, Shihezi, Xingjian, China • UAV training, flight planning and post processing, Sensefly, Lausanne, Switzerland • Sustainable development investment portfolio Indus Pakistan, eWater-CSIRO Integrated Water Resource Modeling Workshop. December 15 -19 ,2014. Avari Hotel, Lahore-Pakistan • Water policy modeling workshop. January 28-February 1, 2013. Pakistan Strategy Support Program (PSSP-IFPRI), University of Agriculture, Faisalabad, Pakistan. • Use of satellite remote sensing/GIS techniques for monitoring of crops. November 12-16, 2012. SUPARCO, Samsani road, Lahore, Pakistan. • Hydrological forecasting models. Summer course 14, September 20-25, 2010. UNESCO-IHE, Delft, the Netherlands. • SWAT summer course on River basin modeling using the Soil and Water Assessment Tool. September 21-25, 2009. UNESCO-IHE, Delft, the Netherlands. • Image processing through ERDAS Imagine. January 12-16, 2009.SUPARCO, Karachi, Pakistan. • SWAT and Mohid land course. May 19-21, 2008. Instituto Superior Técnico, Lisboa, Portugal.
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Name	DR. MUHAMMAD UMAIR Fathers' Name: Sher Muhammad Date of Birth: 15 Feb 1983 Domicile: Punjab (Khanpur, district Rahimyar Khan) 
Personal	Address (Postal): Faculty of Agricultural Engineering & Technology, PMAS Arid Agriculture University, Rawalpindi, Pakistan Address (Permanent): H # B-IV 728/B, Doaba Colony, Khanpur, Distt. Rahimyar Khan Cell: +92 333 0375157 E-Mail: umairkpr@uaar.edu.pk
Experience	• Working as Associate Professor (BPS-20) in the department of Energy System Engineering, Faculty of Agricultural Engineering and Technology, PMAS-Arid Agriculture University, Rawalpindi , since 28 August 2014. • Three years teaching experience as Lecturer in the Faculty of Agricultural Engineering and Technology, University of Agriculture, Faisalabad. (22-09-2005 to 15-09-2008) • Researcher at Tokyo University of Agriculture and Technology (April 2011 to March 2012) and (April 2014 to August 2014) • Assistant Superintendent Sir Syed Hall, University of Agriculture, Faisalabad (2007-2008) • Supervisor Faculty Computer Lab., UAF. (2007) • Incharge Engineering Mechanics Lab., UAF. (2006-2008) • Member of NVM (National Volunteer Movement). Visit the earthquake affected areas of Pakistan (8th of October 2005) as a volunteer, analyst and as a member of a project on “Disaster within a Disaster”. • Work as a volunteer after earthquake in Japan 2011 and visited different places in Tohoku area with Muslim and Japanese welfare organizations. • Volunteer in charge of the Muslim community in the Tokyo University of Agriculture and Technology, Japan. • Volunteer in charge of Engineers Blood Foundation at University of Agriculture, Faisalabad.

Honor and Awards	• First position in B.Sc Agricultural Engineering (Gold Medalist) • Gold Medal from S.M.Elahi Organization in B.Sc Agricultural Engineering • University Merit Scholarships throughout the B.Sc Agri. Engineering • Al-Noor Scholarship throughout the B.Sc Agri. Engineering • MEXT scholarship from Japan Government for Master program in Japan • MEXT scholarship from Japan Government for Ph.D program in Japan
Memberships	• Pakistan Engineering Council AGRI/2502
Brief Statements of Research Interest	Solar Adsorption Refrigeration System with CPC Collectors Solar adsorption refrigeration is promising technology, especially in the remote areas and in the developing countries because it is directly driven by solar energy without involving electricity and moving parts like pumps. Therefore, it is technologically possible and socially feasible in the areas where electricity is not enough, but solar energy is rather easy to obtain. Pakistan has great potential for practical implementation of such technology because ALLAH has given us the abundance of solar energy that can be used efficiently for cooling purpose as well. Keeping in view the current energy crises in Pakistan, this research will open new horizons as an alternative source for cooling and refrigeration purposes using only God gifted solar energy and environment friendly working pairs (like silica-gel/water).
Publications	1. Umair, M.; Akisawa, A.; Ueda, Y. Optimum Settings for a Compound Parabolic Concentrator with Wings Providing Increased Duration of Effective Temperature for Solar-Driven Systems: A Case Study for Tokyo. <i>Energies</i> 2013, 7, 28–42. IF (2.702). (corresponding author) 2. Umair, M.; Akisawa, A.; Ueda, Y. Performance Evaluation of a Solar Adsorption Refrigeration System with a Wing Type Compound Parabolic Concentrator. <i>Energies</i> 2014, 7, 1448–1466. IF (2.702). (corresponding author) 3. Umair, M.; Akisawa, A.; Ueda, Y. Simulation Study of Continuous Solar Adsorption Refrigeration System Driven by Compound Parabolic Concentrator. <i>The Open Renewable Energy Journal</i> 2014, 7. (corresponding author) 4. Wirajati, I.; Umair, M.; Enoki, K.; Ueda, Y.; Akisawa, A. A Three-Stage Adsorption Cycle with Three Silica-Gel Beds. <i>Transactions of the Japan Society of Refrigerating and Air Conditioning Engineers</i> 2014, 31, 423–429.

5. Sattar, A.; Arslan, C.; Ji, C.; Chen, K.; Nasir, A.; Fang, H.; Umair, M. Optimizing the physical parameters for bio-hydrogen production from food waste co-digested with mixed consortia of clostridium. *Journal of Renewable and Sustainable Energy* 2016, 8, 013107. (IF =1.575).
6. Umair, M.; Dwiputro, A.F.; Wirajati, I.G.A.B.; Ueda, Y.; Akisawa, A. Design and Investigation of Heat Transfer in a New Adsorbent Bed with CPC for Solar Adsorption Refrigeration Systems. *Heat Transfer Engineering* 2015, 37, 696–704. (IF =1.693). (corresponding author)
7. Sattar, A.; Arslan, C.; Ji, C.; Sattar, S.; Umair, M.; Sattar, S.; Bakht, M.Z. Quantification of temperature effect on batch production of bio-hydrogen from rice crop wastes in an anaerobic bio reactor. *International Journal of Hydrogen Energy* 2016, 41, 11050–11061. (IF =4.939)
8. Akisawa, A.; Umair, M.; Enoki, K.; Nakayama, M. Static analysis of a new scheme of two stage refrigeration cycle with the combination of FAM Z01 and FAM Z05 adsorbents. *International Journal of Refrigeration* 2018,. (IF =3.461)(corresponding author) 92, 143–153
9. Ameen, M.; Xiaochan, W.; Yaseen, M.; Umair, M.; Yousaf, K.; Yang, Z.; Soomro, S. Performance Evaluation of Root Zone Heating System Developed with Sustainable Materials for Application in Low Temperatures. *Sustainability* 2018, 10, 4130. (IF =2.576)
10. Noor, R.S.; Wang, Z.; Umair, M.; Ameen, M.; Imran, M.; Sun, Y. Performance Evaluation of a Water Seed Drill. *Sustainability* 2019, 11, 137.. (IF =2.576)
11. Ameen, M.; Zhang, Z.; Wang, X.; Yaseen, M.; Umair, M.; Noor, R.S.; Lu, W.; Yousaf, K.; Ullah, F.; Memon, M.S. An Investigation of a Root Zone Heating System and Its Effects on the Morphology of Winter-Grown Green Peppers. *Energies* 2019, 12, 933. (IF, 2.702).
12. Noor, R.S.; Wang, Z.; Umair, M.; Yaseen, M.; Ameen, M.; Rehman, S.-U.; Khan, M.U.; Imran, M.; Ahmed, W.; Sun, Y. Interactive Effects of Grafting Techniques and Scion-Rootstocks Combinations on Vegetative Growth, Yield and Quality of Cucumber (*Cucumis sativus* L.). *Agronomy* 2019, 9, 288. (IF=2.603)
13. Noor, R.S., Wang Z., Umair M., Ameen M., Misal M. A., Sun Y., Long-term Application Effects of Organic and Chemical Fertilizers on Soil Health and Productivity of Taramira (*Eruca Sativa* L.) under Rainfed Conditions. *J. Anim. Plant Sci.*, 2020, 30(4), 970-987. (IF, 0.529)
14. Noor, R.S., Hussain, F., Abbas, I. et al. Effect of compost and chemical fertilizer application on soil physical properties and productivity of sesame (*Sesamum Indicum* L.). *Biomass Conv. Bioref.*, 2020, <https://doi.org/10.1007/s13399-020-01066-5>
15. Arslan. A., A. Munir, W. Amjad, J.L. Alvarado, M. Umair, M. Azam,

	M.N. Anjum, 2021. Use of perforation and mathematical modeling to increase solar based steam distillation system efficiency. <i>Journal of solar energy engineering</i> (ASME). DOI: 10.1115/1.4051316. (IF, 1.64) 16. Mansoor, M.; Latif, N.; Amanullah, A.; Islam, Z.; Muhammad, S.; Umair, M. Impact Assessment of Soil Amendments on Soil Capping in Mungbean Production using Central Pivot Irrigation System in Clayey Soils. <i>Pakistan Journal of Agricultural Research</i> 2016, 29, 135–140. 17. Islam, Z.; Mangrio, A.G.; Ahmad, M.M.; Akber, G.; Muhammad, S.; Umair, M.; Yaskina Application and distribution of irrigation water under various sizes of center pivot sprinkler systems. <i>Pakistan Journal of Agricultural Research</i> 2017, 30, 35–44. 18. Mansoor, M.; Amanullah, A.; Islam, Z.; Umair, M.; Ayaz, M.; Khan, A.; Asif, M.; Sakina, Y. New High Yielding Mungbean [(<i>Vigna radiata</i> (L.) Wilczek] Variety “Inqalab Mung” for the Agro-Climatic Conditions of KPK. <i>Pakistan Journal of Agricultural Research</i> 2017, 30, 173–179. 19. Filza F. R., Umair M., Kahlid J. M., Masooma H., Komal Q., Syed M. R., Review of Energy Consumption and Potential of Renewable Energy in Agriculture Sector: A Case Study of Pothohar Region of Pakistan, <i>Pakistan Journal of Agricultural Research</i>, 2020, 33(2), 280-288. 20. Noor, Rana Shahzad, Hussain, F., Farooq, M. U., Abbas, I., Umair, M., Islam, M. A., & Sheraz, M., Yield and Economic Analysis of Peanut Production under Different Soil Tillage Systems in North-East Region. <i>Pakistan Journal of Agricultural Research</i>, 2020, 33(3), 490-497. 21. Noor, Rana Shahzad, Hussain, F., & Umair, M, Evaluating Selected Soil Physical Properties Under Different Soil Tillage Systems in Arid Southeast Rawalpindi, Pakistan. <i>Journal Clean WAS</i>, 2020, 4(2), 41-45. 22. Rana Shahzad Noor, Fiaz Hussain, Muhammad Umair, Muhammad Umar Farooq, Abu Saad and Yong Sun. Silage Corn Production Under Different Planting Methods in Rainfed Agriculture System: An Energy Analysis. <i>Big Data In Agriculture (BDA)</i>, 2020, 2(1):32-35 23. Noor, Rana Shahzad, Hussain, F., Farooq, M. U., & Umair, M., Cost and Profitability Analysis of Cherry Production: The Case Study of District Quetta, Pakistan, <i>Big Data In Agriculture</i>, 2020, 2(2), 65–71. 24. Noor, Rana Shahzad, Hussain, F., Saad, A., & Umair, M., Maize (<i>Zea Mays</i>) Production Under Different Irrigation Treatments: Investigating The Germination and Early Growth, <i>Big Data In Agriculture</i>, 2020, 4(1), 43-45. 25. Shujaa, A., M. Umair, R.S. Noor, C. Arslan, A. Afzal and Z. Islam, 2021. Experimental Testing of an Indigenous Solar Driven Desiccant Cooling System for Local Conditions of Pakistan. <i>Pakistan journal of agricultural research</i>. doi.org/10.17582/journal.pjar/2021/34.3.400.404.
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26. Ahmad Waqas, Muhammad Umair, Rai Niaz Ahmad, Zia-ul-Haq and Khalid Saifullah Khan, 2021. Assessment Of Crop Responses and Climatic Parameters By Developing Indigenous Hydroponic Greenhouses In Different Regions Of Punjab-Pakistan. Pakistan Journal of Agricultural Research. Vol. 58(2), 643-654, DOI: 10.21162/PAKJAS/21.1065.
27. Noor, R.S., F. Hussain, I. Abbas, M.U. Farooq, M. Umair and Y. Sun. Assessing Sustainability of Rainfed Wheat (*Triticum Aestivum*) Production Under Various Soil Tillage Systems: An Energy and Economic Analysis. Pakistan Journal of Agricultural Research. Vol. 33, Iss. 4, Pages 692-956.
28. Rana Shahzad Noor, Fiaz Hussain, Muhammad Umair, Waqas Aslam, Muhammad Ameen, Muhammad Adnan Islam and Muhammad Sheraz. Yield and Economic Analysis of Peanut Production under Different Soil Tillage Systems in North-East Region. Pakistan Journal of Agricultural Research, Vol.33(3), 490-497

