Cover letter and Curriculum Vitae of Dr. Abdul Wakeel

1- Personal Information and Education



Dr Abdul Wakeel
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Last 10 Years Research Biography

Dr. Abdul Wakeel is a dedicated environmental and soil scientist with extensive experience in mitigating agriculture-related pollution, particularly through innovative nitrogen and biomass management strategies. From 2015 to 2019, he led pioneering research on the utilization of poultry litter and mortality waste as both animal feed and organic fertilizer, thereby reducing environmental hazards associated with improper waste disposal. He further advanced sustainable agriculture by co-developing technologies for transforming biomass residues into commercial products (2017–2019), offering viable alternatives to field burning—a major contributor to air pollution.

Dr. Wakeel has continued to make significant contributions to climate-smart agriculture through major national and international projects focused on greenhouse gas (GHG) mitigation. He is currently contributing to projects assessing GHG emissions from rice–wheat and maize–wheat systems (2024–2026), including the application of alternate wetting and drying (AWD) techniques to reduce methane emissions. He also serves as the Chair for Climate Change at the Punjab Higher Education Commission, where he provides strategic academic and policy leadership to strengthen climate action, green skills, and sustainability initiatives across higher education institutions in Punjab.

In addition, Dr. Wakeel is serving as the Coordinator of an Asian Development Bank (ADB)-supported project on greenhouse gas emissions, leading efforts to develop country-specific emission factors for eight major crops. This landmark initiative is expected to strengthen Pakistan's agricultural GHG inventory systems, improve evidence-based climate policy, and support national reporting commitments under international climate frameworks.

He is also a core partner in the GCRF South Asian Nitrogen Hub (2019–2024), working to reduce reactive nitrogen pollution across the region. His research on N_2O mitigation in maize–wheat systems and the physiological responses of Himalayan lichens to atmospheric reactive nitrogen deposition reflects a multidisciplinary approach toward air quality and ecosystem health.

Dr. Wakeel's commitment to climate-smart agriculture, circular bioeconomy, and science-driven policy engagement has positioned him as a key advocate for sustainable agricultural transformation in Pakistan and South Asia.

Education		
Degree	**Year**	**Name of University**
PhD Plant Nutrition	2008	Justus Liebig University, Giessen, Germany
M.Sc. (Hons) Soil Science	2001	University of Agriculture, Faisalabad, Pakistan
B.Sc. (Hons) Agriculture	1999	University of Agriculture, Faisalabad, Pakistan

2-Experience/Professional Engagements	
Current	
Professor	Institute of Soil and Environmental Sciences, University of Agriculture, Faisalabad, Pakistan **(2024- to date)**
Associate Editor	Journal of Plant Nutrition and Soil Science **(2019 to date)**
Director/Chairman	Pakistan Agricultural Scientists Forum **(2019 to date)**
Associate Editor	New Zealand Journal of Crop & Horticultural Science **(2024 to date)**
Previous	
Executive Director	Endowment Fund Secretariate (**9-03-2025-to 07-01-2026**)
Associate Professor	Institute of Soil and Environmental Sciences, University of Agriculture, Faisalabad, Pakistan **(2019- to 2024)**
Project Lead	South Asia Nitrogen Hub (Pakistan Chapter) **(2019 to 2024)**
Managing Editor	Pakistan Journal of Agricultural Sciences **(2021 to 2024)**
Assistant Professor	Institute of Soil and Environmental Sciences, University of Agriculture, Faisalabad, Pakistan **(2010 to 2019)**
Assistant Professor	Department of Soil Science, PMAS Arid Agriculture University, Rawalpindi **(2010 to 2010)**
Post Doc.	Institute of Plant Nutrition, Justus Liebig University Giessen, Germany **(2008 to 2010)**
PhD Fellow	Institute of Plant Nutrition, Justus Liebig University Giessen, Germany **(2005 to 2008)**
Scientific Officer	Pakistan Agriculture Research Council, Islamabad **(2004 to 2005)**
Agricultural officer	Punjab Agriculture Department, Soil and Water Testing Lab. Jhelum **(2003-2004)**

Research Fellow	National Agricultural Research Center Islamabad **(2002 to 2003)**

3-Research Grants			
Title	**Role/ Position**	**Value**	**Funding Agency**
Research and Development Cluster-Climate Change	Team Leader	30 million PKR	Punjab Higher Education Commission
Developing GHGs emission factors and mitigation strategies for various crops in Pakistan (2026-2030)	Project Manager	1.1 million $	Asian Development Bank
Punjab Higher Education Commission chair on Climate change	Project member/ Lead at UAF	30 million PKR	Punjab Higher Education Commission chair
Efficacy Assessment of Water Soluble and Traditional Potassium Fertilizers (MOP vs. SOP) (2024-2026)	Principal investigator	5.5 million PKR	Engro Fertilizers
Assessing GHGs gases emission from rice-wheat system and alternate wetting and drying (2025-2027)	Principal investigator	32000 $	China Agriculture University, Beijing
Mitigating N_2O emission from maize-wheat cropping system 2024-2026)	Principal investigator	60000 $	China Agriculture University, Beijing
Screening the physiological response of lichens species to nitrogen pollution at three different sites of Himalaya Pakistan (2022 to 2024)	Principal investigator	30,000 £	Global Challenges Research Fund, UK
Atmospheric measurements in Pakistan (2023 to 2024)	Principal investigator	20,000 £	Global Challenges Research Fund, UK
GCRF South Asian Nitrogen Hub (2019-2024)	Team Leader for UAF	378,000 £	Global Challenges Research Fund, UK

