

PERSONAL
INFORMATION

MUHAMMAD ZUBAIR AKRAM

https://www.researchgate.net/profile/Muhammad_Zubair_Akram

ORCID id: <https://orcid.org/0000-0001-6797-6444>

Web of Science ResearcherID®: AAL-6780-2020

RESEARCH INTERESTS

Stress Physiology

Abiotic stresses especially in Drought

Quinoa

Organic amendments

Biochar

EDUCATION AND TRAINING

NOV 2021- NOV 2024
(37° cycle)

Ph.D. Agricultural, Forest and Food Sciences

Department of Agricultural, Forest, Food and Environmental Sciences (DAFE), University of Basilicata (UNIBAS), Potenza, Italy under Ministry of Education (MUR), Universities and Research Scholarship Program.

Tentative Doctorate Title "Growth and Morpho-Physiological Attributes of Drought-Tolerance in Quinoa (*Chenopodium quinoa* Willd.) under Biochar-Amended Soil"

SEP 2019- APRIL 2021
(Not completed)

Ph.D. Agricultural Genetic Engineering (left) (2019-2021)

NIGDE OMER HALISDEMIR UNIVERSITY, NIGDE, TURKEY

AUG 2017- AUG 2019

M.Sc. (Hons.) Agriculture-Agronomy (CGPA- 3.52/4.00) 2019

UNIVERSITY OF AGRICULTURE, FAISALABAD, PAKISTAN

Thesis Topic: Morphological Characterization and Yield Potential of Elite Quinoa Germplasm

OCT 2013- AUG 2017

B.Sc. (Hons.) Agriculture (CGPA – 3.54/4.00) 2017

PMAS ARID AGRICULTURE UNIVERSITY, RAWALPINDI, PAKISTAN

SEP 2010- SEP 2012

F.Sc. (Pre-medical) (Marks - 786/1100) 2012

GOVERNMENT COLLEGE FOR BOYS, PATTOKI, KASUR, PAKISTAN

SEP 2008- AUG 2010

Matriculation (Science) (Marks - 910/1050) 2010

THE TRUST SCHOOL, LAHORE, PAKISTAN

WORK EXPERIENCE

DEC 2012- OCT 2013

Teaching Experience

Work as a Senior Science teacher at Tameer-E-Seerat High School, Raiwind, Lahore, Pakistan for a period of 1 year during 2012-13.

JULY 2016 - SEP 2016

Office of Agronomist Directorate of Soil Conservation, Rawalpindi

Agronomic practices with relation to soil conservation.

OCT 2017- AUG 2019

Agronomic Research Area, UAF, Pakistan.

Field Management and Crop Production of super foods (Expertise in Quinoa Production and other superfoods like Amaranth, Chia and Buck wheat) under supervision of group leader Prof. Dr. Shahzad Maqsood Ahmed Basra.

PROJECTS COMPLETED

Research Fellow

Exploring the Potential of *Chenopodium quinoa* Willd. as low Input High Nutrition and Climatic Resilient Crop (Feb 2018- Aug 2019).

Funding agency: Higher Education Commission, Islamabad, Pakistan.

Project number: 4652

Research Fellow

Exploring the Potential of Moringa as a Crop Growth Enhancer and Forage Crop (Sep 2017-Aug 2019).

Funding agency: Higher Education Commission, Islamabad, Pakistan.

Project number: 20-1042/R&D/11

Research Assistant

Investigation of the Role of *GATA12* in Regulation of Iron Deficiency Signalling in *Arabidopsis thaliana* (Feb 2020- Sep 2021).

Funding agency: TUBITAK, Ankara, Turkey.

Project number: 119Z149

Researcher

Innovative N Fertilization Strategies in Tomatoes for Reducing N Leaching Risks in the Mediterranean (**Dec 2024-conti.**)

Project number: CUP: J63C23000090005

GUEST RESEARCHER

Working as Visiting Guest Researcher at Section of Crop Sciences, Department of Plant and Environmental Science, University of Copenhagen, Taastrup, Denmark under Erasmus+ Traineeship Program 2022-23 (Sep 2023 - May 2024)

EDITORIAL EXPERIENCE

Member of editorial board as “**Advisory Board**” of “**World Biologica**” Journal from May 2021. <https://worldbiologica.com/editorial-board/>.