CONFERENCES AND PROCEEDINGS

1. M. Umair, R. Shiomi, T. Miyazaki, Y. Ueda, and A. Akisawa, "Development of solar adsorption refrigerator driven by direct heating of Compound Parabolic Concentrator (CPC)," in Proceedings of JSES/JWEA Joint Conference (2010), Nihon University of Engineering, Koriyama, Japan, 2010, pp. 105–108.
2. M. Umair, Y. Ueda, and A. Akisawa, "Simulation study of solar adsorption refrigeration system with bended Compound Parabolic Concentrator (CPC)," presented at the The 6th Renewable Energy 2011 Exhibition, Makuhari Messe International Convention Complex, Chiba, Japan, 2011.
3. M. Umair, Y. Ueda, and A. Akisawa, "Experimental investigation of heat transfer in a compact bed with CPC for solar adsorption refrigeration system," in Proceedings of International Symposium on Innovative Materials for Processes in Energy Systems 2013, Kyushu University, Fukuoka, Japan, 2013.
4. M. Umair, Y. Ueda, and A. Akisawa, "Dynamic behavior of CPC driven continuous solar adsorption refrigeration system," in Digital Proceedings of 8th Conference on Sustainable Development of Energy, Water and Environmental System, Dubrovnik, Croatia, 2013, pp. 0204, 1–12.
5. R. Shiomi, M. Umair, T. Miyazaki, Y. Ueda, and A. Akisawa, "Heating Adsorbent Bed by CPC Collectors," in Proceedings of JSES/JWEA Joint Conference (2010), Nihon University of Engineering, Koriyama, Japan, 2010, pp. 399–402.
6. A. Faisal, M. Umair, K. Enoki, Y. Ueda, and A. Akisawa, "Analysis of Heat Transfer in Adsorbent Bed combined with compound parabolic

	concentrator,” presented at the The 20th Conference of Japan Society of Mechanical Engineering Kanto Region, Tokyo University of Agriculture and Technology, Tokyo, Japan, 2014. 7. I.G.A.B. Wirajati, M. Umair, K. Enoki, Y. Ueda, and A. Akisawa, “Three Stage Adsorption Cycle with Three Adsorption Beds”, presented at 2014 JSRAE Annual Conference, Saga University (Honjo Campus, Saga Prefecture), Japan, 2014 September 10-13. 8. F. Hussain, G. Nabi, M. Yasin, M. Umair, M. Usman and RS. Noor “Assessment of Spatiotemporal River Flows Behavior of Indus Basin” in Abstract book of International Conference on Asia-Pacific Policy Dialogue on Water, Energy and Food Security for Poverty Alleviation in Dryland Regions, PMAS-Arid Agriculture University Rawalpindi, Pakistan, pp. 27-28, Nov. 23-25, 2016. 9. A. U. Rehman, M. Yasin and M. Umair “Assessment of Biomass Energy Potential of Rawalpindi” in Abstract book of International Conference on Asia-Pacific Policy Dialogue on Water, Energy and Food Security for Poverty Alleviation in Dryland Regions, PMAS-Arid Agriculture University Rawalpindi, Pakistan, pp. 28-29, Nov. 23-25, 2016. 10. A. H. Sarfraz, M. Umair, M. Yasin and C. Arslan “Design and Performance Evaluation of Household Portable Solar Dryer For Fruits” in Abstract book of International Conference on Asia-Pacific Policy Dialogue on Water, Energy and Food Security for Poverty Alleviation in Dryland Regions, PMAS-Arid Agriculture University Rawalpindi, Pakistan, pp. 47, Nov. 23-25, 2016. 11. A. Sattar, C. Arslan¹, J. Changying, A. Nasir, M. Umair and S. Sattar “Study of The Impact of Incubation Temperature on Bio-Hydrogen Production From Rice Straw Co-Digested with Sludge” in Abstract book of International Conference on Asia-Pacific Policy Dialogue on Water, Energy and Food Security for Poverty Alleviation in Dryland Regions, PMAS-Arid Agriculture University Rawalpindi, Pakistan, pp. 28-29, Nov. 23-25, 2016.
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Research Grants and Contracts	Sr. no.	Project title	Duration	Amount	Role	Status
	1	Design and Development of Indigenous Renewable Energy Technologies for Sustainable Rural and Agricultural Development	3 years	6.8 (million)	Co-PI	Awarded (NRPU, HEC)
	2	Development And Performance Evaluation of Solar Adsorption Cooling System for Greenhouses	3 years	9.9 (million)	PI	Submitted PSF
	3	Design and Development of Portable Solar Dryer for Fruits and Vegetables	1 year	250,000	PI	Completed
	4	Design, Development of solar dryer for processing of on-farm different perishable agriculture products	11 months	478,000	Co-PI	Completed
	5	Development of fixed bed continuous feeding cleaning updraft gasifier for power generation using agricultural waste and other solid waste	1 year	467,500	Co-PI	Completed

Name	ENGR. DR. TAHIR IQBAL Date of Birth: January 1 st , 1989 Domicile: Alipur, Punjab, PAKISTAN 
Personal	Associate Professor/Chairman Department of Farm Machinery and Precision Engineering, Faculty of Agricultural Engineering & Technology, PMAS Arid Agriculture University, Rawalpindi, Pakistan Address (Postal): Faculty of Agricultural Engineering & Technology, PMAS Arid Agriculture University, Rawalpindi, Pakistan Cell: +92 333 3975194 E-Mail: tahir.iqbal@uaar.edu.pk
Experience	• Associate Professor and Chairman, Department of Farm Machinery and Precision Engineering, Faculty of Agricultural Engineering and Technology PMAS-Arid Agriculture University Rawalpindi (30-03-2022 to date) • Assistant Professor of Agricultural Engineering, Faculty of Agricultural Engineering and Technology PMAS-Arid Agriculture University Rawalpindi (15-12-2021 to 30-03-2022) • Deputy Director at Directorate of Student Affairs, PMAS-Arid Agriculture University Rawalpindi (15-12-2021 to 30-03-2022) • Incharge Engineering Workshop Faculty of Agricultural Engineering and Technology PMAS-Arid Agriculture University Rawalpindi (01-09-2019 to date) • Incharge Machinery Section of University Research Farm Koont, Mandra Road, Rawalpindi (From May 2020 to date) • Superintendent of Jinnah Hostel of PMAS-Arid Agriculture University Rawalpindi (May 2012 to May 2013) • Chairman Maintenance & Repair Committee of Univeristy Transport (Oct 2012 to Sept 2014) • Lecturer of Agricultural Engineering, Faculty of Agricultural Engineering and Technology PMAS-Arid Agriculture University Rawalpindi (31-12-2011 to 15-12-2021)
Honor and Awards	• Invited Speakers in International Conferences • Award for valuable services for Pakistan Society of Agricultural Engineers 2021. • Excellent Study Award for 2018-19 from NCEPU, Beijing China

	• Representative of China Government Scholarship 2019 in conferences • Advisor to Aridian society of Agricultural Engineers. • 2nd Prize for excellent paper of Chinese Academy of Agricultural Machinery (2014-2018). • Excellent Study Award for 2017-18 from NCEPU, Beijing China • Excellent Study Award for 2015-16 from NCEPU, Beijing China • Full bright China Scholarship for Ph.D. 2015-2019 • Best Student of the year Award for 2014-15 from NCEPU, Beijing China • Full bright China Scholarship for Chinese Language • Member of different disciplinary committees during lectureship • Office in-charge Secretariat Pakistan Society of Agricultural engineers in 2013-14. • Certificates of Appreciation for outstanding contributions on Pakistan Day Celebrations March 23rd, 2011. organized by UAF. • Certificate of honour for participation in Golden Jubilees Celebration Week of Dept. of Farm Machinery, UAF March 21-26, 2011. • Certificates of Appreciation for outstanding contributions on Pakistan Day Celebrations March 23rd, 2010. organized by UAF. • 2nd position final year Student on the development of Farm Machinery Model in 2009 • Certificates of Appreciation for outstanding contributions on Pakistan Day Celebrations March 23rd, 2009. organized by UAF.
Memberships	• Pakistan Engineering Council, Islamabad. • Member Pakistan Society of Agricultural Engineer • Advisor to Aridian society of Agricultural Engineers.
Graduate Students Postdocs Undergraduate Students	PhD: (Supervisor/Co-Supervisor) = 01 (Member supervisory committee) = 01 MSc: (Supervisor) = 5
Publications	1. Yahya, Iqbal, T*., Omar, M.M. and Ahmad, M., 2021. Techno-Economic Analysis of Fast Pyrolysis of Date Palm Waste for Adoption in Saudi Arabia. <i>Energies</i>, 14(19), p.6048. Impact Factor 3.004 2. Ali, A., Iqbal, T*., Cheema, M.J.M., Afzal, A., Yasin, M., Haq, Z.u., Malik, A.M., Khan, K.S. "Development of a Low-Cost Biomass Furnace

	for Greenhouse Heating. Sustainability 2021, 13, x. Impact Factor 3.21 3. Qin, W., Laixing, L., Chen, S., Iqbal, T., Cq, Dong., Xianbin X. “Efficient strategy of utilizing alkaline liquid waste boosting biomass chemical looping gasification to produce hydrogen” Fuel Processing Technology 2021 Impact Factor 4.982 4. Aneeq., Iqbal, T*., Ali, Z., Shah, SJA., Abbas, A., Afzal, A., Cheema, MJM. Predicting biogas production using kinetic model for mesophilic and thermophilic temperature regimes: a theoretical approach. Asian Journal of Agriculture and Biology. 2021 . 9(x): x-x. Impact Factor 0.4 5. Ma, S., Hang Li., Zhang, G., Iqbal, T., Li, K., Lu, Q*. Catalytic fast pyrolysis of walnut shell for alkylphenols production with nitrogen-doped activated carbon catalyst. Frontiers of Environmental Science & Engineering. 15, 25 (2021). Impact Factor 4.05 6. Zheng, Z., Luo, L., Feng, A., Iqbal, T., Li, Z., Qin, W., Dong, Cq., Zhang, S., Xiao, X. CaO-Assisted Alkaline Liquid Waste Drives Corn Stalk Chemical Looping Gasification for Hydrogen Production. ACS Omega. 2020, XXX, Impact Factor 2.58 7. Iqbal, T., Lu, Q., Zheng, Ali, Z., Kai, L., Ma, S., Abbas, A., and Dong, C.Q. Catalytic fast pyrolysis of wheat stalk with transition metal nitrides to upgrade the pyrolytic products. Journal of Biobased Materials and Bioenergy 13, 870-879 (2019). Impact Factor 3.0 8. Afzal, A., Lee, J., Ali, A., Iqbal, T., Anjum, M.A., Umair, M., Azam, M., Akram, S., Ikram, K. “Development of hybrid mixed mode solar dryer for drying different perishable agricultural products”. Energies 2021, 14, x. Impact Factor 2.7 (Submitted) 9. Omer, K., Xu, MX., Rong-jun Z., Iqbal, T., Ming-feng, L., Lu, Q*. Steam reforming of toluene as a tar model compound with modified nickel-based catalyst. Frontiers in Energy. 2021. Impact Factor 2.65 10. Iqbal, T., Ali, Z., Abbas, A., Hussain, Z., Rafique, S.F., Dong, C.Q. and Lu, Q., 2019. Fast pyrolysis of agricultural residues: A sustainable way to produce clean energy. Fresenius Environmental Bulletin. 28 (2A), pp.1264-1272. Impact Factor 0.7 11. Ali, Z., Lu, Q., Iqbal, T., Arain, Z., Han, J., Wu, Y. W., ... & Yang, Y. P. (2019). Poisoning effects of lead species on the V2O5-WO3/TiO2 type NH3-selective catalytic reduction catalyst. Asia-Pacific Journal of Chemical Engineering, e2309. Impact Factor 1.39 12. Iqbal, T., Dong, C.Q., Lu, Q., Ali, Z., Khan, I., Hussain, Z. and Abbas, A., 2018. Sketching Pakistan's energy dynamics: Prospects of biomass energy. Journal of Renewable and Sustainable Energy, 10(2), p.023101. Impact
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Factor **1.46**

- 13.** Lu, Q., Ali, Z., Tang, H., **Iqbal, T.**, Arain, Z., Cui, M.S., Liu, D.J., Li, W.Y. and Yang, Y.P., 2018. Regeneration of commercial SCR catalyst deactivated by arsenic poisoning in coal-fired power plants. Korean Journal of Chemical Engineering, pp.1-8. Impact Factor **2.47**
- 14.** Abbas, A., **Iqbal, T.**, Ahmad, M., Yousaf, K., Elahi, E. and Yang, M., 2018. Implementation of a novel approach for the evaluation of energy efficiency, management needs and sustainability of wheat production. Fresenius Environmental Bulletin, 27(10), pp.6695-6703. Impact Factor **0.7**
- 15.** Rafique, S.F., Shen, P., Wang, Z., Rafique, R., **Iqbal, T.**, Ijaz, S. and Javaid, U., 2018. Global power grid interconnection for sustainable growth: concept, project and research direction. IET Generation, Transmission & Distribution, 12(13), pp.3114-3123. Impact Factor **3.4**
- 16.** Abbas, A., Yang, M., Yousaf, K., Khan, K.A., **Iqbal, T.** and Hassan, S.G., 2018. Comparative analysis of energy use efficiency in food grain production systems of Pakistan. Fresen. Environ. Bull, 27, pp.1053-1059. Impact Factor **0.7**
- 17.** Abbas, A., Yang, M., Yousaf, K., Ahmad, M., Elahi, E. and **Iqbal, T.**, 2018. Improving energy use efficiency of corn production by using Data Envelopment Analysis (A non-parametric approach). Fresenius Environmental Bulletin, 27(7), pp.4725-4733. Impact Factor **0.7**
- 18.** Abbas, A., Y. Minli, M. Iqbal, K. Yousaf, Hassan, S. G, **Iqbal, T.**, Contextual evaluation of a corn sheller and its vulnerability to different cultivars, International Agricultural Engineering Journal, 27 (2018) 74-81.
- 19.** K.Yousaf, A. Abbas, K. Rui, **Iqbal, T.**, Kunjie Chen, Hydrothermal treatment under pressure on head rice yield and other quality attributes of Indica and Japonica rice cultivars, International Agricultural Engineering Journal, 27 (2018) 188-197.
- 20.** Khan, I., Zhu, H., Yao, J., Khan, D. and **Iqbal, T.**, 2017. Hybrid power forecasting model for photovoltaic plants based on neural network with air quality index. International Journal of Photoenergy, 2017. Impact Factor **2.02**
- 21.** Abbas, A., Yang, M., Ahmad, R., Yousaf, K. and **Iqbal, T.**, 2017. Energy Use Efficiency in Wheat Production, a Case Study of Punjab Pakistan. Fresenius Environmental Bulletin, 26(11), pp.6773-6779. Impact Factor **0.7**
- 22.** Abbas, A., Minli, Y., Elahi, E., Yousaf, K., Ahmad, R. and **Iqbal, T.**, 2017. Quantification of mechanization index and its impact on crop