Soil Mineralogical based potassium fertilization for sustainable crop production in different soils of Pakistan (2017-2021)	Principle Investigator	2.98 million PKR	HEC, Pakistan
A UK-Pakistan partnership for translational crop improvement (2019-2023)	CO-PI (Team leader at UAF)	30,000 £	Biotechnology and Biological Sciences Research Council (BBSRC), UK
Strategies to improve balanced use of fertilizers in Pakistan (2014-2016)	Country coordinator/ PI	55000 US $	International Potash Institute Switzerland
Use of poultry litter and mortality as animal food and fertilizer for crops (2015-2019)	Team Leader (UAF)	6.7 million PKR	PARB, Pakistan
Transforming biomass ash residues into commercializable products (2017-2019)	Co-PI (Team Leader for UAF)	~18.0 million PKR	HEC & Bulleh Shah Company under TDF
Impact assessment of the transgenic sugarcane over expressing antifungal proteins on endophytic and rhizospheric microorganisms	Co-PI/Collaborator	15000 US $	CERA Washington, USA
Application of micronutrients through seed invigoration techniques in rice and wheat	Co-PI	3.7 million PKR	HEC Pakistan
Improvement in Wheat Growth under Salt Stress by Elevated K-Fertilization (2011-2012)	Principal Investigator	0.5 million PKR	HEC, Pakistan

4. Teaching and Students Supervision

a) New courses developed and Taught

1. Nutrient acquisition and transport
2. Biofortification and global health
3. Plant neurobiology and signal transduction

b). Course Revised and Taught

1. Soil fertility and plant nutrition
2. Mathematics for soil scientists
3. Soil fertility evaluation
4. Advances in soil fertility (PhD course)
5. Research proposal and scientific writing
6. Soil quality and management

7. Introduction to soil science

c). Students Supervised

- Master Students= 80
- PhD Students as Supervisor=6
- PhD Students as Member of Supervisory Committee=14

Note: *We have restructured and are following the model of outcome-based education (OBE) for our undergraduate and postgraduate courses*

5- Publications

5.1. Books & Booklets & Proceedings

1. Umair Riaz, **Abdul Wakeel**, Ghulam Murtaza 2026. Soils of Pakistan. Book to be published this year by Springer.
2. Abbas, A., Yang, A., Aziz, T., **Wakeel, A.** (2024) Pakistan Nitrogen Policy Report: Scientific Evidence, Current Initiatives and Policy Landscape. South Asia Nitrogen Hub (SANH) Policy Paper PP2. Faisalabad.
3. **Abdul Wakeel**, 2024. Potash and Pakistani Agriculture. International Potash Institute, Switzerland (Urdu Language)
4. **Abdul Wakeel**, Muhammad Farooq Qayyum, Muhammad Ishfaq. 2022. Essentials of Soil Science. PAS Forum and AFAQ Publishers Lahore
5. **Abdul Wakeel**, Muhammad Ishfaq 2022: Potash Use and Dynamics in Agriculture. Springer, Singapore.
6. Nitrogen Assessment: Pakistan as a Case-Study. Eds; Tariq Aziz, **Abdul Wakeel**, Muhammad Watto, Muhammad Ullah, Muhammad Maqsood, Aysha Kiran. Academic Press. ISBN: 9780128244173
7. Muhammad Sana Ullah, Muhammad Usman, Hafeez ur Rehman and ***Abdul Wakeel***. Conference on innovations in Agriculture: Nourishing Pakistan in Changing Climate (2019)
8. Sajid Ali, Azhar Ali Khan and ***Abdul Wakeel***. International Conference on Significance of Potash use in Pakistan Agriculture. (2016)
9. ***Abdul Wakeel*** and Shaukat Ali. Potassium: a nutrient essential for life (Urdu Version; 2015)
10. ***Abdul Wakeel***. Balanced Use of Fertilizers in Pakistan. Published by International Potash Institute Switzerland. 2015
11. Sardar Alam, ***Abdul Wakeel*** and Muhammad Farooq: Biofortification of staple crops; a solution to combat malnutrition. Published by University of Agriculture Faisalabad Pakistan, 2015.
12. Hafiz Naeem Asghar, ***Abdul Wakeel***, Muhammad Sabir, Nabeel Khan Niazi. Proceeding of international Conference on Soil Sustainability for Food Security, Published by University of Agriculture Faisalabad Pakistan, 2015.
13. ***Abdul Wakeel*****:** Substitution of potassium by sodium in sugar beet (*Beta vulgaris* L.) nutrition with special reference to K