Member of Editorial Review Board of “**International Journal of Agricultural and Environmental Information System (IJAEIS)**” from January 2021. <https://www.igi-global.com/journals/open-access/reviewers/international-journal-agricultural-environmental-information/1160>.

Topic Coordinator at **Frontiers in Plant Science** for section on Plant Abiotic Stress.

REVIEWER ACTIVITIES

Advance in Science, Technology and Engineering Systems Journal (ASTESJ), PLoS One, Journal of Agriculture, Food, Environment and Animal Sciences (JAFEAS), International Journal of Food Science and Agriculture (IJFSA), PLANT, Field Crop Research, Agricultural Water Management, Crop and Environment, European Journal of Agronomy, Saudi Journal of Biological Sciences, Frontiers in Plant Science, Journal of Agriculture and Food Research, Agronomy Research, Scientia Horticulturae, Asian Journal of Agriculture and Biology, European Journal of Agronomy, Plants (MDPI), Environments (MDPI), Sarhad Journal of Agriculture, Foods (MDPI), Water (MDPI), Plant Physiology and Biochemistry, Agronomy (MDPI), International Journal of Molecular Sciences (MDPI), Journal of Environmental Management, Horticulturae (MDPI), Journal of Soil Science and Plant Nutrition, Acta Agriculturae Scandinavica, Section B - Plant Soil Science, Journal of Sustainable Agriculture and Environment.

PERSONAL SKILLS

Good command of planning of layout designs, experimental designs, data collection and analysis.

COMPUTER SKILLS

Microsoft office (Word, Excel, Power Point), Statistics (RStudio, Statistix 8.1, 10 and SPSS) and bioinformatics software like genevestigator and MegaX.

COMMUNICATION SKILLS

Good communication skills in English, Turkish and Urdu.

IELTS (British Council) 2017-2019: 6 bands, CEFR Level: B2.

English language B2 level certificate from Centro Linguistico di Ateneo, Università Degli Studi Della Basilicata on 27/10/2022

Turkish Language level A1 qualified.

JOB-RELATED SKILLS

Have good skills of crop production and experimental data measurement.

Have good teaching experiences.

Project executions

SCIENTIFIC SKILLS

Spectrophotometer, Pressure Chamber, Osmometer, Leaf Spectrometer, Porometer and Chlorophyll Fluorescence meter etc.
Breeding of Soybean, Brassica, Chickpea and Maize.

THESIS and PUBLICATIONS

M.SC. (HONS.) THESIS

M.Sc. (Hons.) Agriculture-Agronomy research thesis title:
Morphological Characterization and Yield Potential of Elite Quinoa Germplasm.

ABSTRACT PUBLISHED/
IN PROGRESS

Nabila Rashid, Shahzad M.A. Basra, Abdul Wahid, **Muhammad Zubair Akram** and Muhammad Tayyab Gulzar. Induction of Heat Tolerance in Quinoa with foliar applied Moringa leaf extract. (Poster Presentation) In National Symposium on *Moringa Oleifera* "Recent Trends and Challenges in Processing and Product Developments" was jointly organized by Punjab Agriculture Research Board (PARB) and University of Sargodha, Sargodha, Pakistan on 09-10 April 2018 and got 3rd Position.

Jabir Riaz, Shahzad M.A. Basra, Shahid Iqbal, Muhammad Bilal Hafeez, Hafeez-Ur-Rahman, Yasir Ramzan and **Muhammad Zubair Akram**. Mitigation of Salt stress in wheat by exogenous application of Moringa leaf extract. (**Poster Presentation**) In National Symposium on *Moringa Oleifera* "Recent Trends and Challenges in Processing and Product Developments" was jointly organized by Punjab Agriculture Research Board (PARB) and University of Sargodha, Sargodha, Pakistan on 09-10 April 2018.

Muhammad Zubair Akram, Hafeez-Ur-Rahman, Shahid Iqbal, Muhammad Waqas and Shahzad Maqsood Ahmad Basra. Phenotyping quinoa genotypes for evaluating heat stress tolerance association. (Poster Presentation) In 5th International Plant Phenotyping Symposium, Adelaide, Australia 02-05 October 2018.