	productivity and socioeconomic factors. International Agricultural Engineering Journal, 26(3), pp.49-54. 23. Shilpakar, R., Hua, Z., Manandhar, B., Shrestha, N., Zafar, M.R., Iqbal, T. and Hussain, Z., 2017, August. Numerical simulation on tunnel spillway of Jingping-I hydropower project with four aerators. In IOP Conference Series: Earth and Environmental Science (Vol. 82, No. 1, p. 012013). IOP Publishing. 24. Yousaf, K., Iqbal, M., Iqbal, T*, and Hanif, M., 2014. Effect of Field Plot Design on the Efficacy of Boom Sprayer. Universal Journal of Agricultural Research, 2(7), pp.236-241. 25. Iqbal, T*, Hussain, Z., Ahmad, M., B. Siddiqui, Design and fabrication of self-propelled multi-crop seed drill (SMSD) for adoption of small farmers, Baloch. J. Agric. Sci. 11(2): 18-22. 2014. 26. Iqbal, T., Abbas, A., Ali, Z., Omar, MM., Zaman, Q., Lu, Q., “Fast pyrolysis of agricultural biomass for formation of bio-oil and other valuable chemicals”. Nov 2019 in 1st International Conference of Agricultural Engineering & Technologies (ICAET-2019), Sind Agriculture Univeristy Tandojam, Pakistan (pp. 64). 27. Aneeq, Fu, Z.G., Iqbal, T*, Ali Shah, S.J., Izhar Khan, H., 2019. Study on gas turbine performance by nitrogen injection for IGCC power plant, in: 2019 2nd International Conference on Computing, Mathematics and Engineering Technologies (ICoMET). IEEE, pp. 1–5. 28. Iqbal, T., Lu, Q., Dong, C.Q., Zhou, M.X., Arain, Z., Ali, Z., Khan, I., Hussain, Z. and Abbas, A., 2018, March. A study of product distribution under fast pyrolysis of wheat stalk while producing bio-oil. In 2018 International Conference on Computing, Mathematics and Engineering Technologies (iCoMET) (pp. 1-6). IEEE. 29. Majig, G., Batmunkh, A., Iqbal, T., Ali, Z., Ochirkhuyag, M., Tan, Z., 2019. Performance Evaluation of Electron Transport Layers based on PCBM/P3HT BHJ Organic Solar Cells, in: 2019 2nd International Conference on Computing, Mathematics and Engineering Technologies (ICoMET). IEEE, pp. 1–5. 30. Z. Ali, Q. Lu*, Iqbal, T., S.R. Laraib, H. Jian, Z. Arain, Aneeq. Investigation of Poisoning effects of P and Zn on commercial SCR catalyst. The 13th International Forum on Strategic Technology (IFOST) May 2018. (In Press) 31. Z. Ali, Q. Lu*, Iqbal, T., S.R. Laraib, Z. Arain, M.K. Pamjwani, M.U. Tahir, A. Muhammad. Poisoning effects of P and Zn on commercial NH₃-SCR V₂O₅-MoO₃/TiO₂ Catalyst. 4th International conference on power
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	generation systems and renewable energy technologies (PGSRET) September 2018. 32. S. Larib, Q. Lu*, S. Sajid, Z. Ali, Iqbal, T. Experimental Study on Ni/γ-AL₂O₃ and Its Modified Catalysts for Catalytic Steam Reforming of Methane. 4th International conference on power generation systems and renewable energy technologies (PGSRET) September 2018. 33. G. Majig*, B. Galsan, Iqbal, T., A, Batmunkh, M. Ochirkhuyag, Z.A. Tan. Analysis of High-Efficiency Organic Photovoltaics Technologies and Engineering. The 13th International Forum on Strategic Technology (IFOST) May 2018. (In Press)
Research Grants and Contracts	1. HEC-PSDP funded Project “Pilot Project for Data Driven Smart Decision Platform for Increased Agriculture Productivity” (0.979 Billons Pkrs) as Principal Investigator in Digital Agriculture Section. 2. Ministry of Science and Technology Funded Project “Domestication and Commercialization of Medicinal & Industrial Hemp for Accelerating Economic Development in Pakistan” as a Co-Principal Investigator in Precision Agriculture Section. 3. HEC-PSDP funded Project “Establishment of National Centre of Industrial Biotechnology for Pilot Manufacturing of Bioproducts using Synthetic Biology and Metabolic Engineering Technologies at PMAS-Arid Agriculture University Rawalpindi” (1.439 Billons Pkrs) as a Co-Principal Investigator in Precision Agriculture Section. 4. Team Member “Establishment of CPEC-Agriculture Cooperation Center” in Arid Univeristy with P.R. China Funding 5. “Development of groundnut seed system, mechanized technology and value-added products to enhance productivity and profitability” (2 Million Pkrs) under PSF product development program as a Co-PI. 6. “Optimization of temperature for maintaining productivity of biogas plant during seasonal changes” Submitted (2019) under ORIC, PMAS-Arid Agriculture University, as a Principal Investigator.
Seminars Conferences Trainings Workshops Organized	1. International Semianr on “Smart Agriculture Technologies for Potato Production” on November 10, 2021, at Agriculture Seminar Hall, PMAS-Arid Agriculture University Rawalpindi. 2. Speaker at One day National Seminar on “Water Conservation and Management in Pothar Region” 3. International training workshop on "Management Tool for Sustainable

	Smart Agriculture" in collaboration with Dalhousie Univeristy on June 25, 2021. 4. Webinar on "Impact of Variable Rate Fertigation on Crop Productivity" on January 18, 2020, at Seminar Hall KOICA Building, PMAS-Arid Agriculture University Rawalpindi. 5. Webinar on "The Role of sensors in Digital Agriculture and How to develop Applicable Systems at Grower Level" in collaboration with Dalhousie Univeristy on December 18, 2020 6. Webinar on "Artificial Intelligence for precision Agriculture" in collaboration with Dalhousie Univeristy and Univeristy of Prince Edward Canada on December 17, 2020 7. One Week "Hand on Training Workshop on Variable Rate Spraying Technologies Development (Phase-1)" on December 15-19, 2020, at Seminar Hall KOICA Building, PMAS-Arid Agriculture University Rawalpindi. 8. Webinar on "Precision Agriculture Technologies- Sustainable Solutions for enhancing productivity" Jointly organised with Pakistan Academy of Sciences on July 24, 2020 9. Webinar consultative meeting on "Establishment of Agricultural Mechanical Complex in Pakistan" jointly organised with Centre for Agricultural Strategy and Development (CAS-D) on May 20, 2020 10. Webinar consultative meeting on "Agricultural Mechanization in Pakistan" jointly organised with Centre for Agricultural Strategy and Development (CAS-D) on May 1st, 2020 11. Two Day Training workshop on "Outcome Based Education (OBE) Program" Jointly organised with Pakistan Engineering Council on March 6-7, 2020, at PKCBC-PMAS-AAUR 12. One Day International Seminar on "Digital technologies for managing agriculture and water resources" on January 16, 2020, at Seminar Hall UIBB, PMAS-Arid Agriculture University Rawalpindi. 13. One Day International Seminar on "Sustainable Management of Land and Water Resources in Pakistan" on December 19, 2019, at Seminar Hall, PMAS-Arid Agriculture University Rawalpindi. 14. International Conference "22nd Sustainable Development Conference" on December 3-5, 2019, at Margala Hotel, Islamabad.
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	15. One Day International Seminar on “Value added Agriculture as a Strategy to Promote Agrifood Export” on November 20, 2019, at Seminar Hall, PMAS-Arid Agriculture University Rawalpindi. 16. One Day International Workshop on “Strategies for Academia-Government-Industry Linkage for Sustainable Agriculture” on October 17, 2019, at Main Auditorium, PMAS-Arid Agriculture University Rawalpindi. 17. One Day International Seminar on “Medicinal Importance of Hemp” on October 16, 2019, at Seminar Hall, PMAS-Arid Agriculture University Rawalpindi. 18. One Day International Seminar on “Innovative Technologies in Agriculture” on July 23, 2019, at Seminar Hall, PMAS-Arid Agriculture University Rawalpindi. 19. One Day International Workshop on “Technical Proposal Writing” on July 24, 2019, at Seminar Hall, PMAS-Arid Agriculture University Rawalpindi.
Trainings & Short Courses	• International Training Course for Capacity Building of Faculty Members/Professional in Crop Yield Gap/Produce in the Areas of Agriculture, Livestock, and Allied Disciplines held on September 2021 KOREA • International Training on “Integrated Prevention and Control of Locust and other Plant Disease and pest for Pakistan” held on March 13-27, 2021 MOFCOM CHINA. • Two Day Training Workshop on “Thesis writing that leads to Indexed Publications” held on September 03-04, 2021. • Hand on Training Workshop on Variable Rate Spraying Technologies Development (Phase-1) on December 15-19, 2020 at Seminar Hall KOICA Building, PMAS-Arid Agriculture University Rawalpindi. • Spate Irrigation and Water Management under Drought and Water Scarcity UNESCO-IHE (Institute for Water Education) Delft, the Netherlands 09 to 20 Sep 2013 • Water Resource Management, Tunnel Farming , Environmental Impact Assessment • Lab View Data Acquisition Software, Turbo Mass, AutoCAD, Origin, Jade 5, XEM, • Civil Defense

Name	DR. MUHAMMAD AZAM Date of Birth: April 2nd, 1989 Domicile: Mandibhaudine, Punjab, PAKISTAN 
Personal	Assistant Professor/Incharge-SEE Faculty of Agricultural Engineering & Technology, PMAS Arid Agriculture University, Rawalpindi, Pakistan Address (Postal): Faculty of Agricultural Engineering & Technology, PMAS Arid Agriculture University, Rawalpindi, Pakistan Cell: +92 3336375463 E-Mail: muhammad.azam@uaar.edu.pk
Experience	• Assistant Professor, Department of Structures and Environmental Engineering, PMAS Arid Agriculture University, Rawalpindi • Assistant Professor, Department of Meteorology, COMSATS University Islamabad
Honor and Awards	• HEC Approved Ph.D. Supervisor • Korean Government Scholarship (KGSP) Grant, 2012-15 • Best Paper Award at Smart Water Grid International (SWG) Conference 2015 • Postgraduate Gold Medal for Master's Degree (GPA 4.5/4.5) • Asia Pacific Youth Parliament for Water (APYPW) Fellowship, 2016 • Excellent Paper Award for Graduate Students, March 2017, Chungbuk National University
Memberships	• Korean Society of Agricultural Engineering • Korea Water Resource Association
Graduate Students	MSc: (Supervisor) = 3
Publications	Papers published in peer reviewed International/ National IF journals: 1. Azam, M., San Kim, H. and Maeng, S.J., Development of smart flood alert

	mobile application in Mushim stream watershed Korea. International journal of disaster risk reduction, no. 21, pp.11-26, March, 2017 (ISSN No.:122124209, I.F = 4.3) 2. Azam, M., Maeng, S.J., Kim, H.S. and Murtazaev, A., 2018. Copula-based stochastic simulation for regional drought risk assessment in South Korea. Water, Vol. 10, no. 4, pp.359, April, 2018 (ISSN No. 2073-4441, I.F = 3.1) 3. Azam, M., Maeng, S.J., Kim, H.S., Lee, S.W. and Lee, J.E., 2018. Spatial and temporal trend analysis of precipitation and drought in South Korea. Water, Vol. 10, no. 6, pp 765, June 2018 (ISSN No. 2073-4441, I.F = 3.1) 4. Maeng, S.J., Azam, M., Kim, H.S. and Hwang, J.H., 2017. Analysis of changes in spatio-temporal patterns of drought across South Korea. Water, Vol. 9, no. 9, pp.679 (ISSN No. 2073-4441, I.F = 3.1) 5. Hamza, A., Anjum, M.N., Masud Cheema, M.J., Chen, X., Afzal, A., Azam, M., Kamran Shafi, M. and Gulakhmadov, A., 2020. Assessment of IMERG-V06, TRMM-3B42V7, SM2RAIN -ASCAT, and PERSI ANN-CDR precipitation products over the Hindu Kush Mountains of Pakistan, South Asia. Remote Sensing, Vol. 12, no. 23, pp.3871 November, 2020 (ISSN No.2072-4292, I.F = 4.8) 6. Ain, N.U., Latif, M., Ullah, K., Adnan, S., Ahmed, R., Umar, M. and Azam, M., 2020. Investigation of seasonal droughts and related large-scale atmospheric dynamics over the Potwar Plateau of Pakistan. Theoretical and Applied Climatology, Vol. 140, no. 1, pp.69-89 April, 2020 (ISSN No.1434-4483, I.F = 3.3) 7. Azam, M., Park, H.K., Maeng, S.J. and Kim, H.S., 2017. Regionalization of drought across South Korea using multivariate methods. Water, Vol. 10, no. 1, pp.24. December 2017 (ISSN No. 2073-4441, I.F = 3.1)
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8. Hwang, J.H., Azam, M., Jin, M.S., Kang, Y.H., Lee, J.E., Latif, M., Ahmed, R., Umar, M. and Hashmi, M.Z., 2020. Spatiotemporal trends in reference evapotranspiration over South Korea. *Paddy and Water Environment*, Vol. 18 no. 1, pp.235-259 January 2020 (ISSN No. 1611-2504, I.F = 1.51)
9. Waseem, M., Ajmal, M., Ahmad, I., Khan, N.M., Azam, M. and Sarwar, M. K., 2021. Projected drought pattern under climate change scenario using multivariate analysis. *Arabian Journal of Geosciences*, Vol. 14 no. 7, pp.1-13. April, 2021 (ISSN No. 1866-7538, I.F = 1.8)
10. Waseem, M., Jaffry, A.H., Azam, M., Ahmad, I., Abbas, A. and Lee, J.E., 2022. Spatiotemporal Analysis of Drought and Agriculture Standardized Residual Yield Series Nexuses across Punjab, Pakistan. *Water*, 14(3), p.496. February, 2022 (ISSN No. 2073-4441, I.F = 3.1)
11. Lee, J.E., Azam, M., Rehman, S.U., Waseem, M., Anjum, M.N., Afzal, A., Cheema, M.J.M., Mehtab, M., Latif, M., Ahmed, R. and Umar, M., 2022. Spatio-temporal variability of drought characteristics across Pakistan. *Paddy and Water Environment*, pp.1-19. January 2022 (ISSN No. 1611-2504, I.F = 1.51)
12. Dar, M.A., Ahmed, R., Latif, M. and Azam, M., 2022. Climatology of dust storm frequency and its association with temperature and precipitation patterns over Pakistan. *Natural Hazards*, vol. 110, no. 1, pp.655-677 (ISSN: 1573-0840, I.F = 3.1)
13. Afzal, A., Munir, A., Amjad, W., Alvarado, J.L., Umair, M., Azam, M. and Anjum, M.N., 2021. Use of Perforation and Mathematical Modeling to Increase Solar-Based Steam Distillation System Efficiency. *Journal of Solar Energy Engineering*, Vol. 143, no.6, December 2021 (ISSN:15288986, I.F = 2.3)
14. Malik, S., Ahmed, R., Latif, M., Azam, M., Haroon, E. and Iqbal, M.B., 2021. Convective available potential energy (CAPE) in Pakistan and its association with precipitation and temperature. *Theoretical and Applied Climatology*,