5.2. Book Chapters

1. Muhammad Ashir Hameed, Muhammad Mughees Ud Din, Muhammad Mahroz Hussain, **Abdul Wakeel.** 2026. South Asia: Climate Change, Agriculture, Jørgen Eivind Olesen, CRC, UK
2. Muhammad Sanaullah, Tehseen Afzal, Tanvir Shehzad, **Abdul Wakeel**, 2022. Soil organic carbon sequestration and climate change. In: Understanding and fostering soil carbon sequestration Eds. Cornelia Rumpel. Burleigh Dodds Science Publishing Limited. Cambridge, UK.
3. Muhammad Arif Watto, Tariq Aziz, **Abdul Wakeel**, W*aqar Ahmad*, Abdul Jalil Marwat, and Munir Hussain Zia. (2021). Pathways to sustainable nitrogen use and management in Pakistan. In: Nitrogen Assessment: Pakistan as a Case-Study. Eds; Tariq Aziz, Abdul Wakeel, Muhammad Watto, Muhammad Ullah, Muhammad Maqsood, Aysha Kiran. Academic Press. ISBN: 9780128244173
4. Tariq Aziz, **Abdul Wakeel**, Ahmad Naeem Shahzad, Robert Rees and Mark Sutton. (2021). Rethinking nitrogen use: need to plan beyond present. In: Nitrogen Assessment: Pakistan as a Case-Study. Eds; Tariq Aziz, Abdul Wakeel, Muhammad Watto, Muhammad Ullah, Muhammad Maqsood, Aysha Kiran. Academic Press. ISBN: 9780128244173
5. **Abdul Wakeel**, Aysha Kiran, Muhammad Rizwan Shahid, Zunaira Bano and Munir Hussain Zia. (2021) Trends in nitrogen use and development in Pakistan. In: Nitrogen Assessment: Pakistan as a Case-Study. Eds; Tariq Aziz, Abdul Wakeel, Muhammad Watto, Muhammad Ullah, Muhammad Maqsood, Aysha Kiran. Academic Press. ISBN: 9780128244173
6. Muhammad Sanaullah, Tahseen Afzal, Tanvir Shahzad, and **Abdul Wakeel**. 2019. Carbon Sequestration for Sustainable Agriculture In: M. Farooq, M. Pisante (eds.), Innovations in Sustainable Agriculture, Springer Nature Switzerland AG 2019 469
7. Sardar Alam Cheema, Hafeez ur Rehman, Aysha Kiran, Khurram Bashir, **Abdul Wakeel**, 2018. Progress and Prospects for Micro-Nutrient Bio-fortification in Rice/Wheat. In. Hossain, M. A., T. Kamiya, D. J. Burrit, L. P. Tran, T. Fujiwara. Plant Micro-Nutrient Use Efficiency: Molecular and Genomic Perspectives in Crop Plants. Elsevier, USA.
8. **Wakeel, A**., M. Farooq, K. Bashir, L. Oztruck. 2018. Micronutrient malutrition and biofortification: Recent advances and future perspectives. In. Hossain, M. A., T. Kamiya, D. J. Burrit, L. P. Tran, T. Fujiwara. Plant Micro-Nutrient Use Efficiency: Molecular and Genomic Perspectives in Crop Plants. Elsevier, USA.
9. **Abdul Wakeel**, Muhammad Yaseen, Muhammad Aamer Maqsood, Muhammad Sanaullah, and Tariq Aziz. 2017. Plant Nutrients and Soil Fertility Management: **In.** (Eds) M. Sabir, J. Akhtar and K., R., Hakeem. Soil and Plant Interaction. University of Agriculture Faisalabad.
10. Muhammad Sana Ullah, Muhammad Saqib, **Abdul Wakeel**. 2017. Climate Change and Carbon Sequestration: **In.** (Eds) M. Sabir, J. Akhtar and K., R., Hakeem. Soil and Plant Interaction. University of Agriculture Faisalabad.

11. Muhammad Aamer Maqsood, Tariq Aziz, Muhammad Sabir, **Abdul Wakeel**, Muhammad Sanaullah and Muhammad Zia-Ur-Rehman. 2017. Organic matter: significance, sources and functions **In.** (Eds) M. Sabir, J. Akhtar and K., R., Hakeem. Soil and Plant Interaction. University of Agriculture Faisalabad.
12. **Abdul Wakeel**, Mehreen Gul, Christian Zörb (2016) Potassium for Sustainable Agriculture. In: Soil Science: Agricultural and Environmental Perspectives. Springer, Germany
13. Hafeez-ur- Rehman, Ahmad Nawaz, **Abdul Wakeel**, Yashpal Singh Saharawat, Muhammad Farooq (2014). Conservation Agriculture in South Asia. In: Conservation Agriculture eds. M., Farooq, K. M. Siddique, Springer International Switzerland.
14. Salmaan Saeed, **Abdul Wakeel**, Rihsi Behl, Abdul R. Asif (2010). Distribution of Zinc, Copper and Selenium in Food Chain; Bioavailability, Clinical Implications and Biofortification. In: Crop Science and Land Use for Food and Bioenergy. eds. R.K. Behl, W. Merbach, H. Meliczek and C. Kaetsch. Agrobios International (India).

5.3. List of Peer Reviewed Publications

1. Ud Din, M.M., A. Wakeel, M.I. Khan, M.A. Wahid, and M.A. Sutton. 2026. Environmental trade-offs of nitrogen fertilizer application in wheat production system. *Soil Sci. Soc. Am. J.* (In press). DOI: 10.1002/saj2.70287
2. Mujtaba, A., **A. Wakeel** and M. Sanaullah. 2025. Contribution of nitrogenous sources to carbon mineralization and soil health. *Soil Environ*. 44(2): 232-241. DOI: doi.org/10.25252/SE/2025/253544
3. Muhamad Akmal, Muhammad Hayder Ali, Ayesha Younus, Umair Riaz, Sardar Alam Cheema & **Abdul Wakeel** (2025): Effect of nano and bulk iron oxide on growth, yield, and iron enrichment in rice, Journal of Plant Nutrition, DOI: 10.1080/01904167.2025.2581113
4. Hafsa, Kiran, A., **Wakeel, A**., & Ahmad, F. (2025). Genotypic Variability in Root System Architecture and Its Association with Fe and Zn Biofortification in Wheat (*Triticum aestivum* L.). *Journal of Plant Nutrition and Soil Science*, *188*(4), 686-701.
5. Safi, Z., Rees, R., Drewer, J., Sutton, M., Bhatia, A., Adhya, T. K., ... & Bansal, S. (2025). Increasing nitrogen use efficiency by reducing ammonia and nitrate losses from tomato production in Kabul, Afghanistan. Open Agriculture, 10(1), 20250429. (IF 1.6)
6. **Wakeel, A**., Qadeer, A., Bano, Z. et al. Managing Fertilizer Rates and Tillage Depth to Improve Nitrogen Use Efficiency and Soil Health. J Soil Sci Plant Nutr 25, 2937–2947 (2025).
7. Safi, Z., Rees, R., Drewer, J., Bhatia, A., Adhya, T.K., **Wakeel, A**. and Bansal, S., 2025. Managing reactive nitrogen in spring wheat cropping systems: insights from Kabul, Afghanistan. Environmental Research Communications, 7(4), p.045003. (IF 2.9)