Samreen Nazeer, Shahzad Maqsood Ahmed Basra, **Muhammad Zubair Akram**, Muhammad Bilal Hafeez and Shahid Iqbal. Adaptability of newly introduced Amaranth germplasm under agro-ecological conditions of Faisalabad. (Poster Presentation) In 15th PAS Forum Conference on "Innovations in Agriculture", University of Agriculture, Faisalabad 13-15 February 2018.

Ansar Raza, Shahzad Maqsood Ahmad Basra, **Muhammad Zubair Akram**, Samreen Nazeer and Muhammad Bilal Hafeez. Evaluating the efficiency of stored moringa leaf extract on growth and yield of hybrid maize. (Oral Presentation) in International Conference on "Water Saving and Plant Production Strategies: Constraints and Implications for Sustainable Agriculture" organized by Department of Botany, Government College University, Faisalabad on 26-28 March 2019.

Shahzad Maqsood Ahmad Basra, Muhammad Bilal Hafeez, **Muhammad Zubair Akram**, Irfan Afzal and Hafeez ur Rehman. Superfoods: a viable solution to food and nutrition security of Pakistan. (Oral presentation) in "1st International conference on Sustainable Agriculture: Food Security under Changing Climate Scenarios" organized by Ghazi University Dera Ghazi Khan on 3-5 April 2019.

Samreen Nazeer and **Muhammad Zubair Akram**. Screening of USDA Amaranth germplasm for morphological and phenological characteristics. (Oral Presentation but couldn't present because of funds issues) in "2. International Conference on "Agriculture, Forestry & Life Sciences" (ICAFLS 2019) organized in Prague, Czech Republic on 18-20 April 2019.

Taseer Ahmad, Muhammad Tahir, Muhammad Abdullah Saleem, Intizar Hussain, **Muhammad Zubair Akram** and Umar Murad Farooqi. Effect of different seed priming techniques on germination and growth of Mung Bean (*Vigna radiata* L.). (Oral Presentation but couldn't present because of funds issues) in "2. International Conference on "Agriculture, Forestry & Life Sciences" (ICAFLS 2019) organized in Prague, Czech Republic on 18-20 April 2019.

Muhammad Abdullah Saleem, Muhammad Tahir, Taseer Ahmad, Intazar Hussain, Umar Murad Farooqi and **Muhammad Zubair Akram**. Influence of seed priming with potassium nitrate and salicylic acid on germination and seedling vigour of Mung Bean. (Oral Presentation but couldn't present because of funds issues) in "2. International Conference on "Agriculture, Forestry & Life Sciences" (ICAFLS 2019) organized in Prague, Czech Republic on 18-20 April 2019.

Samreen Nazeer and **Muhammad Zubair Akram**. Application of silicon priming under various irrigation regimes in hybrid Maize. (Oral Presentation but couldn't present because of funds issues) in "2. International Conference on "Agriculture, Forestry & Life Sciences" (ICAFLS 2019) organized in Prague, Czech Republic on 18-20 April 2019.

Muhammad Bilal Hafeez, Shahzad M.A. Basra, Hafeez-ur-Rehman, **Muhammad Zubair Akram**, Samreen Nazeer, Shahid Iqbal and Muhammad Waqas. Phenotyping crop canopy and root traits for assessment of adaptability in Quinoa genotypes. in "5th International Conference Rhizosphere 5 - Shining light on the world beneath our feet" organized by University of Saskatchewan, Canada on 7-11 July 2019 (Poster presentation but couldn't present because of funds issues).

Muhammad Zubair Akram, Madad Ali, Samreen Nazeer and Emre Aksoy. Study of various physio-genetic parameters of single cross double haploid Maize hybrids. in Bitki Islahi ve Genetigi Ogrenci Kongresi organized by Nigde Omer Halisdemir University, Nigde, Turkey on 27-28 May 2021.

Samreen Nazeer, **Muhammad Zubair Akram** and Emre Aksoy. Assessment of Amaranth genotypes against different salinity levels. in Bitki Islahi ve Genetigi Ogrenci Kongresi organized by Nigde Omer Halisdemir University, Nigde, Turkey on 27-28 May 2021.

Muhammad Zubair Akram, Angela Libutti and Anna Rita Rivelli. 2024. Water stress response of different quinoa genotypes grown with and without woody biochar. 53rd National Congress on "La gestione delle risorse nell'innovazione delle filiere agro-alimentari" organized by Italian Society of Agronomy from 11 to 13 September 2024.