	Vol. 146, no. 1, pp.191-212. October 2021, (ISSN No.1434-4483, I.F = 3.3) 15. ○ Imtiaz, I., Umar, M., Latif, M., Ahmed, R. and Azam, M., 2022. Landslide susceptibility mapping: improvements in variable weights estimation through machine learning algorithms—a case study of upper Indus River Basin, Pakistan. <i>Environmental Earth Sciences</i>, Vol. 81 no. 4, pp.1-14. February, 2022 (ISSN: 1866-6299, I.F = 2.7) 16. Lee, S., Kim, D., Maeng, S., Azam, M. and Lee, B., 2022. Runoff Reduction Effects at Installation of LID Facilities under Different Climate Change Scenarios. <i>Water</i>, Vol. 14, no.8, pp.1301, 16 April, 2022, (ISSN No. 2073-4441, I.F = 3.1) 17. Hwang, J.H., San Kim, H., Azam, M. and Maeng, S.J., 2020. Optimal size estimation of water storage tank for upland crops. <i>Desalination and Water Treatment</i>, no. 200, pp.310-322. October 2020 (ISSN: 1944-3994 I.F = 1.2) 18. Gajendra Sharma, Azam Muhammad Disaster Preparedness, Vulnerability and Resilience - Review of Theories and Implementations -.<i>Crisisonomy</i>, Vol. 16 no. 5, pp.133-154 March 2020, (ISSN: 2466-1198, KCI) 19. ○ Lee, J.E., Kim, S., Sharma, G. and Azam, M., Effective Disaster Prevention or Mitigation by Examining the Significance of Disaster Resilience. <i>Prevention</i>, Vol.15 No.3, pp. 119-139, April, 20 ISSN: 2466-1198) 20. Muhammad Azam, Gajendra Sharma.(2019).A Transdisciplinary Approach of Crisisonomy for Implementing SDGs in Global Society - Using the Core System Model and Disaster Resilience Concept -.<i>Crisisonomy</i>, Vol. 15, no. 6, pp 89-104. 2020, (ISSN: 2466-1198, KCI) Papers/Abstracts published in international/national Conferences/proceedings: 1. Seung, J.M., Azam M*., Kim, H.S., Hwang, J.H., (2nd November 2017). “Stochastic Simulation Of Drought Risk Using Copula Model”. Paper presented at Smart Water Grid International (SWG) Conference, Incheon, Republic of Korea.
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	2. Azam M*, Park, H.K., Seung, J.M., Kim, H.S., (3rd November 2017). “Regionalization of Drought Using Hydro-Climatic of South Korea”. Paper presented at Smart Water Grid International (SWG) Conference, Incheon, Republic of Korea. 3. Seung, J.M., Hwang, J.H., Azam M*, Ardasher, M., (October 2017). “Application of Water Availability Estimation Program at Daechung Island”. Paper presented at Korean Society of Civil Engineering (KSCE) 2017 Convention, BEXCO, Busan, Republic of Korea. (In Korean). 4. Azam M*, Choi H.S., Kim, H.S., Hwang, J.H., Seung, J.M., (May 2017) “Regionalization Using Cluster Probability Model and Copula-Based Drought Frequency Analysis”. Paper presented at Korea Water Resource Association Conference, 2017, Changwon Exhibition Convention Center, ISSN: 1738-2726, pp. 46. 5. Jeon, K.S., Hwang, J.H., Azam, M., Maeng, S.J., (May 2016). “Improving Water Balance Analysis Method for Water Supply and Demand Assessment”. Paper presented at Korea Water Resource Association Conference, 2016, K-water Convergence Institute Daejeon, pp. 262. 6. Kim, H.S., Azam, M.*, Maeng, S.J., (October 2015). “Variation of Annual Maximum Daily Streamflow Using Forecasted Daily Rainfall” Paper presented at Smart Water Grid International (SWG) Conference, Incheon, Republic of Korea. (Best Paper Award). 7. Kim, H.S., Azam, M.*, Maeng, S.J., (November 2014). “Variation of Annual Maximum Daily Streamflow Using Forecasted Daily Rainfall” Paper presented at Smart Water Grid International (SWG) Conference, Incheon, Republic of Korea. 8. Maeng, S.J., Kim, H.S., Azam, M., (September 2014). “Analysis for Runoff Simulation in Geumho River Basin on Water Uses”. Paper presented at 22nd International Congress on Irrigation and Drainage (ICID) & 65th IEC Meeting, Gwangju, Republic of Korea, Volume I - Question 58 and 59. 9. Maeng, S.J., Kim, H.S., Jeong, J.H., Azam, M., (November 2013). “Development of the Rainfall-Runoff Model Modules of the River Flow Management System”. Proceedings of the 2nd international Symposium on Advance Technology for River Management, Seoul National University, Republic of Korea, SP2013-1.
Research Grants and Contracts	• Design and development of Sensor based flood alarming system under the Smart Water Grid Research Group, funded by Ministry of Land,

	Infrastructure and Transport (MOLIT) South Korea (02/2011- 06/2017). • Development of Guideline for Flexible Evaluation of River Flow under Advance Research Center for River Operation and Management (ARCROM), funded by Ministry of Land, Infrastructure and Transport (MOLIT) South Korea (02/2011-06/2016). • Development of Local Water Shortage Assessment System under Smart Water Grid(SWG) Research Group, funded by Ministry of Land, Infrastructure and Transport(MOLIT) South Korea (07/2013-07/2016). • Drought frequency analysis using stochastic approaches in R funded by Ministry of Land, Infrastructure and Transport(MOLIT) South Korea (07/2015-07/2018). • Development of Integrated Real-time Discharge Measurement System (IRDIMS) under Hydrologic Survey Center Korea, funded by Ministry of Land, Infrastructure and Transport (MOLIT) South Korea. (03/2017-06/2018). ❏ Development and Testing of an Index of Stream Condition (ISC) for Geum River, South Korea funded by Ministry of Land, Infrastructure and Transport (MOLIT) South Korea. (03/2017-10/2017).
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Name	ENGR. DR. ZIA UL HAQ Date of Birth: Jan 2nd, 1987 Domicile: Chakwal (Punjab) 
Personal	Assistant Professor Department of Farm Machinery and precision Engineering Faculty of Agricultural Engineering & Technology, PMAS Arid Agriculture University, Rawalpindi, Pakistan Address (Postal): Department of Farm Machinery and precision Engineering Faculty of Agricultural Engineering & Technology, PMAS Arid Agriculture University, Rawalpindi, Pakistan Cell: +92-333-5772063 E-Mail: zia.ch@uaar.edu.pk
Experience	• Working as “Assistant Professor” in the Department of Farm Machinery and Precision Engineering, FAE&T-PMAS-AAUR from 25th May, 2022 to date. • Worked as “Lecturer” in FAE&T-PMAS-AAUR from 19th Jan, 2016 to 24th of May 2022. • Worked as Visiting Lecturer at AAUR from fall 2013-14 to Fall 2015-16. • Worked as a Researcher/Trainer in the Institute of Hydroponic Agriculture (IHA)- PMAS-Arid Agriculture University Rawalpindi (2013-18). • Worked as a “Deputy Manager (R&D)” June, 2013 to October, 2013. • Worked as a “Research Fellow” at “Agricultural Engineering Institute”, NARC Islamabad for the period of 9 month.
Graduate Students Postdocs Undergraduate Students	PhD: (Supervisor/Co-Supervisor) = 01 (Under process) (Member supervisory committee) = 03 MSc: (Supervisor) = 8 =02 (Under Process)

Publications

1. **Zia-Ul-Haq**, R. N. Ahmad, J. K. Sial, M. Yasin and M. Hani . 2018. Effect of different Soilless Substrates on Tomato under Hydroponic System, International Journal of BioSciences. 12(4): 409-415.
2. **Zia-Ul-Haq**, M. S. Ansar, A. Nasir, A. Iqbal, S. R. Haidree, T. Mehmood and M. K. Nawaz. 2019. Variation in growth rate and production of hydroponically grown tomatoes at various location of indigenous shed house. International Journal of Biosciences. 15(3): 524-527.
3. **Zia-Ul-Haq**, M. R. Jamil, Y. Khalil, M. A. Anwar, Y. Mehmood, M. A. Islam, T. Mehmood, S. R. Haidree, H. M. Asam. 2019. Development and testing of mechanical pollinator for bell pepper in controlled environment agriculture. International Journal of Biosciences. 15(3): 528-532.
4. Islam, M. A., M. Iqbal, **Zia-ul-Haq**, M. M. ALi, H. S. Mahmood, S. A. Kalwar, L. A. Shahid, B. M. K. Niazi and M. Husain. 2019. Field performance evaluation of zone disk tiller machinefor soil physical properties and its relative impact on wheat crop recovery in cotton stubble field. Pakistan Journal of Agricultural Research, 32(2):343-352.
5. Sohail Raza Haidree, **Z. U. Haq**, S. J. Butt, T. Mehmood and H. M. Asam. Engineering prospects for off-season fruit and vegetable production: A review. International Journal of Biosciences. 2020. International Journal of Biosciences. Vol. 16, No. 1, p. 375-385.
6. Sohail Raza Haidree, **Z. U. Haq**, S. J. Butt, T. Mehmood and A. Qadeer. 2019. Comparison study of static nutrient film technique with drip irrigation and pasteurized soil for wheat grass production under greenhouse condition. International Journal of Biosciences. 15(4): 418-422.
7. Sohail Raza Haidree, **Z. U. Haq**, M. Usman, S. J. Butt and T. Mehmood. 2019. Effect of hydroponically grown substrates on fodder production under protected environment. International Journal of Biosciences. 15(4): 448-453.
8. Sohail Raza Haidree **Z. U. Haq**, S. J. Butt, T. Mehmood and A. Qadeer. 2019. Comparative performance of different wheat-grass production techniques under greenhouse condition. International Journal of Biosciences. 15(4): 395-400.
9. Sohail Raza Haidree, **Zia-Ul-Haq**, Muhammad Ansar, Hamza Muneer Asam, Talha Mehmood, Abdul Qadeer, Muhammad Kazim Nawaz and Hafiz Muhammad Qasim. 2020. Efficacy of greenhouse system for the hydroponic fodder production: A Review. International Journal of Biosciences. Vol. 16, No. 1, p. 363-374.
10. Nauman Ahmad, **Z. U. Haq**, M. A. Islam, S. R. Haidree, T. Mehmood,

	H. M. Asam. Ergonomic and Safety Prospects of Farm Machinery-A Review. International Journal of Biosciences. 2020. International Journal of Biosciences. Vol. 16, No. 6, p. 11-26. 11. Muhammad Ehtisham Zafar, Zia-Ul-Haq, M. Adnan Islam, Hamza Muneer Asam, Abdul Qadeer and Talha Mehmood. Occupational Health, Safety and Ergonomic Issues of Sugar Industry- A Review. 2020. International Journal of Biosciences. Vol. 16, No. 4, p. 206-221. 12. Mohammad Aurangzeb, Zia-Ul-Haq, Hamza Muneer Asam, Talha Mehmood and Sohail Raza Haidree. Prospects of post-harvest processing of fruit. A review. 2020. International Journal of Biosciences. Vol. 17, No. 1, p. 194-200. 13. Abu Saad, Zia-Ul-Haq, Tajwar Alam, Hamza Muneer Asam, Sohail Raza Haidree and Talha Mehmood. Role of engineering for the development of rainfed agriculture in Pakistan- A review. 2020. International Journal of Biosciences. Vol. 17, No. 2, p. 268-277. 14. Muhammad Kazim Nawaz, Z. U. Haq, T. Mehmood, H. M. Asam, S. R. Haidree, A. Qadeer. 2019. Current status and adoption of mechanized agriculture in Pakistan-A review. International Journal of Biosciences. 15(4): 423-432. 15. Muhammad Kazim Nawaz, Z. U. Haq, S. R. Haidree, H. M. Asam, T. Mehmood, A. Qadeer. 2019. Development and testing of power operated Interculture-implements for poor and small farmers of Pakistan. International Journal of Biosciences. 15(2): 586-594. 16. Muhammad Kazim Nawaz, Z. U. Haq, S. R. Haidree, H. M. Asam, T. Mehmood, A. Qadeer. 2019. Prospects and scope of precision engineering, protected agriculture and vertical farming in Pakistan- A review. International Journal of Biosciences. 15(3): 505-513. 17. Muhammad Kazim Nawaz, Z. U. Haq, M. Yasin, A. Gulzar, M. Ansar and T. Mehmood. 2019. Comparative Performance Evaluation of Intercultural Implements in Cotton Field. International Journal of Biosciences. 15(4): 507-514. 18. Muhammad Kazim Nawaz, Zia-Ul-Haq, Ali Imran, Hamza Muneer Asam, Talha Mehmood, Sohail Raza Haidree, Abdul Qadeer and Muhammad Kamran Shafi. 2020. Field evaluation of small scale interculture implement in grapevine yard. Pure and Applied Biology. Vol. 9, Issue 2, pp 19. Hamza Muneer Asam, Z. U. Haq, M. Yasin, M. Ansar, A. Gulzar and A. Islam. 2019. Comparative Performance of wheat sowing machinery in wheat-rice cropping system, International Journal of Biosciences. 15(4):
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372-380.

20. Hamza Muneer Asam, Muhammad Jehanzeb Masud Cheema, **Zia-Ul-Haq**, Mumtaz, Ahmad, Talha Mehmood, Muhammad Kazim Nawaz, Sohail Raza Haidree and Abdul Qadeer. Adaptation of happy seeder in combine harvested paddy fields a case study of district Sheikhpura Punjab, Pakistan. 2020. International Journal of Biosciences. Vol. 16, No. 1, p. 314-319.
21. Hamza Muneer Asam, **Zia-Ul-Haq**, Talha Mehmood, M Kazim Nawaz, Sohail Raza Haidree and Abdul Qadeer. Engineering management of rice-residue in rice-wheat cropping system of Indo-Gangetic plain, A Review. 2020. International Journal of Biosciences. Vol. 16, No. 1, p. 320-328.
22. Hamza Muneer Asam, **Zia-Ul-Haq**, Talha Mehmood, M Kazim Nawaz, Sohail Raza Haidree, Abdul Qadeer and Saif-ur-Rehman. Conservation agriculture impacts on soil environment, crop rotations, weeds and residue management- A review. 2020. International Journal of Biosciences. Vol. 16, No. 4, p. 418-423.
23. Abdul Qadeer, **Z. U. Haq**, S. J. Butt, H. M. Asam, T. Mehmood, M. K. Nawaz and S. R. Haidree. 2020. Hydroponics as an innovative technique for lettuce production in greenhouse environment. Pure and Applied Biology. 9(1): 20-26.
24. Abdul Qadeer, **Z. U. Haq**, S. J. Butt, H. M. Asam, M. K. Nawaz, S. R. Haidree and T. Mehmood. 2020. Development and testing of re-circulating nutrient film technique. Pure and Applied Biology. 9(1): 1209-1215.
25. Abdul Qadeer, **Z. U. Haq**, S. J. Butt, A. Gulzar and T. Mehmood. 2019. Comparative performance of static and re-circulating close hydroponic system for lettuce production. International Journal of Biosciences. 15(4): 401-407.
26. Abdul Qadeer, **Zia-Ul-Haq**, Shahid Javed Butt , Sohail Raza Haidree, Talha Mehmood, Hamza Muneer Asam and Muhammad Kazim Nawaz. 2020. Hydroponic agriculture in controlled environment: A review. International Journal of Biosciences. Vol. 16, No. 1, p. 407-416.
27. Abdul Qadeer , **Zia-Ul-Haq**, Shahid Javed Butt , Sohail Raza Haidree , Talha Mehmood, Muhammad Kazim Nawaz and Hamza Muneer Asam. 2020. Prospects of lettuce production in hydroponic agriculture: A review. International Journal of Biosciences. Vol. 16, No. 3, p. 608-626.
28. Talha Mehmood, **Zia-Ul-Haq**, Saad Mahmood, Muhammad Kazim Nawaz, Hamza Muneer Asam and Muhammad Kamran Shafi. Forage