8. Rehman, H. U., Ahmad, Z., Kiran, A., **Wakeel, A.**, Alharby, H. F., Majrashi, A., ... & Alharbi, B. M. (2025). Genotype to Soil Zinc Interaction; Influence of Zinc Application Time on its Plant Dynamics and Biofortification Potential. *Journal of Soil Science and Plant Nutrition*, *25*(2), 2373-2386. (IF 3.1)
9. Farooq, M., Nawaz, A., Rehman, A., Ullah, A., **Wakeel, A.**, ur Rehman, H., ... & Frei, M. (2024). Conservation agriculture effects on ecosystem health and sustainability–A review of rice–wheat cropping system. *Science of the Total Environment*, *957*, 177535. (IF 8.0)
10. Qadeer, A., **Wakeel, A***., Cheema, S.A., Shahzad, T., Sanaullah, M. 2024. Integrated Impacts of Soil Salinity and Drought Stresses on the Decomposition of Plant Residues. Sustainability, 16, 5368. (IF 3.3)
11. Shahid, M. R., **Wakeel, A.**, Ullah, M. S., & Gaydon, D. S. (2024). Identifying changes to key APSIM-wheat constants to sensibly simulate high temperature crop response in Pakistan. Field Crops Research, 307, 109265. (IF 5.8)
12. Noor, M., Kiran, A., Shahbaz, M., Sanaullah, M., & **Wakeel, A**. (2024). Root system architecture associated zinc variability in wheat (*Triticum aestivum* L.). Scientific Reports, 14(1), 1781. (IF 4.2)
13. Afzal T, **Wakeel A**, Cheema SA, Iqbal J, Sanaullah M. Influence of quality and quantity of crop residues on organic carbon dynamics and microbial activity in soil. Soil & Environment. 2024 Jun 1;43(1). (IF 0.3)
14. Rizwan, M., Tanveer, H., Ali, M.H., Sanaullah, M. and **Wakeel, A.***, 2024. Role of reactive nitrogen species in changing climate and future concerns of environmental sustainability. Environmental Science and Pollution Research, pp.1-17.
15. Sultana, R., Kiran, A., Sanaullah, M., & **Wakeel, A.** (2023). Exploring the linkage between root system architecture and grain iron content in wheat (*Triticum aestivum* L.). Frontiers in Sustainable Food Systems, 7, 1156728. (IF 4.7)
16. Afzal T, **Wakeel A,** Shahzad T, Hussain S, Sanaullah M. 2023. Phosphorus and zinc nutrition in maize (*Zea mays* L.) under drought stress. Journal of Animal & Plant Sciences. 1;33(6). (IF 0.5)
17. Tayyab, M., Sanaullah, M., & **Wakeel, A.** (2023). Sodium substitutes potassium requirements of sugar beet under saline–sodic conditions. Journal of Plant Nutrition and Soil Science, 186(4), 464-472 (IF: 2.5)
18. Akmal M, Younus A, **Wakeel A,** Jamil Y, Rashid MA. 2023: Synthesis and application of optimized ZnO nanoparticles for improving yield and Zn content of rice (*Oryza sativa* L.) grain. J. Plant Nutr., 46, 1077–1090.
19. Rehman H ur, Ali I, Ali F, Awan MI, **Wakeel A,** Farooq M, Hussain M. 2023. Nitrogen management strategies to improve crop performance, recovery efficiency and their relationship with physiological indices in dry direct-seeded rice. Int. J. Plant Prod., 291-308.

20. Tayyab M, Sanaullah M, **Wakeel A.** 2023. Sodium substitutes potassium requirements of sugar beet under saline–sodic conditions. J. Plant Nutr. Soil Sci. https://doi.org/10.1002/jpln.202200398

21. Tayyab M, **Wakeel A,** Mubarak MU, Artyszak A, Ali S, Hakki EE, Mahmood K, Song B, Ishfaq M. 2023. Sugar beet cultivation in the tropics and subtropics: challenges and opportunities. Agronomy, 13, 1213. https://www.mdpi.com/2073-4395/13/5/1213.

22. Tayyab M, **Wakeel A,** Sanaullah M, Maqsood S, Basra A. 2023. Physiological and biochemical characterization of sugar beet against salt-stress. Pak. J. Agri. Sci, 60, 235–247.

23. Tayyab M, **Wakeel A,** Sanaullah M, Zahir M, Umair Mubarak M, Ijaz M, Ishfaq M. 2023. Foliar application of boron enhances sugar beet yield and industrial sugar content by promoting indigenous soil-boron uptake. Pakistan J. Bot., 55, 1295-1303.

24. Tufail MA, Irfan M, Umar W, **Wakeel A,** Schmitz RA 2023: Mediation of gaseous emissions and improving plant productivity by DCD and DMPP nitrification inhibitors: Meta-analysis of last three decades. Environ. Sci. Pollut. Res. 30, 64719–64735.

25. Ishfaq, Muhammad, Aysha Kiran, Hafeez ur Rehman, Muhammad Farooq, Naseem Hassan Ijaz, Faisal Nadeem, Imran Azeem, Xuexian Li, and **Abdul Wakeel***. "Foliar nutrition: potential and challenges under multifaceted agriculture." Environmental and Experimental Botany (2022): 104909

26. Ishfaq, Muhammad, Aysha Kiran, **Abdul Wakeel***, Muhammad Tayyab, and Xuexian Li. "Foliar-applied potassium triggers soil potassium uptake by improving growth and photosynthetic activity of wheat and maize." Journal of Plant Nutrition (2022): 1-16.

27. Akmal, Muhammad, Ayesha Younus, **Abdul Wakeel**, Yasir Jamil, and Muhammad Abid Rashid. "Synthesis and application of optimized ZnO nanoparticles for improving yield and Zn content of rice (*Oryza sativa* L.) grain." Journal of Plant Nutrition (2022): 1-14.