PUBLICATIONS RESEARCH PAPERS

Muhammad Farhan Aslam, Shahzad Maqsood Ahmed Basra, Muhammad Bilal Hafeez, Shahbaz Khan, Muhammad Sohail Irshad, Shahid Iqbal and **Muhammad Zubair Akram**. 2019. Inorganic fertilization improves quality and biomass of *Moringa oleifera* L. Agroforestry Systems. 94: 975-983.

Samreen Nazeer, Shahzad Maqsood Ahmed Basra, Shahid Iqbal, Muhammad Bilal Hafeez, Ahmad Mateen, **Muhammad Zubair Akram**, Noreen Zahra, Shahbaz Khan, Muhammad Sohail Saddiq and Jahanzaib. 2020. Adaptability and yield potential of different species of amaranth under semiarid conditions. International Journal of Agriculture and Biology, 24:1558–1564.

Samreen Nazeer, **Muhammad Zubair Akram** and Madad Ali. 2022. Amaranth as Nutrition-Rich and Climatic Resilient Crop: A Review. Agriculturae Conspectus Scientificus, 87(4): 281-293.

Muhammad Zubair Akram, Shahzad Maqsood Ahmed Basra, Muhammad Bilal Hafeez, Shahbaz Khan, Samreen Nazeer, Shahid Iqbal, Muhammad Sohail Saddiq and Noreen Zahra. 2021. Adaptability and yield potential of new quinoa lines under agro-ecological conditions of Faisalabad-Pakistan. Asian Journal of Agriculture and Biology, 2021(2):202005301.

Madad Ali, Muhammad Ahsan, **Muhammad Zubair Akram** and Samreen Nazeer. 2022. Study of physio genetic parameters of double haploid single cross Maize hybrid. Sarhad Journal of Agriculture, 38(5): 1-11.

Mehwish Mujahid, **Muhammad Zubair Akram** and Samreen Nazeer. 2021. Evaluation of mungbean (*Vigna radiata*) under drought stress by foliar application of salicylic acid. Journal

of Agriculture, Food, Environment and Animal Sciences, 2(1): 1-14.

Muhammad Bilal Hafeez, Shahid Iqbal, Yuanyuan Li, Muhammad Sohail Saddiq, Shahzad M.A. Basra, Hui Zhang, Noreen Zahra, **Muhammad Zubair Akram**, Daniel Bertero, and Ramiro N. Curti. 2022. Assessment of Phenotypic Diversity in the USDA Collection of Quinoa Links Genotypic Adaptation to Germplasm Origin. *Plants*, 11: 738.

Muhammad Zubair Akram, Angela Libutti and Anna Rita Rivelli. 2023. Evaluation of Vegetative Development of Quinoa under Water Stress by Applying Different Organic Amendments. *Agronomy*, 13(5): 1412.

Abdul Ghaffar Khan, Abid Niaz, Shahzadi Mahpara, Rehmat Ullah, Muhammad Tahir, Muhammad Akram Qazi, Affan Ahmed, Nihayet Koçyiğit, Syed Asghar Hussain Shah, Abdul Rauf, Muhammad Muneer, **Muhammad Zubair Akram**, Abdel-Rhman Z. Gaafar, Mohamed S. Elshikh, Mai Sayed Fouad. 2023. Impact of various irrigation levels and nitrogen rates on wheat (*Triticum aestivum* L.) yield and nitrate leaching. *Journal of King Saud University-Science* 35(10): p. 102940.

Anna Rita Rivelli, **Muhammad Zubair Akram** and Angela Libutti. 2024. Woody biochar rate and water shortage impact on early growth stages of *Chenopodium quinoa* Willd. *Agronomy* 14(1): 53.

Ahmad Khan, Muhammad Amjad Ali, Muhammad Tahir, Samreen Nazeer, **Muhammad Zubair Akram**, Muhammad Arslan Azmat and Sabina Asghar. 2023. Response of various wheat varieties against root-knot nematodes (*Meloidogyne graminicola*) based on their morphological characters and grain yield. *Sarhad Journal of Agriculture*, 39(4): 944-951.

Muhammad Zubair Akram, Angela Libutti and Anna Rita Rivelli. 2024. Enhancing vegetative growth of quinoa and soil properties under water shortage through targeted organic amendments. *Biology and Life Sciences Forum*, 30(1): 4.