	preservation technology for sustainable livestock industry in rainfed areas of Pakistan: A review. 2020. Pure and Applied Biology. Vol. 9, Issue 3, pp1849-1855 29. Talha Mehmood, Zia-Ul-Haq, Saad Mahmood, Sohail Raza Haidree, Hamza Muneer Asam and Abdul Qadeer. Impact of climate change on agriculture and water resources of Pakistan: A review. 2020. Pure and Applied Biology. Vol. 10, Issue 1, pp152-159 30. Muhammad Kamran Shafi, Zia-ul-Haq, Muhammad Yasin, Asim Gulzar, Muhammad Ansar. Efficacy of different sowing geometry on wheat yield and cultivation in Pothwar Region. 2020. International Journal of Biosciences. Vol. 16, No. 3, p. 561-565. 31. Muhammad Kamran Shafi , Zia-Ul-Haq, Muhammad Ansar, Hamza Muneer Asam, Sohail Raza Haidree, Talha Mehmood and M Kazim Nawaz. Effect of the sowing geometry on wheat yield- A review. 2020. International Journal of Biosciences. Vol. 16, No. 4, p. 433-440. 32. Hamza Khan, Shahid Javed Butt, Zia-Ul-Haq and Ismara Naseem. Effect of NPK on various soilless and soil-based substrates on the growth, yield and quality of Zinnia (Zinnia elegans L.). 2020. International Journal of Biosciences. Vol. 16, No. 3, p. 548-560. 33. Imran Hussain, Shahid Javed Butt, Zia-Ul-Haq and Ismara Naseem. Impact of climatic variations on the growth, yield and quality of different Strawberry varieties. 2020. International Journal of Biosciences. Vol. 16, No. 1, p. 417-426. 34. Asif Ali; Tahir Iqbal; Muhammad Jehanzeb Masud Cheema; Arslan Afzal; Muhammad Yasin; Ziaul Haq; Arshad Mahmood Malik; Khalid Saifullah Khan 2021 Development of a Low-Cost Biomass Furnace for Greenhouse Heating Sustainability 13 (9):5152 35. Ahmad Waqas I*, Muhammad Umair, Rai Niaz Ahmad, Zia-ul-Haq and Khalid Saifullah Khan 2021 Assessment Of Crop Responses And Climatic Parameters By Developing Indigenous Hydroponic Greenhouses In Different Regions Of Punjab-Pakistan Pak. J. Agri. Sci., Vol. 58(2), 643-654; 2021 36. Islam, M.A., Z.U. Haq, R.S. Noor, M. Khan, M.M. Ali, Z. Ali, A.A. Mirani, H.S. Mahmood, M. Hussain and B.M.K. Niazi. 2021. Modification and performance evaluation of fertilizer band placement drill machine for wheat crop in rain-fed areas. Pakistan Journal of Agricultural Research, 34(3): 417-424. 37. Luqman Sadiq, Zia-Ul-Haq, Zulfqar Ali, Hamza Muneer Asam, Talha Mehmood, Muhammad Kazim Nawaz. 2021 Prospects of post-harvest
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	processing of cereal grains in Pakistan: A review, International Journal of BioSciences. 18(1): 207-221. Papers Presented in Conferences/Articles 38. Mehmood, T., A. Anwar, Z.U. Haq, M. Umair, G. Shabbir, M. Ansar and S. Ishfaq. 2019. Forage compaction and preservation technology for small farmers to feed livestock. Proc. 1st International Conference on Agricultural and Biological Sciences focusing food security and climate change. March 27-30, 2019. The University of Haripur, Pakistan. 39. Mehmood, T., Z.U. Haq, M. Umair, S. Ishfaq, A. Anwar, G. Shabbir and M. Ansar. 2019. Silage quality as influenced by different levels of moisture content, chop length and compaction pressure grown under rainfed conditions of Pothowar. Proc. 6th International Conference on Sustainable Agriculture in Changing Climate: Strategies and Management. June 19-21, 2019. University of Poonch Rawalakot, Pakistan.
Research Projects	1. Development of Dust Control Mechanism for Wheat Thresher to Minimize Environmental Pollution and Control Health Hazards of Farming Community as PI (ALP) 2. Developing Various Dimensions of Indigenous Hydroponics System (Researcher/Trainer/Site-In-charge) 3. Testing Indigenous Hydroponics Greenhouses at Various Location of Punjab (Researcher/Trainer) 4. Development and Evaluation of Power-take-off (PTO) Driven Disk Plow (Research Fellow)

DR. ARSLAN AFZAL



Ghori town 4-A, Street no 3 House no.179
(Ground floor), Islamabad, Pakistan.

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Skype: arslan.afzal63

Summary

- Working as assistant professor (TTS) in PMAS Arid Agriculture University, Rawalpindi
- Worked as researcher in energy distribution department at Taxes A & M University, USA
- Experience of working as expert of renewable energy in DAAD German funded project
- Worked as a researcher during the ICDD German project in the discipline of solar energy
- Excellent interpersonal, communicational, technical and management skills

Objective

To obtain a high quality research that will utilize my education, experience, interpersonal and leadership skills, as well as provide opportunities for growth and advancement in the organization and future life.

Education

Ph.D. Agricultural Engineering (HEC PCD No. 15015)

Sep 2013 – April

2018

Major: Theory of Manufacturing Processing, Grain Preservation and Processing, Farm Machinery and Environment, Special problem & Seminar 1

Minor: Object oriented programming, community development thought Extension Education, Design and Analysis of Experiments for Researcher

Thesis Topic: Development of hybrid solar distillation system for value addition of medicinal plant

M.Sc. (Hons) Agricultural Engineering

Sep 2010 – Nov

2012

University of Agriculture, Faisalabad.

Major: Theory of model, Renewable Energy Engineering, Advance power and Machinery, Agriculture storage Engineering, Harvesting Machinery, Operational Research, special problem, Seminar.

Minor: Experimental statistics, High level programming 1.

Thesis Topic: Value Addition of Agriculture products using solar distillation system.

B.Sc. Agricultural Engineering (PEC No. AGRI/03203)

Sept 2006 – Aug

2010

University of Agriculture, Faisalabad.

Major: Metallurgy and workshop practices, Manufacturing engineering, energy resource and utilization, boiler engineering and power plants, I.C Engines

Renewable Energy

Apparatuses Used

- Pyranometer
- Thermocouple
- Barrel colorimeter
- AVO-meter
- Data logger
- Laser thermometer

Computer Skills

- Sigma plot
- Matlab
- Microsoft word
- Excel
- PowerPoint
- AutoCAD
- Zotero

Mechanical

instruments &

apparatuses

- CNC lathe machine
- Milling machine
- Arc or gas welding
- Rolling mill

Minor: Computer Programing, engineering statics, communication skills and leadership development, sociology engineering.

- Biogas plants

Research Collaboration

Taxes A & M University (USA)
University of Kassel (Germany)

Surveying
Instruments

International Experience

International Research Initiative Program (USA) 25 Sep 2016 - 23 April 2017

Worked as a researcher in Department of Engineering Technology and Industrial Distribution, Taxes A & M University, USA.

- Theodolite
- Dumpy level
- Planimeter

Presentation in International Conferences (Spain) 04-06 April 2017

Participation and oral presentation entitled “Income generation of rural community by using solar distillation system” in “**International Conference on Renewable Energies and Power Quality (ICREPQ’17)**” that has been held in University of Malaga (Spain) on April, 04-06, 2017.

International Conferences/Workshop (Germany) 03-04 Jul 2014

Participation in Annual Thematic Conference (ATC) themed “Reflections on MDG 1 ‘Decent Work for all’ Where Do We Stand?” held in University of Kassel, Germany. The program featured presentations and discussion on the Millennium Development Goal 1- Eradicate Extreme poverty and Hunger- in an interdisciplinary context.

Participation and Presentation in Summer School (Germany) 16-20 Jun 2014

International DAAD-Alumni Summer School held in the University of Kassel, 37213 Witzenhausen Germany from June 16 -20th, 2014 organized by the University of Kassel, supported by German Academic exchange Service (DAAD).

Responsibilities: Improved the presentation skills; attended different presentation for national and international participant. Visited SMA Solar technology AG, World largest Inverter Manufacturer Company.

Participation and Presentation in DAAD Workshop (Germany) 1-20 Nov 2013

Applied agricultural technology and engineering in developing countries held in the University of Kassel, 37213 Witzenhausen Germany, organized by German Academic exchange Service (DAAD).

Responsibilities: Visited the Hanover exhibition Centre the world’s biggest exhibition Centre and saw different types of new machineries. I met different scientists and exchanged knowledge.

National Experience

Appointed as a Teaching Assistant in the Department of 11 Feb to 30 May 2016

Farm Machinery & power, U.A.F

Worked as a teaching assistant in the department of Farm Machinery & Power, UAF

**Presentation in International Conferences/ Symposium/
Workshop/Summers Schools**

04-06 Nov 2015

Participation and oral presentation entitled “Extraction of Essential oil from Eucalyptus Leaves by using solar distillation system” in the International conference “**Renewable energy technologies for community development in Pakistan**” on October, 04-06, 2015.

**Presentation in International Conferences, Workshop
/Summers Schools**

24-27 Mar 2014

Participation and oral presentation in International Seminar on “**Bio char for Climate-Friendly Agriculture**” held at University of Agriculture, Faisalabad From March, 24-27, 2014.

**Presentation in International Conferences/ Symposium/
Workshop/Summers Schools**

09-12 Jan 2014

Participation and Poster presentation entitled “by using solar distillation Value addition of agriculture products by using solar distillation system ” in the International conference “**Linkages , Value Chains and Development along the Rural-Urban Interface**” on January, 09-12, 2014.

Awards

Global Clean-tech Innovation Programme (Finalist)

11 Jan

2017

I am finalist at Global Clean-tech Innovation Programme for Start-ups in Pakistan, United Nations Industrial Development Organization (UNIDO).

Pakistan Innovation grand challenge (Best student in whole Pakistan)

16 Oct

2014

Due to excellent research performance I won the **Rs. 500,000** Student Prize for Pakistan Poverty Alleviation Fund (PPAF) Agriculture+ Rural Challenge in Pakistan and award was presented by the Federal Minister of Planning and Development (**Dr. Ahsan Iqbal**).

Resilient Community Design Challenge (2nd Position)

08 April

2018

2nd Position in solar distillation system project achieved at ESW conference, Georgia institute of Technology USA.

Projects

Development of indigenous renewable energy technologies for sustainable agriculture

Aug 2022 –Continue

- To develop small scale solar distillation, Solar drone for smart farming
- International collaboration with Germany and USA.

Design, Development of solar dryer for processing of on-farm different perishable agriculture products

Jan 2019 –

Aug 2019

- To develop small scale solar dryer for processing of different perishable agricultural products
- Technology transfer to the farming community for the Income generation for the end-users.

Renewable Technologies in Pakistan

Jan 2013 –

Dec 2015

- Dissemination of knowledge to the stakeholder (students, researcher, end –users etc.) about renewable energy technologies viz. solar thermal, solar PV and Biogas
- Capacity building of student, trainers and entrepreneurs for appropriate selection and operation of efficient, economical and environment friendly renewable energy technologies acceptable to end-users.

Value Addition to agriculture products by using Solar Energy

Jan 2011-Dec

2012

- Construction of Scheffler Reflector in Agriculture Engineering workshop of U.A.F
- Operated Distillation still by using solar energy and got essential oils of different agriculture product first time in Pakistan.

Trainings

(IELTS)

Jun 2013 –

Aug 2013

University of Agriculture, Faisalabad.

Responsibilities: Improved the Listening, Speaking, Reading and Writing. Successfully completed a course on Spoken English in Faculty of social sciences.

Remote Sensing and Digital Image programing

Nov 2010 –

Dec 2010

A project aimed at studying topographical data and Agriculture field measurements put on by using Remote sensing technique.

Research Paper Publications (Impact Factor)

- Nadeem, M., M. Anjum, A. Afzal, M. Azamn, F. Hussan, M. Usaman, M. Mashood, M. Ahsan, F. Majeed, 2022. Assessment of multi-satellite precipitation production over the Himalayan Mountains of Pakistan, South Asia. Sustainability (2022) 14–8490 <https://www.mdpi.com/2071-1050/14/14/8490> (**Impact Factor 3.25**)
- Lee, j., M. Azam, S. Rehman, M. Waseem, M. Anjum, **A. Afzal**, M. Cheema, M. Mehtab, M. Latif, R. Ahmad, M. Umer, A. Sarwar, S. Rehman, 2021. Spatio-temporal variability

of drought characteristics across Pakistan. Paddy and Water Environment (2022) 20:117–135 <https://doi.org/10.1007/s10333-021-00881-4> (**Impact Factor 2.31**)

- **Arslan, A.**, A. Munir, W. Amjad, J.L. Alvarado, M. Umair, M. Azam, M.N. Anjum, 2021. Use of perforation and mathematical modeling to increase solar based steam distillation system efficiency. Journal of solar energy engineering (ASME). DOI: 10.1115/1.4051316. (**Impact Factor 2.38**)
- Asif, A., T. Iqbal, M.J.M. Cheema, **A. Afzal**, M. Yasin, Z. Haq, A. Malik and K.S. Khan, 2021. Development of a Low-Cost Biomass Furnace for Greenhouse Heating. Sustainability (MDPI). Doi. 10.3390/su13095152. (**Impact Factor 3.25**)
- Sajeela, A., Y. Bao, M.S. Butt, R. Shukat, **A. Afzal** and J.Y. Huang, 2021. Fabrication and characterization of gum arabic- and maltodextrin-based microcapsules containing polyunsaturated oils. Journal of food and agriculture. DOI 10.1002/jsfa.11309 (**Impact Factor 3.64**)
- Hamza, A., M. Anjum, M.J.M. Cheema, Chen, X, **A. Afzal**, M. Azam, M.K. Shafi and A. Gulakhmadov 2020. Assessment of IMERG-V06, TRMM-3B42V7, SM2RAIN-ASCAT, and PERSIANN-CDR Precipitation Products over the Hindu Kush Mountains of Pakistan, South Asia. International Journal of Remote Sensing doi:10.3390/rs12233871 (**Impact Factor 4.8**)
- **Afzal, A.**, A. Munir, A. Ghafoor and J. Alvarado 2017. Development of hybrid solar distillation system for essential oil extraction. International Journal of Renewable Energy (ELSEVIER) vol 113, Issue 5, 2017. Pages: 22-29 (**Impact Factor 8.01**)

Research Paper Publications (Non-Impact Factor)

- Shujaa, A., M. Umair, R.S. Noor, C. Arslan, A. Afzal and Z. Islam, 2021. Experimental Testing of an Indigenous Solar Driven Desiccant Cooling System for Local Conditions of Pakistan. Pakistan journal of agricultural sciences. doi.org/10.17582/journal.pjar/2021/34.3.400.404.
- Muhammad, N.A., M.J.M. Cheema, M.Z.R. Hashmi, M. Azam, **A. Afzal** and M.W. Ijaz, 2021. Climate Change in the Mountains of Pakistan and its Water Availability Implications. Springer Nature Switzerland AG 2021. doi.org/10.1007/978-3-030-65679-9_5
- Aneeq, T. Iqbal, Z. Ali, S. Shah, A. Abbas, **A. Afzal**, M.J.M. Cheema, 2020. Predicting biogas production using kinetic model for mesophilic and thermophilic temperature regimes: a theoretical approach. Asian J Agric & Biol. Online First. DOI: 10.35495/ajab.2020.03.196.
- Ikram, K., Y. Niaz, M. Mansha, M. Ghani, F. Shabir, M. Waqas, M. Bodlah, M. Nadeem, **A. Afzal**, M. Omer, A. Waheed, 2020. Cleaning material arrangement

testing for sugarcane detrasher: a simulation approach. Big Data In Agriculture (BDA) DOI: <http://doi.org/10.26480/bda.02.2020.55.58>

- **Afzal, A., A. Munir, A. Ghafoor and J. Alvarado**, 2017. Income generation of rural community by using solar distillation system. Renewable Energy and Power Quality Journal (RE&PQJ) ISSN 2172-038 X, No.15 April 2017.

Languages

Fluent in Urdu, English, Punjabi, Hindi (Spoken).

Qualities

Highly motivated, quick learner, ambitious, devoted to work, keen desire to learn new technologies, active participation in group work and activities.