28. Rehman, H.U., Alharby, H.F., Al-Zahrani, H.S., Bamagoos, A.A., Alsulami, N.B., Alabdallah, N.M., Iqbal, T. and **Wakeel, A**., 2022. Enriching Urea with Nitrogen Inhibitors Improves Growth, N Uptake and Seed Yield in Quinoa (Chenopodium quinoa Willd) Affecting Photochemical Efficiency and Nitrate Reductase Activity. Plants, 11(3), p.371. **(IF: 3.9)**

29. Bansal, S., Raghuram, N., Adhya, T.K., Rahman, M.M., Tshering, D., Dahal, K.R., **Wakeel, A**., Aminath, S., Safi, Z., Nissanka, S. and Pathak, H., *et al* 2022. Long-term trends of direct nitrous oxide emission from fuel combustion in South Asia. Environmental Research Letters, 17(4), p.045028. **(IF: 6.7)**

30. Kiran, A., **Wakeel, A**., Mahmood, K.; Mubaraka, R., Hafsa, Haefele, S.M. 2022. Biofortification of Staple Crops to Alleviate Human Malnutrition: Contributions and Potential in Developing Countries. Agronomy 2022, 12, 452. https:// doi.org/10.3390/agronomy12020452 **(IF: 3.4)**
31. **Wakeel, A.** and Labuschagne MT (2021) Editorial: Crop Biofortification for Food Security in Developing Countries. Front. Sustain. Food Syst. 5:756296. doi: 10.3389/fsufs.2021.756296
32. Ishfaq, M., **Wakeel, A**., Shahzad, M. N., Kiran A. and Xuexian Li. 2021. Severity of zinc and iron malnutrition linked to low intake through a staple crop: a case study in east-central Pakistan. *Environmental Geochemistry and Health*. 43(10):4219-4233 **(IF: 4.6)**
33. Kiran, A., **Wakeel, A**., Sultana, R., Ayesha Khalid, Qurrat-ul-Ain, Rafia Mubaraka, Ahmad Naeem Shahzad, Shaista Jabeen Khan & Mehwish Noor. 2021. Concentration and Localization of Fe and Zn in Wheat Grain as Affected by Its Application to Soil and Foliage. *Bulletin of Environmental Contamination and Toxicology.* 106, 852-858 **(IF: 2.15)**
34. Khan, M.I., Afzal, M.J., Bashir, S., Naveed, M., Anum, S., Cheema, S.A., **Wakeel, A.,** Sanaullah, M., Ali, M.H. and Chen, Z., 2021. Improving Nutrient Uptake, Growth, Yield and Protein Content in Chickpea by the Co-Addition of Phosphorus Fertilizers, Organic Manures, and Bacillus sp. MN-54. *Agronomy*, *11*, 436. (**IF:3.4**)
35. Tayyaba Samreen, Fien Degryse, Roslyn Baird, Rodrigo Coqui da Silva, Zahir Ahmad Zahir, Muhammad Zulqernain Nazir, **Abdul Wakeel**, Sidra-Tul-Muntaha, Michael McLaughlin. 2021. Development and testing of improved-efficiency boron-enriched diammonium phosphate fertilizers. J. Soil Sci. Plant Nutr. 21, 1134-1143. **(Impact Factor=3.8)**
36. Kiran, A., **Wakeel, A**., Ishaq, R., Mubaraka, R., Ishfaq, M., & Mahmood, A. 2021. Zinc priming of maize seed enhances root to shoot Zn translocation but not of analogous heavy metals. *Journal of Animal & Plant Sciences*, *31*(4). (**IF:0.49**)
37. Shahid, M. R., **A. Wakeel**, W. Ishaque, S. Ali, K. B. Soomro, M. Awais. 2020. Optimizing different adaptive strategies by using crop growth modelling under IPCC climate change scenarios for sustainable wheat production. Environ. Dev. Sust. 28, 1-25. **(Impact Factor=3.2)**
38. Zeeshan, A., M. Usman, I. Anastopoulos, A. Qadeer, R. Zhu, **A. Wakeel**, R. Dong. 2020. Use of nano-/micro-magnetite for abatement of cadmium and lead contamination. J. Environ. Manage. 264, 110477. **(Impact Factor=6.8)**
39. Ullah, A., M. Farooq, F. Nadeem, A. Rehman, A. Nawaz M. Naveed, **A. Wakeel**, and Mubshar Hussain. 2020. Zinc seed treatments improve the productivity,

quality and grain biofortification of desi and kabuli chickpea. Crop and Pasture Sciences 71(7):668-678 **(Impact Factor=2.2)**

40. Usman, M., M. Farooq, **A. Wakeel**, A. Nawaz, S. A. Cheema, H. Rehman, I. Ashraf, M. Sanaullah. 2020. Nanotechnology in agriculture: Current status, challenges and future opportunities. Sci. Total Environ. 721, 137778. **(Impact Factor=6.55)**

41. Mubarak, M.U., S.A. Cheema, A. Mahmud, A. and **A. Wakeel*.** 2020. Use of Poultry Mortality Compost for Biofortification of Trace Elements in Food Crops. Intl. J. Agric. Biol. 23:295–301. **(Impact Factor=0.822).**

42. Shahzad, A. N., M. K. Qureshi, **A. Wakeel***, T. Misselbrook. 2019. Crop production in Pakistan and low nitrogen use efficiencies. Nature Sustainability 2, 1106-1114. **(Impact Factor=19.34)**

43. Ullah, M. S., M. Usman, **A. Wakeel**, S. A. Cheema, I. Ashraf, M. Farooq. 2020. Terrestrial ecosystem functioning affected by agricultural management systems: A review. Soil Tillage and Research 196, 104464. **(Impact Factor=4.6)**

44. Gul, M., **A. Wakeel*,** D. Steffens, S. Lindberg. 2019. Potassium-induced decrease in cytosolic Na^+ alleviates deleterious effects of salt stress on wheat (*Triticum aestivum* L.). Plant Biol. 21, 825-831 **(Impact Factor=3.08)**

45. Kiran, A., A. **Wakeel*,** R. Snowdon, W. Friedt. 2019. Genetic dissection of root architectural traits by QTL and genome-wide association mapping in rapeseed (*Brassica napus*). Plant Breeding, 138, 184-192. doi:10.1111/pbr.12665 **(Impact Factor=1.8)**