Muhammad Tahir, Muhammad Amjad Ali, Ahmad Khan, **Muhammad Zubair Akram**, Sana Ullah, Imran Faraz, Muhammad Shahroz Khan, Muhammad Abrar, Fahad Ali and Qaisar Abbas. 2023. Impact of various soil amendments on root knot nematodes and plant growth attributes of tomato (*Solanum lycopersicum* L.). *Journal of Pure and Applied Agriculture* 8(4): 30-37.

Mehwish Zafar, Muhammad Shahzad, **Muhammad Zubair Akram**, Quratulain, Mehak Shehzad and Samreen Nazeer. 2024. Assessment of growth and physiological traits of *Chenopodium quinoa* lines under different salt levels. *Sarhad Journal of Agriculture*, 40: 315-324.

Bushra Irfan, Muhammad Shahbaz, Asif Mukhtar, **Muhammad Zubair Akram**, Muhammad Atif Bashir, Sabina Asghar, Abdul Ghaffar and Samreen Nazeer. 2024. Seed Priming with Thiourea enhances the performance of Sesame (*Sesamum indicum* L.) varieties under salinity stress. *Sarhad Journal of Agriculture*, 38: 1007-1016.

Muhammad Zubair Akram, Anna Rita Rivelli, Angela Libutti, Fulai Liu and Christian Andreasen. 2024. Mitigation of drought stress for quinoa (*Chenopodium quinoa* Willd.) varieties using woodchip biochar-amended soil. *Plants*, 13: 2279.

Muhammad Zubair Akram, Angela Libutti and Anna Rita Rivelli. 2024. Drought stress in quinoa: effects, responsive mechanisms, and management through biochar amended soil: A review. *Agriculture*, 14: 1418.

Shahid Ali Khan, Farooq Ahmad, **Muhammad Zubair Akram**, Yan Tongyu, Fatima Urooj, Kamran Ahmad, Saeed Ullah, Sharmeen Zulfiqar, Tahira Batool, Aqsa Sarwar, Yaqoob Sultan and Samreen Nazeer. 2024. Morpho-Anatomical Alterations in Asthama Plant (*Euphorbia hirta* L.) in Various Regions of Faisalabad, Pakistan. *Sarhad Journal of Agriculture*, 40: 1144-1152.

CHAPTER PUBLISHED

Muhammad Zubair Akram, Samreen Nazeer, Anila Sadia and Muhammad Abdullah Saleem. 2020. Phytoremediation and Environmental Factors. In: Bioremediation and Phytoremediation for Sustainable Soil Management. Apple Academic Press, Taylor and Francis. ISBN: 9781774637180.

Muhammad Bilal Hafeez, Ali Raza, Noreen Zahra, Kanval Shaukat, **Muhammad Zubair Akram**, Shahid Iqbal and Shahzad Maqsood Ahmed Basra. 2021. Gene regulation in halophytes in conferring salt tolerance. In *Handbook of Bioremediation* (pp. 341-370). Academic Press.

Noreen Zahra, Kanval Shaukat, Muhammad Bilal Hafeez, Ali Raza, Sadam Hussain, Muhammad Tanees Chaudhary, **Muhammad Zubair Akram**, Shiva Najafi Kakavand, Muhammad Sohail Saddiq and Abdul Wahid. 2021. Physiological and Molecular Responses to High, Chilling, and Freezing Temperature in Plant Growth and Production: Consequences and Mitigation Possibilities. In: Husen A. (eds) Harsh Environment and Plant Resilience. Springer, Cham.

Samreen Nazeer, **Muhammad Zubair Akram** and Madad Ali. 2021. Rhizosphere Engineering and Soil Sustainability: An Introduction. In Junaid Ahmad Malik (Ed.), Handbook of Research on Microbial Remediation and Microbial Biotechnology for Sustainable Soil (pp. 583-601). IGI Global.

Samreen Nazeer, **Muhammad Zubair Akram** and Madad Ali. 2022. Rhizosphere Engineering and Soil Sustainability: An Introduction. In Research Anthology on Strategies for Achieving Agricultural Sustainability (pp. 23-41). IGI Global. (Selected by IGI Global's executive editorial board for inclusion as a reprinted chapter with 100% unchanged).