References

- **Prof. Dr. Jorge L. Alvarado**, Professor, Dept. Engineering Technology and Industrial Distribution, Texas A & M University, USA
Phone: (979) 458-1900, **Email:** jorge.alvarado@tamu.edu
 - **Dr. Anjum Munir**, Associate Professor/Chairman, Dept. of Energy Systems Engineering University of Agriculture, Faisalabad.
Phone: +92 41 92 00 161 Ext. 3002, **Email:** anjum.munir@uaf.edu.pk
 - **Prof. Dr. Oliver Hensel**, Head, Universität Kassel - FG Agrartechnik, Nordbahnhofstr. 1a, D-37213 Witzenhausen, Germany.
Ph: +49(0)5542 981225 E-mail: agrartechnik@uni-kassel.de
 - **Wolfgang Scheffler**, Chairman Simply Solar Bruky, G.v. Werdenbergstr. 6, D-89344 Aislingen, Germany. E-mail: W.Scheffler@simply-solar.de
-

Muhammad Naveed Anjum

Assistant Professor

Department of Land and Water Conservation Engineering

PMAS Arid Agriculture University Rawalpindi

Phone: +92 333 8370838

E-Mail: naveedwre@uaar.edu.pk

ResearchGate: <https://www.researchgate.net/profile/Muhammad-Naveed-Anjum>



EDUCATION:

- 2018 **Ph.D.** Hydrology and Water Resources, University of Chinese Academy of Sciences, China
2010 **M.Sc.** Water Resources Engineering, University of Engineering & Technology, Lahore, Pakistan.
2008 **B.Sc.** Agricultural Engineering, University of Agriculture, Faisalabad, Pakistan.
-

POSITIONS:

- 2019 – now** Assistant Professor, PMAS-Arid Agriculture University Rawalpindi, Pakistan.
2018 – 2019 Post-Doctoral Researcher, University Chinese Academy of Sciences, China.
2012 – 2014 Junior Engineer (Hydrology and Sedimentation), Engineering General Consultants (Pvt) Ltd., Lahore, Pakistan.
2011 – 2012 Research Associate, Centre of Excellence in Water Resources Engineering, University of Engineering and Technology, Lahore, Pakistan.
-

FELLOWSHIPS:

- 2021 Fellowship for “Capacity Building of Faculty Members/Professional in Crop Yield Gap/Produce in the Areas of Agriculture, Livestock and Allied Disciplines” from 8-15 September, 2021, organized by the Korea International Cooperation Agency and Hankyong National University under the International Cooperation Program of the Government of Korea.
2009 Postgraduate (M.Sc. Water Resources Engineering) Merit Scholarship, obtained from the University of Engineering and Technology, Lahore, Pakistan.
2008 Undergraduate (B.Sc. Agricultural Engineering) Merit Scholarship, obtained from the University of Agriculture, Faisalabad, Pakistan.
-

HONOURS/AWARDS:

- 2018 Outstanding Graduate Award, granted by the University of Chinese Academy of Sciences, Beijing, China.
2017 Panta Rhei-International Association of Hydrological Sciences (IAHS) Award.
2017 Outstanding Reviewer Award, obtained from the Editorial Board of Journal of Hydrology.
2014 The Chinese Academy of Science and The World Academy of Sciences (CAS-TWAS) President's Fellowship.
2010 Postgraduate (M.Sc. Water Resources Engineering) First Position Award, obtained from the University of Engineering and Technology, Lahore, Pakistan.
-

SUPERVISION OF GRADUATE STUDENTS:

MSc Students

- 2022 Muhammad Umar Nadeem
2020 Ali Hamza, Awais Pervaiz

TEACHING ACTIVITIES:

2019-2020 (Fall-Semester)	Fluid Mechanics, 2 nd Semester, BSc Agricultural Engineering.
2019-2020 (Spring-Semester)	Open Channel Hydraulics, 4 th Semester, BSc Agricultural Engineering
2019-2020 (Spring-Semester)	Pumps and Tube Wells, 8 th Semester, BSc Agricultural Engineering.
2020-2021 (Fall-Semester)	Farm Mechanization & Water Conservation Engineering (Theory + Practical), 3 rd Semester, BSc Agriculture Section-E
2020-2021 (Fall-Semester)	Farm Mechanization & Water Conservation Engineering (Theory + Practical), 3 rd Semester, BSc Agriculture Section-F
2020-2021 (Fall-Semester)	Climate Change and Water Resources (Theory + Practical), 1 st Semester, MSc Agricultural Engineering
2021 Summer	Open Channel Hydraulics, BSc Agricultural Engineering
2021 Summer	GIS and Remote Sensing, BSc Agricultural Engineering
2021 Summer	Fluid Mechanics, BSc Agricultural Engineering
2021-2022 (Fall-Semester)	Climate Change and Water Resources (Theory + Practical), 1 st Semester, MSc Agricultural Engineering
2021-2022 (Fall-Semester)	Farm Mechanization & Water Conservation Engineering (Theory + Practical), 3 rd Semester, BSc Agriculture Section-C
2022 Spring	Fluid Mechanics, 2 nd Semester, BSc Agricultural Engineering
2022 Spring	GIS and Remote Sensing, 6 th Semester, BSc Agricultural Engineering

RECENT TRAININGS/WORKSHOPS:

- 2021 Two Day Training workshop on “**GPS and GNSS Hands-on Training Workshop for Surveying & Mapping**” Jointly organized by Pilot Project for Data driven Smart Decision Platform for increased agriculture productivity (DDSDP), IGEO and ORIC PMAS-Arid Agriculture University, Rawalpindi on 3-4 August, 2021 at PMAS-AAUR.
- 2021 One Day International Webinar on “**Artificial Intelligence for precision Agriculture**” organized by PMAS-Arid Agriculture University Rawalpindi in collaboration with Dalhousie University, Canada and University of Prince Edward Island, Canada, on 17 August, 2021 at PMAS-AAUR.
- 2021 Two days Training Webinar on “**Thesis Writing that Leads to Indexed Publication**” organized by Faculty of Agricultural Engineering & Technology, PMAS-Arid Agriculture University, Rawalpindi on 3-4 September, 2021.
- 2021 Consultative Workshop on “**Agri Climate & Water (ACWA) Information Portal**” organized by FAO at Crystal Ball Room, Marriot Hotel Islamabad-under the GCF Project on 28 July 2021.
- 2021 Two Days International Seminar on “**Recent Challenges & Prospects of Horticulture in Pakistan**” organized by PMAS-Arid Agriculture University Rawalpindi on 23-24 June, 2021.
- 2021 Training Course (online) on “**Agricultural Pest and Disease Control Technology for Pakistan**” sponsored by Ministry of Commerce and organized by National Agricultural Technology Extension and Service Center from 6-17 September, 2021, in Beijing, China.

INSTITUTIONAL RESPONSIBILITIES:

- In charge of Hydrodynamics Lab. Department of land and Water Conservation Engineering, FAE & T
- Member of PEC Central Committee at FAE & T
- Member of Continuous Quality Improvement (CQI) Committee at FAE & T
- Member of Centre for Agriculture Strategy and Development (CAS-D)
- Member of Admission Committee for B.Sc., M.Sc., and PhD Agricultural Engineering Program
- Member of the Civil Works Evaluation Committee at PMAS-AAUR

GP PROFESSIONAL AFFILIATION:

- Registered Member of Pakistan Engineering Council, Islamabad. (Agri/2740)

KEY PUBLICATIONS:

Papers published in peer reviewed International/ National IF journals:

1. Min, Y., Li, Z., **Anjum, M.N.**, Kayastha, R., Kayastha, R.B., Rai, M., Xin, Z., Chunhai, X., 2022. Projection of Streamflow Changes under CMIP6 Scenarios in the Urumqi River Head Watershed, Tianshan Mountain, China. *Global and Planetary Changes*. [IF = 3.498]
2. Lee, J.E., Azam, M., Rehman, S.U., Waseem, M., **Anjum, M.N.**, 2022. Spatio-temporal variability of drought characteristics across Pakistan. *Paddy and Water Environment*. [IF = 1.517]
3. Min, Y., Li, Z., **Anjum, M.N.**, Zhang, X., Gao, Y., Xu, C., 2021. On the importance of subsurface heat flux for estimating the mass balance of alpine glaciers. *Global and Planetary Changes*. [IF = 5.114]
4. Afzal, A., Munir, A., Amjid, W., Alvarado, J., Umair, M., Azam, M., **Anjum, M.N.**, 2021. Use of Perforation and Mathematical Modeling to Increase Solar-Based Steam Distillation System Efficiency. *Journal of Solar Energy Engineering*. [IF = 2.384]
5. Wang, X., Shangguan, D., Li, D., **Anjum, M.N.**, 2021. Spatiotemporal Variability of Velocity and Influence of Glacier Thickness Using Landsat Imagery: Hunza River Basin, Karakoram Range (1993–2019). *IEEE Access*. [IF = 3.367]
6. Shangguan, D., Li, D., Ding, Y., Liu, J., **Anjum M.N.**, Li, Y., Guo, W., 2021. Determining the Events in a Glacial Disaster Chain at Badswat Glacier in the Karakoram Range Using Remote Sensing. *Remote Sensing*. [IF = 4.848]
7. Ali, A., Farid, H.U., Khan, Z.M., Ahmad, I., **Anjum, M.N.**, Mubeen, M., Shakoor, A., 2021. Temporal Analysis for Detection of Anomalies in Precipitation Patterns over a Selected Area in the Indus Basin of Pakistan. *Pure and Applied Geophysics*. [IF = 2.335]
8. Shahzad, H., Farid, H.U., Khan, Z.M., **Anjum, M.N.**, Ahmad, I., Chen, X., Sikandar, P., Mubeen, M., Ahmad, M., Gulakhmadov, A., 2020. An Integrated Use of GIS, Geostatistical and Map Overlay Techniques for Spatio-Temporal Variability Analysis of Groundwater Quality and Level in the Punjab Province of Pakistan, South Asia. *Water*. [IF = 3.103]
9. Zaman, M., Ahmad, I., Usman, M., Ullah, S., **Anjum, M.N.**, Khan, M.I., Qamar, M.Z., 2020. Event-Based Time Distribution Patterns, Return Levels, and Their Trends of Extreme Precipitation across Indus Basin. *Water*. [IF = 3.103]
10. Hamza, A., **Anjum, M.N.**, Cheema, M.J.M., Chen, X., Afzal, A., Azam, M., Shafi, M.K., Gulakhmadov, A., 2020. Assessment of IMERG-V06, TRMM-3B42V7, SM2RAIN-ASCAT, and PERSIANN-CDR Precipitation Products over the Hindu Kush Mountains of Pakistan, South Asia. *Remote Sensing*. [IF = 4.848]
11. Haider, H., Zaman, M., Liu, S., Ullah, S., Usman, M., Chauhadry, Z.R., **Anjum, M.N.**, Waseem, M., 2020. Appraisal of Climate Change and Its Impact on Water Resources of Pakistan: A Case Study of Mangla Watershed. *Atmosphere*. [IF = 2.686]
12. Haider, H., Zaman, M., Liu, S., Saifullah, M., Usman, M., Chaudhary, J.N., **Anjum, M.N.**, Waseem, M., 2020. *Atmosphere*. doi:10.3390/atmos11101071. [IF = 2.397]

13. Gulakhmadov, A., Chen, X., Gulahmadov, N., Liu, T., **Anjum, M.N.**, 2020. Simulation of the Potential Impacts of Projected Climate Change on Streamflow in the Vakhsh River Basin in Central Asia under CMIP5 RCP Scenarios. *Water*. [IF = 2.544]
14. Khan, I., Zhu, X., Arshad, M., Zaman, M., Niaz, Y., **Anjum, M.N.**, 2020. Assessment of Spatiotemporal Characteristics of Agro-meteorological Drought Events based on comparing SSI, SPI and MSDI. *Journal of Water and Climate Change*. [IF = 1.254]
15. Da, L., Shangguan, D., **Anjum, M.N.**, 2020. Glacial Lake Inventory Derived from Landsat 8 OLI in 2016–2018 in China–Pakistan Economic Corridor. *International Journal of Geo-Information*, Accepted for publication. [IF = 2.239]
16. Ijaz, M.W., Mahar, R.B., Ansari, K., Siyal, A.A., **Anjum, M.N.**, 2020. Integrated assessment of contemporary hydro-geomorphologic evolution of the Indus River Estuary, Pakistan in context to regulated fluvial regimes. *Estuarine, Coastal and Shelf Science*, <https://doi.org/10.1016/j.ecss.2020.106657>. [IF = 2.333]
17. Nasir, S., Sajid, M., Zahid, F.M., **Anjum, M.N.**, Khan, N.A., Ashraf, I., Saddiq, B., 2020. An Appraisal of the Effects of Organophosphate on Biochemical Parameters of Farmers. *Pakistan Journal of Agricultural Sciences*, 57(4): 1189-1195. [IF = 0.663]
18. **Anjum, M.N.**, Ahmad, I., Ding, Y., Shangguan, D., Zaman, M., Ijaz, M. W., Sarwar, K., 2019. Assessment of **IMERG-V06** Precipitation Product over Different Hydro-Climatic Regimes in the Tianshan Mountains, North-Western China. *Remote Sensing*, 11 (19): 2314. [IF = 4.509]
19. **Anjum, M.N.**, Ding, Y., Shangguan, D., 2019. Simulation of the projected climate change impacts on the river flow regimes under CMIP5 RCP scenarios in the westerlies dominated belt, northern Pakistan. *Atmospheric Research*, 227: 233-248. [IF = 4.676]
20. Adnan, M., Kang, S., Zhang, G., **Anjum, M.N.**, Zaman, M., Ali A.F., 2019. Evaluation of SWAT Model performance on glaciated and non-glaciated subbasins of Nam Co Lake, Southern Tibetan Plateau. *Journal of Mountain Science*, 16(5): 1075-1097. [IF = 1.550]
21. Farid, H.U., Khan, Z.M., Ahmad, I., Shakoor, A., **Anjum, M.N.**, Iqbal, M.M., Mubeen, M., Hadi, M.A., 2019. Estimation of infiltration models parameters and their comparison to simulate the onsite soil infiltration characteristics. *International Journal of Agricultural and Biological Engineering*, 12(3): 84-91. [IF = 1.731]
22. Ahmad, I., Tayyab, M., Zaman, M., **Anjum, M.N.**, 2019. Finite-Difference Numerical Simulation of Dewatering System in a Large Deep Foundation Pit at Taunsa Barrage, Pakistan. *Sustainability*, 11(3): 1–17. <https://www.mdpi.com/2071-1050/11/3/694> [IF = 2.576]
23. Min, Y., Li, Z., **Anjum M.N.**, 2019. Investigating the Performance of IMERG-V05 and TRMM-V07 Satellite Precipitation Products over the Tianshan Mountains in Northwestern China. *Water*, 11:1139. [IF = 2.544]
24. Adnan, M., Kang, S., Zhang, G., Saifullah, M., **Anjum, M.N.**, Ali A.F., 2019. Simulation and Analysis of the Water Balance of the Nam Co Lake Using SWAT Model. *Water*, 11(7): 1383. [IF = 2.544]
25. Adnan, M., Kang, S., Zhang, G., **Anjum, M.N.**, Zaman, M., Ali A.F., 2019. Evaluation of SWAT Model performance on glaciated and non-glaciated subbasins of Nam Co Lake, Southern Tibetan Plateau. *Journal of Mountain Science*, 16(5): 1075-1097. [IF = 1.423]
26. **Anjum, M.N.**, Ding, Y., Shangguan, D., Ahmad, I., Ijaz, M.W., 2018. Performance Evaluation of Latest Integrated Multi-satellite Retrievals for Global Precipitation Measurement (IMERG) over the Northern Highlands of Pakistan. *Atmospheric Research*, 205: 134-146. <https://www.sciencedirect.com/science/article/pii/S0169809517311018> [IF = 4.676]
27. **Anjum, M.N.**, Ding, Y., Shangguan, D., Liu, J., Ahmad, I., Ijaz, M.W., Khan, M.I., 2018. Quantification of spatial-temporal variability of snow cover and hydro-climatic variables based on