46. Shahzad, A. N., M. Rizwan, M. G. Asghar, M. K. Qureshi, S. A. H. Bukhari, A. Kiran, **A. Wakeel***. 2019. Early maturing *Bt* cotton requires more potassium fertilizer under water deficiency to augment seed-cotton yield but not lint quality. Scientific Reports, 9, 7378. https://www.nature.com/articles/s41598-019-43563-2. **(Impact Factor=4.3)**

47. Ullah, A., M. Farooq, M. Hussain, R. Ahmad and **A. Wakeel.** 2019. Zinc seed coating improves emergence and seedling growth in *desi* and *kabuli* chickpea types but shows toxicity at higher concentration. Intl. J. Agric. Biol. 21: 553–559. **(Impact Factor=0.822).**

48. Ullah, A., M. Farooq, M. Hussain, R. Ahmad and **A. Wakeel.** 2019. Zinc seed priming improves stand establishment, tissue zinc concentration and early seedling growth of chickpea. J. Ani. Plant Sci. 29(4), 1046-1053. **(Impact Factor=0.490).**

49. Muzaffar, W., R. Ahmad, M. Hussain, M. Farooq and **A. Wakeel.** 2019. Influence of seed priming and sowing methods on growth and productivity of wheat cultivars differing in seed size in rice-wheat cropping system of Punjab, Pakistan. Intl. J. Agric. Biol. 21: 803–809. **(Impact Factor=0.822).**

50. Ullah, A., M. Farooq, A. Rehman, M. Arshad, H. Shoukat, **A**. **Wakeel.** Nadeem, F. 2018. Manganese nutrition improves the productivity and grain biofortification of bread wheat in alkaline calcareous soil. Experimental Agriculture, 54(5), 744-754. **(Impact Factor=1.39)**

51. Tariq, M., M. N. Afzal, D. Muhammad, S. Ahmad, A. N. Shahzad, A. Kiran, **A. Wakeel*** 2018. Relationship of tissue potassium content with yield and fiber quality components of *Bt* cotton as influenced by potassium application methods. Field Crops Research 229:37-43. **(Impact Factor=5.2)**

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5.4. Popular Articles

1. Khalid Mahmood and Abdul Wakeel. 2020. Beet Sugar: a win-win strategy. https://www.dawn.com/news/1567185
2. Sajid Ali, **Abdul Wakeel**, 2017. Significance of Potash Use in Pakistani Agriculture: A Conference Report. e-ifc. No. 48, ISSN 1662-2499 (Online); ISSN 1662-6656 (Print)
3. Mubarak, M.U., M. Zahir, M. Gul, M. Farooq, and **A. Wakeel**. 2016. Sugar Beet Response to Potassium Fertilizer under Water Sufficient and Water Deficient Conditions. *e*-ifc No 46. ISSN 1662-2499 (Online); ISSN 1662-6656 (Print)
4. Dil Baugh Muhammad, Muhammad Naveed Afzal, Muhammad Tariq, and **Abdul Wakeel.** (2016) Impact of Potassium Fertilization Dose, Regime, and Application Methods on Cotton Development and Seed-Cotton Yield under an Arid Environment. *e*-ifc No 45. ISSN 1662-2499 (Online); ISSN 1662-6656 (Print)
5. ***Wakeel, A*.** 2014. Critical Review of Research on Soil K and Crops' Response to K Fertilizers in Pakistan: Perspectives and Opportunities. *e*-ifc No 37. ISSN 1662-2499 (Online); ISSN 1662-6656 (Print)
6. Nisar Ahmad and ***Abdul Wakeel***. 2014. Report of IPI-ISES Capacity Building Seminar on "Balanced Use of Fertilizers for Quality Produce and Sustainable Agriculture in Pakistan", 20 August 2014, Faisalabad, Pakistan. e-ifc No 38. ISSN 1662-2499 (Online); ISSN 1662-6656 (Print)
7. ***Wakeel, A*.,** M. Farooq Qayyum, Ahmad Naeem Shehzad. Report of IPI-BZU Awareness Seminar on "Potash Use in Pakistani Agriculture" held on 4 December 2014 at Bahauddin Zakariya University (BZU), Multan, Pakistan. Electronic International Fertilizer Correspondent (e-ifc) No 39. ISSN 1662-2499 (Online); ISSN 1662-6656 (Print)
8. ***Abdul Wakeel***: Promoting sugar beet cultivation; In Agriculture and Technology. Dawn, 14th May, 2012.
9. ***Abdul Wakeel*** *and Hafeez Rehman: Crop bio-fortification can combat 'Hidden Hunger. The Express Tribune 15th October 2012.*

6- Professional Grooming and Internationalization

6.1. International Research grants

Due to my strong international networking and effective collaborative engagements, I have successfully generated innovative research ideas, which enabled me to secure substantial research funding amounting to approximately **37 million PKR** and **0.8 million USD**. These grants have significantly supported impactful research projects and fostered further collaboration at both national and global levels.

6.2. MoU Signed

- Memorandum with SAWiE for regenerative agriculture and students' capacity building through field internships. 2023-2028.
- Memorandum of Understanding between UAF and National management Consultant Karachi for Agricultural development at farm level. 2012
- Memorandum of Understanding between UAF and Sugar Beet Seed Institute (SBSI) P.O.Box 31585-4114, Karaj, Iran to work sugar beet cultivation options in Pakistan. 2012
- Memorandum of Understanding (Mou) Between University of Agriculture, Faisalabad and Lahore University of Management Sciences Lahore for collaboration under Technology Development Fund (TDF), funded by HEC Pakistan on **"Transforming biomass ash residues into commercializable products"**. **(2017-2019)**
- Memorandum of Understanding Between **Scientists of** University of Agriculture, Faisalabad-Pakistan and King Saud University, Riyadh, Saudi Arabia to work on **"Iron biofortification of grain wheat (*Triticum aestivum* L.) through genetic engineering**". **(2017-2019)**

7- Knowledge transfer activities for researchers, farmers and communities (outreach)

I have presented my research findings in various scientific conferences held in Germany, Italy, Turkey, Canada, China etc. and I have been an invited speaker/plenary speaker many times. More 100 oral and [poster presentations have been made at various occasions. Below is the list of only invited/keynote/plenary lectures list, although I have presented my results in international conferences in many countries.