UNDER PROCESS

Muhammad Zubair Akram, Angela Libutti, Christian Andreasen, Fulai Liu and Anna Rita Rivelli. 2024. Woody biochar improves plant water status and growth of five quinoa varieties under water stress differently (**submitted to Journal of Soil Science and Plant Nutrition**).

Abida Kausar, Rida Yasmeen, Shahid Iqbal, Muhammad Bilal Hafeez, Asif Mukhtiar, Ali Raza, Samreen Nazeer, **Muhammad Zubair Akram**, Sadam Hussain, Fahd Rasul, Noreen Zahra. 2024. Silicon drenching modulates antioxidant, photosynthetic efficiency, secondary metabolites, and yield of two contrasting varieties of bread wheat under drought stress (**submitted to Turkish Journal of Agriculture and Forestry**).

Atif Naeem, Madad Ali, Ahmad Jawad, Asif Ameen, Mehwish Mehwish, Talah Liaqat, Samreen Nazeer, **Muhammad Zubair Akram**, Shahbaz Hussain. 2024. Assessment of optimal seeding rate for fine and coarse rice varieties using the direct seeded rice (DSR) method (**submitted to Seeds**).

Muhammad Zubair Akram, Anna Rita Rivelli, Angela Libutti, Fulai Liu and Christian Andreasen. 2024. Quinoa varieties responses to biochar addition and water scarcity: a comparative study of root traits, stomatal morphology and gaseous exchange (**working on manuscript**).

Muhammad Zubair Akram, Saqib Saleem Akhtar and Saadat Ullah Malghani. 2024. Biochar: a sustainable approach to plant stress tolerance (**working on manuscript**).

URDU PUBLICATIONS

NEWSPAPER ARTICLE

Muhammad Zubair Akram. 2018. Amaranth Ghazai ehmiyat ka hamil poda-Amaranth. Jang Newspaper.

DIGEST ARTICLE

Muhammad Zubair Akram, Muhammad Bilal Hafeez and Shahzad Maqsood Ahmed Basra. 2018. Quinoa. Zarai Digest, University of Agriculture, Faisalabad.

Samreen Nazeer, **Muhammad Zubair Akram** and Shahzad Maqsood Ahmed Basra. 2017.

Amaranth, Ek besh-baha Gazai Ahmiyat ki Nai Fasal. Zarai Digest, University of Agriculture, Faisalabad.

Samreen Nazeer, **Muhammad Zubair Akram** and Shahzad Maqsood Ahmed Basra. 2017. Quinoa ka Taruf, Khasosiyat or Tariqa-e-Kast. Nida-E-Kissan.

ADDITIONAL INFORMATION

HONOURS AND AWARDS

Awarded by a laptop in "PM Youth Laptop Scheme" in 2015.
Winner of Erasmus+ Traineeship Program (2022-23) by University of Basilicata, Potenza, Italy.

MEMBERSHIPS

Global Quinoa Network (GCN)
Agri-Tourism Development Corporation of Pakistan
Moringa for Life
American Society of Agronomy (ASA)
Erasmus Student Network (ESN)
Nordic Biochar Network (NBN)

CERTIFICATIONS

Certificate of participation in "The Unilever International Art Project for Schools" organized by Wall's in 2006 in Collaboration with The Trust School T.N.B Lahore.

Certificate of participation in "First Traffic Internship & Safety Education Programme" organized by City Traffic Police Lahore in Collaboration with Atlas Honda in 2009.

Attended "First Moringa Festival" on 21st January 2018 at Pattoki, Pakistan.

Certificate of participation in "International Poultry Expo-2015." Organized by Pakistan Poultry Association in 2015.

Certificate of Blood Donation in "Shaheed Zulfiqar Ali Bhutto Medical University (PIMS) Islamabad, Pakistan" on 16th April 2016.

Certificate of Honour to participate in "National Agri-Tourism Mela" organized by Agri-Tourism Development Corporation of Pakistan on 11-13 November 2016.

Certificate of appreciation in "CV MAKEUP Competition" on 7th February 2018 at University of Agriculture, Faisalabad.

Certificate of Honour to participate in "Lok Mela" organized by Agri-Tourism Development Corporation of Pakistan in March 2018.

Certificate of participation in "National Quinoa Day" organized by Agri-Tourism Development Corporation of Pakistan on 10th March 2018.