- multi-source remote sensing data in the Swat watershed, Hindukush Mountains, Pakistan. *Meteorology and Atmospheric Physics*. <https://doi.org/10.1007/s00703-018-05847> [IF = 2.204]
28. Zaman, M., **Anjum, M.N.**, Usman, M., Ahmad, I., Ullah, S., Yuan, S., Shyin, L., 2018. Enumerating the effects of climate change on water resources using GCMs scenarios at the Xin'anjiang Watershed, China. *Water*. <https://www.mdpi.com/2073-4441/10/10/1296/htm> [IF = 2.544]
29. Ahmad, I., Zhang, F., Liu, J., **Anjum, M.N.**, Zaman, M., Waseem, M., Farid, F., 2018. A linear bi-level multi-objective program for optimal allocation of water resources. *PLOS One*, 13(2): e0192294. <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0192294> [IF = 2.740]
30. Ahmad, I., Zhang, F., Tayyab, M., **Anjum, M.N.**, Zaman, M., Liu, J., Saddique, Q., 2018. Spatiotemporal analysis of precipitation variability in annual, seasonal and extreme values over upper Indus River basin. *Atmospheric Research*. <https://www.sciencedirect.com/science/article/pii/S0169809517312796> [IF = 4.676]
31. Ijaz, M.W., Mahar, R.B., Siyal, A.A., **Anjum, M.N.**, 2018. Geospatial analysis of creeks evolution in the Indus Delta, Pakistan using multi-sensor satellite data. *Estuarine, Coastal and Shelf Science*, 200: 324-334. <https://www.sciencedirect.com/science/article/pii/S0272771417307515> [IF = 2.333]
32. Xu, C., Li, Z., Wang, P., **Anjum, M.N.**, Li, H., Wang, F., 2018. Detailed comparison of glaciological and geodetic mass balances for Urumqi Glacier No.1, eastern Tien Shan, China, from 1981 to 2015. *Cold Regions Science and Technology*, 155: 137-148. <https://www.sciencedirect.com/science/article/pii/S0165232X17304949> [IF = 2.739]
33. Zaman, M., Yuan, S., Usman, M., Ahmad, A., Sultan, M., Qamar, M., Ullah, S., Adnan, M., **Anjum, M.N.**, Nawaz, M.I., Ali, I., 2018. Investigating Hydrological Responses and Adaptive Operation of a Hydropower Station under a Climate Change Scenario. *Polish Journal of Environmental Studies*, 27: 2337-2348. <https://doi.org/10.15244/pjoes/78678> [IF = 1.383]
34. Ali, A.F., Cunde, X., **Anjum, M.N.**, Adnan, M., Nawaz, Z., Ijaz, M.W., Sajid, M., Farid, H.U., 2017. Evaluation and comparison of TRMM multi-satellite precipitation products with reference to rain gauge observations in Hunza River Basin, Karakoram Range, Northern Pakistan. *Sustainability*, 9: 1-17. <https://www.mdpi.com/2071-1050/9/11/1954> [IF = 2.576]
35. Adnan, M., Nabi, G., Kang, S., Zhang, G., Adnan, R.M., **Anjum, M.N.**, Iqbal, M., Ali, A.F., 2017. Snowmelt Runoff Modelling under Projected Climate Change Patterns in the Gilgit River Basin of Northern Pakistan. *Polish Journal of Environmental Studies*, 26 (2): 525-542. [doi: 10.15244/pjoes/66719](https://doi.org/10.15244/pjoes/66719) [IF = 1.383]
36. Farid, H.U., Khan, Z.M., Ali, A., Mubeen, M., **Anjum, M.N.**, 2017. Site-Specific Aquifer Characterization and Identification of Potential Groundwater Areas in Pakistan. *Polish Journal of Environmental Studies*, 26: 17-27. [doi: 10.15244/pjoes/64645](https://doi.org/10.15244/pjoes/64645) [IF = 1.383]
37. Ijaz, M.W., Siyal, A.A., Mahar, R.B., Ahmad, W., **Anjum, M.N.**, 2017. Detection of Hydromorphologic Characteristics of Indus River Estuary, Pakistan, Using Satellite and Field Data. *Arabian Journal for Science and Engineering*, 42: 2539-2558. [doi:10.1007/s13369-017-2528-9](https://doi.org/10.1007/s13369-017-2528-9) [IF = 1.711]
38. Wang, S., Ding, Y., Jiang, F., **Anjum, M.N.**, Iqbal, M. 2017. Defining Indices for the Extreme Snowfall Events and Analyzing their Trends in Northern Xinjiang, China. *Journal of the Meteorological Society of Japan*, 95: 287-299. [doi: 10.2151/jmsj.2017-016](https://doi.org/10.2151/jmsj.2017-016) [IF = 1.9]
39. Iqbal, M., Wen, J., Wang, X., Lan, Y., Tian, H., **Anjum, M.N.**, Adnan, M., 2017. Assessment of Air Temperature Trends in the Source Region of Yellow River and Its Sub-Basins, China. *Asia-Pac. Journal of Atmospheric Sciences*, 54(1): 111-123. [doi:10.1007/s13143-017-0064x](https://doi.org/10.1007/s13143-017-0064x) [IF = 1.833]
40. **Anjum, M.N.**, Ding, Y., Shangguan, D., 2016. Comparison of two successive versions 6 and 7 of TMPA satellite precipitation products with rain gauge data over Swat Watershed, Hindukush

- Mountains, Pakistan. Atmospheric Science Letters, 17: 270-279. <https://rmets.onlinelibrary.wiley.com/doi/full/10.1002/asl.654> [IF = 1.879]
41. **Anjum, M.N.**, Ding, Y., Shangguan, D., Ijaz, M.W., Zhang, S., 2016. Evaluation of High-Resolution Satellite-based Real-Time and Post-Real-Time Precipitation Estimates during 2010 Extreme Flood Event in Swat River Basin, Hindukush Region. Advances in Meteorology. <https://www.hindawi.com/journals/amete/2016/2604980/> [IF = 1.491]
42. Sarwar, M.K., **Anjum, M.N.**, Mahmood, S., 2013. Impact of Silt Excluder on Sediment Management of an Irrigation Canal: A Case Study of D.G. Khan Canal, Pakistan. Arabian Journal for Science and Engineering, 38: 3301–3307. doi: [10.1007/s13369-013-0641-y](https://doi.org/10.1007/s13369-013-0641-y) [IF = 1.711]

CURRICULUM VITAE

1. PERSONAL DATA

Name: *Engr. Dr. Fiaz Hussain*

Date of Birth: *13-04-1990*

Place of Birth: *Punjab Pakistan*

Nationality: *Pakistan*

Contact Address: *Department of Agricultural Engineering, FAE&T, PMAS-Arid Agriculture University Rawalpindi, Shamsabad, Murree Road, Rawalpindi, 46300, Pakistan*

Personal Address: *P/O Railway Station Budh, Rodan Wala, Tehsil & District Muzaffargarh*

Tel (Mobile): *+92 3065508264*

Email: enqr.fiaz@uqar.edu.pk

Google: <http://scholar.google.com/citations?user=J6FgZQQAAAAJ&hl=en>

2. ACADEMIC/PROFESSIONAL PARTICULARS

(a) Field of Specialization

Major Field of Specialization: **Civil Engineering**

Fine Field Specialization: **Water Resources Engineering**

(b) Academic Qualifications

PhD, Civil Engineering, 2020, National Central University, Taiwan

Characterization of a Regional Groundwater System using Physical Based Models, 4.14 (89.68%)

M.Sc. Water Resources Engineering, 2015, University of Engineering and Technology, Lahore, Pakistan, Impact of Rainfall and Landuse Pattern on Water and Sediment Yield of Soan Basin, 3.741

B.Sc. Agricultural Engineering, 2012, Bahauddin Zakariya University, Pakistan, 3.83

(c) Academic Honors and Awards

PhD fully funded International Student Scholarship National Central University Taiwan (2017-2020)

1st Position Fee Refund Award during BSc and MSc

BSc Gold Medalist, Department of Agricultural Engineering, Bahauddin Zakariya University

Student of the Year Award, Department of Agricultural Engineering, Bahauddin Zakariya University, 2012

Gurmani Foundation Merit Scholarship during BSc Engineering

(d) Membership of Professional Bodies

Pakistan Engineering Council, Lifetime Registered Engineer (Agri-4185) from 02/2015

(e) Language Proficiency

<i>Language</i>	<i>Speak</i>	<i>Write</i>	<i>Read</i>
English	Excellent	Excellent	Excellent
Urdu	Excellent	Excellent	Excellent

3. CAREER DETAILS

(a) Academic Positions Held

Assistant Professor, Department of Agricultural Engineering, PMAS-Arid Agriculture University Rawalpindi, Pakistan, (04/2022 – To Date)

Post-doctoral Researcher, Civil Engineering, College of Engineering, National Central University, Taiwan, (10/2020- 07/2021)

Lab Engineer, Department of Agricultural Engineering, PMAS-Arid Agriculture University Rawalpindi, Pakistan, (05/2016 – 03/2022)

Research Associate, Centre of Excellence in Water Resources Engineering, University of Engineering and Technology, Lahore, Pakistan, (01/2013 – 06/2014)

Visiting Faculty Staff, Department of Agricultural Engineering, Bahauddin Zakariya University, Pakistan, (08/2012 – 12/2012)

(b) Professional/Industrial Positions Held

Water Engineer, Haris Engineering & Management Consultant, Pakistan, (04/2015-05/2016)

Project Engineer, Pyramid Construction, Pakistan, (09/2014-03/2015)

4. TEACHING

(a) Summary of Courses Taught

I&D-101, Fluid Mechanics, 1

I&D-202, Engineering Hydrology, 2

I&D-302, Soil and Water Conservation Engineering, 1

I&D-303, Irrigation Engineering, 2

I&D-405, GIS Applications in Water Resources, 1

LWCE-603, Farm Irrigation Systems, 1

FR-515, Forest Survey and Leveling, 1

(b) Research Students Supervised/Trained

<u>Level</u>	<u>Number of Trainees</u>
PhD Students	N/A
Master Students	N/A
Undergraduate Students	05

(c) Participation in Thesis and Oral Examination Committees

<u>Level</u>	<u>Number of Examinations</u>
PhD Students	03
Master Students	05

(d) Training

Teaching & Learning Methods, CEWRE, UET, (23/12/2020)

1. International Webinar – Transboundary Water Management: Issues & Conflicts

Teaching & Learning Methods, ACO Technologies plc, England, (2021)

ACO Online Academy - 2021 Webinar Series

1. Blue/Green Roof Design (10/02/2021)
2. Managing Highways Surface Water (17/02/2021)
3. Design requirements for commercial drainage (24/02/2021)
4. Managing Rail Surface Water (17/03/2021)
5. Effective Grease Management (24/03/2021)
6. Practical and Sustainable Surface Water Management (31/03/2021)

Teaching & Learning Methods, ICE WaRM, Australia, (2021)

Essential Water Webinar Series - A Webinar series by ICE WaRM

1. Seminar 1 – An Introduction to Water Management (22/03/2021)
2. Seminar 2 – Groundwater: Lifting the veil on the unseen (22/04/2021)
3. Seminar 3 – Irrigation what is it's future in a water scarce world? (10/06/2021)
4. Seminar 4 – Protecting water quality in urban environments (12/11 and 25/11 2021)

Teaching & Learning Methods, CUAHSI, United States, (2021)

Online webinar series by CUAHSI from February 10 – March 31

1. Feb. 10. Introduction: The Global Catchment Map and Perspectives from Diverse Geographies
2. Feb. 17. Historical Hydrology and Hydrologic Change

3. Feb. 24. Alpine, Boreal, and Arctic Catchments
4. Mar. 3. Seasonally Snow-Covered Temperate Catchments
5. Mar 10. Low to No Snow Temperate Catchments
6. Mar 17. Forest Management and Environmental Disturbance: Lessons Learned from Harvest and Afforestation
7. Mar. 24. Agricultural and Urban Catchments
8. Mar. 31. Conclusions and Synthesis.