7.1. Invited/Plenary/Keynote Lectures at various Scientific Forums

1. Methods to Quantify GHG Emission from Rice and Non-Rice Crops in Capacity Building on GHG Measurement and Alternate Wetting and Drying (AWD) in Rice-Wheat Cropping System in Punjab, Pakistan 8-12 April 2025, Okara.
2. Pakistan Global Commitment for Climate Change & Methods to Quantify GHG Emission from Rice and Non-Rice Crops in Capacity Building on GHG Measurement and Alternate Wetting and Drying (AWD) in Rice-Wheat Cropping System in Punjab, Pakistan 14-16 April 2025, Faisalabad
3. Significance of modelling and climate change scenario. In International Hands-on Training Workshop on "Advancing Cropping Systems with APSIM: Performance Analysis and Emission Mitigation"26-27th, February 2025 University of Agriculture Faisalabad in collaboration with Iowa State University and Asian Development Bank.
4. Reducing GHG Emissions from Rice with Alternate Wetting and Drying in Pakistan. 6 February 2025, Mariotte Islamabad
5. Improving Nitrogen Use Efficiency to Achieve NetZero Food System. Invited lecture at LUMS, Lahore May 2023
6. Coordinated Penal Discussion on Food Security Organized by German Embassy in Pakistan at Serena Hotel, Islamabad. October 2023

7. Managing reactive nitrogen species to mitigate climate change impacts: south Asia perspective. International Conference on Climate Change February 2023. PMAS Arid Agriculture University, Rawalpindi, Pakistan **(Invited Lecture)**
8. Potash Use and Dynamic in Soil: Pakistan Perspectives. International Congress of Soil Science 9-11 March, 2022. **(Invited Lecture)**
9. Influence of different N sources and tillage depth on NUE and soil microbial activity in wheat crop. Programme of the XXI International N Workshop: version 23-28-Oct-2022. Madrid, Spain
10. Nitrogen management to achieve Sustainable Development Goals (SDGs). National Conference of Soil Science, March 2022 (**Invited Lecture**)
11. Macro nutrient management in wheat. Sultan Qaboos University Muscat December 2022 (**Invited Lecture**)
12. Needs of nutrients for plants. Invited lecture in workshop for Agriculture diploma students and farmers. August 2022 (**Invited Lecture**)
13. Agricultural Foods Quality and Malnutrition. Transforming Food Systems: Healthy affordable and Balanced Nutrition. 28 May 2021 (YPARD) (**Keynote Lecture**)
14. Nitrogen losses and sustainable management strategies for climate-resilient agriculture in Pakistan. International Conference on "CLIMATE-RESILIENT SMART SOIL MANAGEMENT". Focusing Food Security, Ecosystems & Environment, 5-7 March 2020, Haripur, KPK, Pakistan. (**National invited Speaker**)
15. Recent Advances in Nitrogen Management for Sustainable Food Production. International online conference, "Dynamic strategies in plant sciences for crop sustainability and food security" 26-27 May 2021. International Conference at Women University Faisalabad (**Plenary Lecture**)
16. Global campaign on sustainable nitrogen management: prospects and way-forward. 18th International Congress of Soil Science, 2020. Tando Jam, Sindh Pakistan (**Plenary Lecture**)
17. Genetic Variation in Basmati Rice for Zn Fertilization in Different Rice Production Systems. International Rice Workshop, 25-27, July 2018. Chanakkali, Turkey (**Invited lecture**).
18. Rice Production Systems in Pakistan. International Rice Workshop, 25-27, July 2018., Chanakkali, Turkey (**Invited lecture**).
19. Why Should Potash be Used for Sustainable Agriculture, December 9, 2017, Seminar on 'Balanced Fertilizer Use' Organized by University of Agriculture Faisalabad, Pakistan (**Invited Lecture**)
20. Significance of Micronutrient Biofortified Staple and Fodder Crops. International Seminar Organized by University of Agriculture Faisalabad, Pakistan on 30 October, 2017. (**Invited Lecture**)
21. Research and Development in Potassium and Need of Policy Reforms. Potassium for sustainable crop production in Pakistan. April 18, 2017, Organized by IPNI and Engro fertilizers at University of Agriculture Faisalabad, Pakistan (**Invited lecture**)
22. Elevated potassium fertilization improves wheat growth and yield under salt stress. Frontiers of Potassium Science, January 25-27, 2017, organized by IPNI at Rome Italy (**Invited Lecture**)
23. Role of Potassium in Promoting Sustainable Production of Banana in Problematic Soils of Sindh. A seminar organized by FAO on January 11, 2017 in Karachi, Pakistan. (**Invited Lecture**)