Certificate of participation in "Nutrition Week Celebration" organized by Department of Home Economics, Government College University, Faisalabad on 13th March 2018.

Certificate of participation in "National Symposium on *Moringa oleifera*: Recent Trends and Challenges in Processing and Product Development" Jointly organized by Department of Chemistry, University of Sargodha and Punjab Agriculture Research Board (PARB) on 09-10 April 2018.

Certificate of attending International Conference on "SOYBEAN: CHALLENGES AND OPPORTUNITIES" organized by Department of Agronomy and Department of Plant Breeding and Genetics, University of Agriculture, Faisalabad on 17-18 September 2018

Attending "Scientific Writing Workshop" Scientific Expert organized by Agrarian Society, UAF.

Certificate of attending on day Workshop on "Kitchen Gardening and Edible Landscape" organized by University of Agriculture, Faisalabad, Agri-Tourism Club (UAF), Best Garden Nursery Farms, Institute of Horticultural Sciences (UAF) and Agri-Tourism Development Corporation of Pakistan on 3rd February 2019.

Certificate of attending Conference on "Innovation in Agriculture: Nourishing Pakistan in Changing Climate" organized by Institute of Soil and Environmental Science, University of Agriculture Faisalabad and Pakistan Agriculture Scientists Forum (PAS Forum) on 13-15 February 2019.

Attend National Seminar on "Superfood Crops for Sustainable Food Security" organized by Department of Agronomy, Ghazi University, Dera Ghazi Khan on 11 March 2019.

Certificate of appreciation on participation in "National Quinoa Festival" on 23rd March 2019 organized by J.K. Agri-Tourism Farms.

Attended "Loqat festival" Agri-Tourism Development Corporation of Pakistan on 28th April 2019.

Certificate of appreciation on participation in "Food Trends, Challenges and

Sustainability Strategies under Changing Climate” on 11th July 2019 organized by University of Agriculture, Faisalabad.

Certificate of completion of module **“How to review a manuscript”** on 28th March 2020 presented by Jaap van Harten by Research Academy of ELESVIER.

Certificate of completion of module **“How to respond to reviewers comments”** on 28th March 2020 presented by Paul Cumine by Research Academy of ELESVIER.

Certificate of achievement of completion of course **“How to teach online: providing continuity for students”** presented by Matt Jenner head of learning FutureLearn for 3 weeks from 9th April 2020.

Certificate of online training titled **“International Food Standards”** by National Alliance for Safe Food” on 14th May 2020.

Certificate of participation “Infection Prevention and Control (IPC) for Novel Coronavirus (COVID-19)” by World Health Organization on 10th April 2020.

Certificate of achievement of completion of course **“Tackling the novel coronavirus”** provided by London School of Hygiene & Tropical Medicine and UK Public Health Rapid Support Team presented by Dr Anna Seale Associate Professor, Wellcome Trust Career Development Fellow and Deputy Director for Research for the UK Public Health Rapid Support Team London School of Hygiene & Tropical Medicine on FutureLearn for 3 weeks from 4th April 2020.

Certificate of completion of module **“Let’s break the chain of COVID-19 infection”** on 10th April 2020 by Mouhammad Bin Rashid University of Medicine and Health Sciences, UAE.

Certificate of completion of module **“How to prepare your manuscript”** on 9th April 2020 presented by Anthony Newman by Research Academy of ELESVIER.

Certificate of participation in **“Clinical care severe acute respiratory infection”** by World Health Organization on 10th April 2020.

Certificate of participation for attending **International Conference for Youth in Agriculture 2021** organized by **IAAS World and CSAYN Global Resilience of Living World** from 13-16, May, 2021.

Certificate of participation for attending **“III. Bitki Islahı ve Genetiği Öğrenci Kongresi 2021 online”** organized by **Faculty of Agricultural Sciences and Technologies, Nigde Omer Halisdemir University, Nigde Turkey** from 27th May to 28th May 2021.

Statement of participation for completing online course of **“Climate Change”** of 18 hours organized by The Open University on 7th June 2022.

Statement of participation for completing online course of **“Gene manipulation in plants”** of 10 hours organized by The Open University on 7th June 2022.