Teaching & Learning Methods, Department of Agricultural Engineering, Khwaja Fareed UEIT RYK, Training program (31/03/2021)

1. Design, Operations and Maintenance of Solar Pumping Unit for Precision Surface Irrigation

Teaching & Learning Methods, Collaborative Training Program of ICAR-Indian Institute of Water Management (IIWM) and International Water Management Institute (IWMI) during 29-30 June 2021

1. Enhancing Agricultural Resilience through Index-based Flood Insurance and Post-flood Management Interventions in India

Teaching & Learning Methods, Joint Virtual Workshop by ECMWF from 29 Jun to 1 July 2021

1. Connecting global to local hydrological modelling and forecasting: scientific advances and challenges

Teaching & Learning Methods, United Nations/Islamic Republic of Iran Workshop on 9-11 August 2021

1. Space Technology Applications for Drought, Flood and Water Resource Management

Teaching & Learning Methods, Google Flood Forecasting Workshop

1. Flood Forecasting Workshop 2021 from Oct 5 – 8, 2021

Teaching & Learning Methods, Training Workshop by Lawrence Berkeley National Laboratory

1. 2021 Evapotranspiration workshop from Nov 2 – 4, 2021

5. RESEARCH

(a) Research Interests

1. Groundwater-surface water interaction,
2. Watershed hydrology,
3. Hydrological modelling,
4. Hydrogeological modelling,
5. Soil and water conservation,
6. GIS applications in water resources,
7. Rainwater harvesting

(b) Publications/Citations Data

<u>Type of Publication</u>	<u>Number of Publications</u> Articles
in International Refereed Journals	20
Conference Papers	08
Papers in HEC recognized Journals	06
Books/Book Chapters	N/A
Other Journals Papers	10
Patents	N/A
<u>Citation Source</u>	<u>Number of Citations</u>
Google Scholar	250+
https://scholar.google.com/citations?user=J6FgZQQAAAAJ&hl=en	

(c) Research Projects Completed

Completed two research and development projects of PSF and LDA

1. Assessment of Agricultural Drought Prone Areas of Pothwar and Agro-Ecological Zoning (AEZ) Using Remote Sensing Techniques
2. Rainwater Harvesting Pilot Project in Lahore

(d) Research Projects in Pipeline

Two research project are under pipeline for future plan

1. Impact of Changing Climate on Cropping Patterns of Potohar Region Pakistan
2. Smart Groundwater Management Model for Regional Groundwater System

(e) Participation in Regional & International Conferences

1. EGU General Assembly, Vienna, Austria, May 3-8, 2020
2. The 24th Hydraulic Engineering Conference, Taipei, Taiwan, September 26-27, 2019
3. 5th International Conference on Urban Disaster Reduction Decades Review on Recovery: Learning from Best Practices, Taipei, Taiwan, September 16-18, 2019
4. The 20th Cross-strait Symposium on Environment, Resources and Ecological Conservation, Chiayi, Taiwan, June 16-17, 2019
5. EGU General Assembly, Vienna, Austria, April 4-13, 2018
6. PAWEES 2017 International Conference, Taichung, Taiwan, November 9—10, 2017
7. 23rd International Congress on Irrigation and Drainage, Mexico City, Mexico, 8-14 October 2017
8. Asia-Pacific Policy Dialogue on Water, Energy and Food Security for Poverty Alleviation in Dryland Regions, Rawalpindi Pakistan, November 23 - 25, 2016

8. SERVICE

(a) Membership of Conference Committees

Board member of Young Hydrologic Society on the conference committee

Member of International Society of Paddy and Water Environment Engineering (PAWEES)

Member of EGU General Assembly

(b) Service as Reviewer

Journals

1. Water Resources Management, 1573-1650, Springer (since: 2019)
2. Arabian Journal of Geosciences, 1866-7538, Springer (since: 2020)
3. Irrigation and Drainage, 1531-0361, Wiley (since: 2022)

Conferences

1. 24th ICID (International Congress on Irrigation and Drainage), Sydney, Australia, 30 May - 5 June 2022
2. 5th International Conference on Urban Disaster Reduction Decades Review on Recovery: Learning from Best Practices, Taipei, Taiwan, September 16-18, 2019
3. Asia-Pacific Policy Dialogue on Water, Energy and Food Security for Poverty Alleviation in Dryland Regions, Rawalpindi Pakistan, November 23 - 25, 2016

(c) Membership of Journal Editorial Boards

Editorial member of Frontiers in Agronomy for Irrigation section

(d) University Service

Along with teaching, I am also performing different duties and services for extracurricular activities according to the directions of VC and Dean Office

9. LIST OF PUBLICATIONS

(a) International Refereed Journals

1. Muhammad Umer Nadeem, Muhammad Naveed Anjum, Arslan Afzal, Muhammad Azam, Fiaz Hussain, Muhammad Usman, Muhammad Mashood Javaid, Muhammad Ahsan Mukhtar, Faizan Majeed, Assessment of Multi-Satellite Precipitation Products over the Himalayan Mountains of Pakistan, South Asia, Sustainability 2022, 14(14), 8490. <https://doi.org/10.3390/su14148490> (IF: 3.889)
2. Ray-Shyan Wu, You-Yu Sin, Jing-Xue Wang, Yu-Wen Lin, Hsing-Chuan Wu, Riyan Benny Sukmara, Lina Indawati, Fiaz Hussain*, Real-Time Flood Warning System Application, Water 2022, 14, 1866. <https://doi.org/10.3390/w14121866> (IF: 3.530)
3. Fiaz Hussain, Ray-Shyan Wu, Dong-Sin Shih, Water Table Response to Rainfall and Groundwater Simulation using Physics-Based Numerical Model: WASH123D, Journal of Hydrology: Regional Studies, 39(2022), 100988, <https://doi.org/10.1016/j.ejrh.2022.100988> (IF: 5.437)
4. Naveed Ahmed, Genxu Wang, Martijn Booij, Sun Xiangyang, Fiaz Hussain, Ghulam Nabi, Separation of the Impact of Landuse/Landcover Change and Climate Change on Runoff in the Upstream Area of the Yangtze River, China, Water Resources Management, Springer Nature (Switzerland), <https://doi.org/10.1007/s11269-021-03021-z> , 2021 (IF: 4.426)

5. Ray-Shyan Wu, Fiaz Hussain, Yuan-Chien Lin, Tzu-Yu Yeh, Kai-Chun Yu, Characterization of Regional Groundwater System Based on Aquifer Response to Recharge–Discharge Phenomenon and Hierarchical Clustering Analysis, *Water*, MDPI (Switzerland), 13(18), 2535, 2021 <https://doi.org/10.3390/w13182535> (IF: 3.530)
6. Fiaz Hussain, A systematic review on integrated surface–subsurface modeling using watershed WASH123D model, *Modeling Earth Systems and Environment*, Springer Nature (Switzerland), 2021, <https://doi.org/10.1007/s40808-021-01203-7> (IF: 0.554)
7. Fiaz Hussain, Ghulam Nabi, Ray-Shyan Wu, Spatiotemporal Rainfall Distribution of Soan River Basin, Pothwar Region, Pakistan, *Advances in Meteorology*, Hindawi, 1-24, 2021, <https://doi.org/10.1155/2021/6656732> (IF: 2.223 and Article of the Year Award 2021)
8. Fiaz Hussain, Kai-Chun Yu, Ray-Shyan Wu, Estimation of Hydrogeological Parameters Using Physically Based Hydrological Modeling and Lithology Data in Ungauged Creek Catchments of Southern Taiwan, *Hydrological Sciences Journal*, Taylor & Francis Group (United Kingdom), 703-728, 2021, <https://doi.org/10.1080/02626667.2021.1889558> (IF: 3.942)
9. Fiaz Hussain, Ray-Shyan Wu, Jing-Xue Wang, Comparative study of very short term flood forecasting using physics based numerical model and data driven prediction model, *Natural Hazards*, Springer Nature (Switzerland), <https://doi.org/10.1007/s11069-021-04582-3>, 2021, (IF: 3.158)
10. Fiaz Hussain, Ray-Shyan Wu, Kai-Chun Yu, Application of Physically Based Semi-Distributed HEC-HMS Model for Flow Simulation in Tributary Catchments of Kaohsiung Area Taiwan, *Journal of Marine Science and Technology*, Elsevier B.V. (Netherlands), 1(29), 42-62, 2021, <https://doi.org/10.51400/2709-6998.1003> (IF: 0.667)
11. Ghulam Nabi, Fiaz Hussain, Wu Ray-Shyan, Vinay Nangia, Riffat Bibi, Micro watershed management for erosion control using soil and water conservation structure and SWAT modeling, *Water*, MDPI (Switzerland), 12(5), 1439, 2020, <https://doi.org/10.3390/w12051439> (IF: 3.530)
12. Fiaz Hussain, Riaz Hussain, Ray-Shyan Wu, and Tanveer Abbas, Rainwater Harvesting Potential and Utilization for Artificial Recharge of Groundwater Using Recharge Wells, *Processes*, MDPI (Switzerland), 7(9), 623, 2019, <https://doi.org/10.3390/pr7090623> (IF: 3.352)
13. Fiaz Hussain, Ghulam Nabi, Ray-Shyan Wu, Bashir Hussain, Tanveer Abbas, Parameter evaluation for soil erosion estimation on small watersheds using SWAT model. *International Journal of Agricultural and Biological Engineering*, Chinese Society of Agricultural Engineering (China), 12(1), 98-108, 2019, <https://doi.org/10.25165/j.ijabe.20191201.3769> (IF: 2.032)
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(b) Conference Papers

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2. Fiaz Hussain, Ray-Shyan Wu, Rainwater Harvesting Potential and Utilization for Artificial Recharge of Groundwater Using Recharge Wells, The 24th Hydraulic Engineering Conference, Taipei, Taiwan September 26-27, 2019
3. Fiaz Hussain, Ray-Shyan Wu, Urban Inundation Mitigation and Artificial Groundwater Recharge using Surface Runoff Rainwater Harvesting Technique, 5th International Conference on Urban Disaster Reduction Decades Review on Recovery: Learning from Best Practices, Taipei, Taiwan, September 16-18, 2019
4. Fiaz Hussain, Ray-Shyan Wu, The Concept of Training Image-Based Geostatistics for Spatial Distribution of Hydraulic Conductivity, The 20th Cross-strait Symposium on Environment, Resources and Ecological Conservation, Chiayi, Taiwan, June 16-17, 2019
5. Fiaz Hussain, Ray-Shyan Wu, Regional Scale Climatic Attributes and Pan Evaporation Paradox - A Case Study of Pothwar Region Pakistan, 20th EGU General Assembly, Vienna, Austria, April 4-13, 2018
6. Fiaz Hussain, Ray-Shyan Wu, Ghulam Nabi, Soil Erosion Control in Micro Watersheds under Various Slope and Vegetative Covers using SWAT Modeling, PAWEES 2017 International Conference, Taichung, Taiwan, November 9—10, 2017
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8. Fiaz Hussain, Ghulam Nabi, Assessment of Spatiotemporal River Flows Behavior of Indus Basin. International Conference "Asia-Pacific Policy Dialogue on Water, Energy and Food Security for Poverty Alleviation in Dryland Regions" November 23 - 25, 2016, Rawalpindi Pakistan

(c) HEC Refereed Journals

1. Rana Shahzad Noor, Fiaz Hussain, Irfan Abbas, Muhammad Umair, Abu Saad, Muhammad Umar Farooq and Yong Sun. Assessing Sustainability of Rainfed Wheat (*Triticum Aestivum*) Production under Various Soil Tillage Systems: An Energy and Economic Analysis. Pakistan Journal of Agricultural Research, 2020, 33(4): 810-819
2. Rana Shahzad Noor, Fiaz Hussain, Muhammad Umar Farooq, Irfan Abbas, Muhammad Umair, Muhammad Adnan Islam, Muhammad Sheraz (2020). Yield and Economic Analysis of Peanut Production under Different Soil Tillage Systems in North-East Region. Pakistan Journal of Agricultural Research, 2020, 33(3), 490-497
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(d) Other Journal Publications

1. Amir Iqbal, Fiaz Hussain (2021). "Assessment of equity in water distribution at watercourse level and the impact on water productivity". Water Productivity Journal, 1(4): 1-12
2. Noor RS, Fiaz Hussain, MU Farooq, R Noor, MM Waqas, (2021). Evaluating performance of water seed drill for wheat production: a sustainable technique under rainfed agricultural system, Big Data in Agriculture 3(1), 21-26
3. Noor RS, Fiaz Hussain, Muhammad Umair, 2020, Evaluating Selected Soil Physical Properties Under Different Soil Tillage Systems in Arid Southeast Rawalpindi, Pakistan. Journal Clean WAS, 4(2), 41-45
4. Noor RS, Fiaz Hussain, M Umair, (2020). Production under different irrigation treatments: investigating the germination and early growth, Science Heritage Journal (GWS), 4(1), 43-45
5. Noor RS, Fiaz Hussain, MU Farooq, M Umair, (2020). Cost And Profitability Analysis Of Cherry Production: The Case Study Of District Quetta, Pakistan, Big Data in Agriculture 2(2), 65-71
6. Noor RS, Fiaz Hussain, A Saad, M Umair, (2020). Performance Evaluation Of Wheat Straw Chopper Blower, Acta Mechanica Malaysia, 3(2), 29-32
7. Noor RS, Fiaz Hussain, M Umair, MU Farooq, A Saad, Y Sun, (2020). Silage Corn Production under Different Planting Methods in Rainfed Agriculture System: An Energy Analysis. Big Data In Agriculture, 2(1), 32-35.
8. Ghulam Nabi, Fiaz Hussain, Ray-Shyan Wu, Vinay Nangia, Riffat Bibi, Abdul Majid, 2017. Optimizing micro watershed management for soil erosion control under various slope gradient and vegetation cover conditions using SWAT modeling. Hydrol. Earth Syst. Sci. Discuss, <https://doi.org/10.5194/hess-2017-532>
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11. CERTIFICATION

I, the undersigned, certify that, to the best of my knowledge and belief, this CV correctly describes my qualifications, my experience and myself. I understand that any willful mis-statement described herein may lead to my disqualification or dismissal, if engaged.

CRITERION 7

INSTITUTIONAL FACILITIES

Standard- 7.1: The institution must have the infrastructure to support new trends in learning such as e-learning:

The faculty building is under construction that will include all the facilities necessary and required by HEC and PEC. However, currently students use the University main library where the facility of internet, e-library and access to read and download the scientific publications is available that is very helpful for the high quality education and producing research of international standard.

Standard- 7.2: The library must possess an up-to-date technical collection relevant to the program and must be adequately staffed with professional personnel

The University central library has limited number of books, journals and periodicals related to Agricultural Engineering. The main library is equipped with the facility of internet and e-library but it does not have space capacity as per number of students in the University and there is no catalogue system for searching the books and other reading materials. Department itself is developing its own library with up-to-date infrastructure, facilities and with the availability of recommended and relevant books.

Standard- 7.3: Class-rooms must be adequately equipped and offices must be adequate to enable faculty to carry out their responsibilities

- The faculty is using the infrastructure of other faculty as its own building is under construction. Currently, the class rooms are equipped with CCTV cameras and multimedia facility for effective teaching.
- The numbers of classrooms are not enough with respect to number of students.
- Similarly, at present the department has shortage of laboratories and present labs facilities are not adequate.
- The temporary computer lab is not equipped with internet and printing facility.
- All the faculty members are provided offices but there is no internet facility because of that they are facing problem in research, teaching and other office matters as well.
- The faculty dean office is not adequate according to the requirement and working environment.

CRITERION 8

INSTITUTIONAL SUPPORT

The university administration has been striving to strengthen and up-gradation of all the departments, and establishing new Faculties and Institutes. The university is also trying to attract highly qualified faculty members. The university is also hiring on Tenure Track System (TTS) which would be helpful in pooling up better human resources as faculty members.

Standard 8-1: There must be sufficient support and financial resources to attract and retain high quality faculty and provide the means for them to maintain competence as teachers and scholars

The faculty has sufficient financial resources for infrastructure, Labs and Libraries and hiring new competent faculty members. However, as whole there are no attractive packages or facilities for faculty member on university level for example

- There is no proper maintenance/ documentation and investment of GPF deducted from salary. Similarly no benefit/ welfare from BF deduction available to faculty.
- Very meager benefit for faculty children's education at university level is available.
- The University has very limited residential facilities for faculty members at university campus and majority of faculty members remain in waiting list for a long time.
- There is no facility for schooling for employees children. The university can collaborate with DPS (Division Public School) for specific seats for University faculty members at subsidize fees.

Standard 8-2: There must be an adequate number of high quality graduate students, research assistants and Ph.D. students.

The intake of B.Sc. (Hons) and M.Sc (Hons) students is once in a year. However Ph.D. students are enrolled in each semester. A strict merit policy is applied during admission that comprises of entry test and interview.

Standard- 8.3: Financial resources must be provided to acquire and maintain Library holdings, laboratories and computing facilities.

Although administration provides adequate financial resources, yet there is need to increase budget to carry out advance level research.

ANNEXURE-A

PERFORMA-2

FACULTY COURSE REVIEW REPORT

ANNEXURE-B

PERFORMA-3

SURVEY OF GRADUATING STUDENTS

ANNEXURE-C

PERFORMA-4

RESEARCH STUDENTS PROGRESS REVIEW

ANNEXURE-D

PERFORMA-5

FACULTY SURVEY