Certificate of appreciation on online training **“The Global Markets Programme: A Pathway towards GFSI-Recognised Certification”** on 20th June 2020 organized by National Alliance for Safe Food.

Certificate of workshop attendance “Network analysis tools in (microbial) ecology: a workshop” with **1 ECTS** organized by **Prof. Eugenio Parente, Dipartimento di Scienze, Università degli Studi della Basilicata** on 24-25 May 2022.

Certificate of completion “Sustainable Agronomy Conference Virtual Event - Utilizing Precision Agriculture for Sustainable Crop Management” with **2 CEUs** organized by **American Society of Agronomy** on 20/07/2022.

Certificate of completion “Sustainable Agronomy Conference Virtual Event - Enhancing Sustainability through On-farm Research and Metrics” with **2 CEUs** organized by **American Society of Agronomy** on 27/07/2022.

Certificate of completion “Sustainable Agronomy Conference Virtual Event - Building Soil Health with 4R Nutrient Management” with **2 CEUs** organized by **American Society of Agronomy** on 03/08/2022.

Certificate of completion “Sustainable Agronomy Conference Virtual Event - Utilizing Precision Agriculture for Sustainable Crop Management” with **2 CEUs** organized by **American Society of Agronomy** on 20/07/2022.

Certificate of completion “Sustainable Agronomy Conference Virtual Event - Exploring the Present and Future of Carbon and Ecosystem Services Markets” with **1 CEU** organized by **American Society of Agronomy** on 10/08/2022.

Certificate of completion “Iodine as a Plant Nutrient” with **1 CEU** organized by **American Society of Agronomy** on 05/10/2022.

Certificate of completion “Soil pH: Causes, Effects, and Management” with **1 CEU** organized by **American Society of Agronomy and Soil Science Society of America** on 02/11/2022.

Certificate of completion "Management Strategies to Improve Phosphate and Potassium Fertilizer Use Efficiency" with **1 CEU** organized by **American Society of Agronomy and Soil Science Society of America** on 16/11/2022.

Certificate of completion "Ethical Considerations in Soil Science" with **1 CEU** organized by **Soil Science Society of America** on 09/12/2022.

Certificate of completion "Global Agricultural Market Insights for 2023" with **1 CEU** organized by **American Society of Agronomy** on 03/02/2023.

Certificate of completion "Fertilization Strategies for Regenerative Agriculture and Soil Health" with **1 CEU** organized by **American Society of Agronomy and Soil Science Society of America** on 23/02/2023.

Certificate of completion "Science-Based Nutrient Management in Times of High Fertilizer Price" with **1 CEU** organized by **American Society of Agronomy and Soil Science Society of America** on 04/03/2023.

Certificate of completion "2023 Sustainable Agronomy Conference - Utilizing Artificial Intelligence and Unmanned Aerial Vehicles (UAVs) for Sustainable Crop Management" with **2 CEUs** organized by **American Society of Agronomy** on 17/07/2023.

Certificate of completion "2023 Sustainable Agronomy Conference - Preserving Pest Management Options through Integrated Pest Management (IPM) Principles" with **2 CEUs** organized by **American Society of Agronomy** on 25/07/2023.

Certificate of completion "2023 Sustainable Agronomy Conference - Building Sustainable Management Systems through the 4R Principles" with **2 CEUs** organized by **American Society of Agronomy** on 01/08/2023.

Certificate of completion "2023 Sustainable Agronomy Conference - Decoding the Basics of Carbon and Ecosystems Services Markets for Short- and Long-term Success" with **2 CEUs** organized by **American Society of Agronomy** on 12/09/2023.

Certificate of completion "Biochar and manure amendments on cover crops to improve soil health and moisture regime" with **1 CEU** organized by **American Society of Agronomy and Soil Science Society of America** on 10/11/2023.

Certificate of completion "Is Soil Compaction Squeezing Your Yields?" with **1 CEU** organized by **American Society of Agronomy and Soil Science Society of America** on 26/02/2024.

Certificate of completion "2024 Sustainable Agronomy Conference - Conference, Putting Data into Action for Precision Nutrition" with **2 CEUs** organized by **American Society of Agronomy** on 16/07/2024.

Certificate of participation "2024 Sustainable Agronomy Conference - Conference, Putting Data into Action for Precision Nutrition" with **2 CEUs** organized by **American Society of Agronomy** on 16/07/2024.