24. Impact Assessment and Future of Potassic Fertilizers in Pakistan. FAO, International Workshop on "4R Nutrient Stewardship for Food, Economic and Environmental Security" April 4-6, 2016. Serena Hotel, Islamabad (**Invited lecture**)
25. Sugar Beet: A Supplementary Crop to Sugarcane in Pakistan. April 2016. One day workshop at Institute of Soil and Environmental Sciences, University of Agriculture, Faisalabad. (**Invited lecture**)
26. Use of Potash for Sustainable Cotton Production in Pakistan. CCRI, Multan National Seminar on "Challenges and Prospective of Potassium Use for Cotton" February 18, 2016 (**Invited lecture**)
27. Promoting use of potassic fertilizers in Pakistan. International workshop on "Current status of fertilizer use in Pakistan" November 29 – December 1, Organized by ICARDA and ISES at University of Agriculture Faisalabad. (**Invited lecture**)
28. Role and Need of Potassium Fertilizers for Quality and Sustainable Maize Production. FAO Workshop June 6, 2015 Sahiwal, Pakistan. (**Invited lecture**)
29. Balanced Use of Fertilizers for Pulses. National Seminar on sustainable pulses production for food security. August 11, 2015, A BZU Campus Layyah (**Invited lecture**)
30. Importance of potassium for aerobic and anaerobic rice. FAO commodity-based Workshop on Balanced Use of Fertilizers and Food Security – Rice. June 15, 2015 at Pearl Continental, Lahore Pakistan (**Invited lecture**)
31. Role and Economic Importance of Potassium Fertilization in Mango: SOP Vs. MOP. FAO commodity-based Workshop on Balanced Use of Fertilizers and Food Security – Mango. May 26, 2015, at Pearl Continental, Karachi Pakistan (**Invited lecture**)
32. "Strategies to improve potash fertilization in Pakistan and potential role of IPI in Pakistan" FAO symposium on public-private partnership to manage soil fertility. February 3, 2015, at Serena Hotel Islamabad Pakistan (**Invited lecture**)
33. "Strategies to improve potash fertilization" IPI-BZU Awareness Seminar on 'Potash Use in Pakistani Agriculture' held on 4 December 2014 at Bahauddin Zakariya University (BZU), Multan, Pakistan. (**Invited lecture**)
34. "Potassium-sodium interaction in soil and plant under saline-sodic conditions" 12th International IPI Symposium, July 24-27, 2012, Chengdu, China (**Invited lecture**)

7.2. Organized Conferences/Seminars/Workshops/Farmers' day

1. Capacity Building on GHG Measurement and Alternate Wetting and Drying (AWD) in Rice-Wheat Cropping System in Punjab, Pakistan 14-16 April 2025, Faisalabad in Collaboration with Asian Development Bank.
2. International Hands-on Training Workshop on "Advancing Cropping Systems with APSIM: Performance Analysis and Emission Mitigation"26-27th, February 2025 University of Agriculture Faisalabad in collaboration with Iowa State University and Asian Development Bank.
3. Workshop on Climate Resilient and Low Carbon Agriculture in Pakistan. 7 February 2025, at University of Agriculture, Faisalabad in collaboration with Asian Development Bank.
4. Seminar On Sustainable Nitrogen Management for Food Security & Environmental Health & Pakistan Nitrogen Policy Report: Scientific Evidence,

Current Initiatives, And Policy Land Scape. 5-6 August 2024. University of Agriculture Faisalabad.

5. International Hands-on Training Workshop “Modelling Nitrogen Management in Different Cropping Systems in Changing Climate” (20-22nd, May 2024). University of Agriculture Faisalabad
6. Preparation for the 16th SACEP Governing Council MOCC&EC/SANH/INI/UAF/CU CONSULTATIVE Workshop on the draft “South Asia Roadmap for Sustainable Nitrogen Management” 9th May 2024, Marriot Hotel, Islamabad. Pakistan
7. Stakeholders’ workshop, under the umbrella of International Nitrogen Management Systems (INMS), on Sustainable Nitrogen Management perspectives and National Policies, June 5-6, at Movenpick hotel, Karachi Pakistan. (The event was held on July 18, 2023, with approval from competent authority)
8. Stakeholders’ workshop, under the umbrella of International Nitrogen Management Systems (INMS), on Sustainable Nitrogen Management perspectives and National Policies, March 21, 2023, at Faletti's hotel, Lahore Pakistan.
9. Stakeholders’ workshop, under the umbrella of International Nitrogen Management Systems (INMS), on Sustainable Nitrogen Management perspectives and National Policies, May 8-9, 2023, at Marriott hotel, Islamabad Pakistan.
10. First international conference on “Climate Change: Impacts and Solutions” 7-9 November 2022 at the Institute of Soil and Environmental Sciences, University of Agriculture Faisalabad, Pakistan
11. 19th International Congress of Soil Science entitled “Soil Health and Sustainable Development Goals” 9-11 March, 2022, University of Agriculture Faisalabad, Pakistan
12. National Seminars on World Environment Day 6th June 2022, University of Agriculture Faisalabad, Pakistan
13. International webinar on “Sustainable Nitrogen Management and Food Security” 8th December 2021, University of Agriculture Faisalabad, Pakistan
14. Online Course on “Data Science with Python Version II” 22nd July-31st August 2022, University of Agriculture Faisalabad, Pakistan
15. Online Course (Forty days) “Data Science with Python” 1st January-10th February 2022, University of Agriculture Faisalabad, Pakistan
16. International Webinar entitled “A Way Forward to Food Quality and Safety” 23 June 2021
17. A international Webinar of Nitrogen and ecosystem restoration, 04 June 2021
18. International Seminar on Sustainable Nitrogen Management 11-12 March, 2020, New Senate Hall, University of Agriculture Faisalabad, Pakistan
19. Conference on innovations in Agriculture: Nourishing Pakistan in Changing Climate (2019)
20. 2nd stakeholders’ workshop, under the umbrella of International Nitrogen Management Systems (INMS), on perspectives and challenges of nitrogenous fertilizer use in agriculture of Pakistan, June 25-26, 2019 at ISES, UAF.
21. 1st stakeholders’ workshop, under the umbrella of International Nitrogen Management Systems (INMS), on ‘perspectives and challenges of nitrogenous fertilizer use in agriculture of Pakistan’. December 13-14, 2018. ISEs University

22. Significance of Micronutrient Biofortified Staple and Fodder Crops. International Seminar Organized by University of Agriculture Faisalabad, Pakistan on 30 October 2017.
23. Significance of potassium in Pakistan Agriculture. Farmers' day held on November 29, 2016, at, BZU, Multan.
24. Significance of potassium in Pakistan Agriculture. Farmers' day held on October 26, 2016, at Bahadur Campus Layyah, BZU, Multan.
25. Farmers' Day held at Sub campus Burewala on poultry mortality compost 23 September 2019
26. Farmers' Day held at Sub campus Depalpur on poultry mortality compost 24 September 2019
27. Conference on sustainable crops and animal production system with a theme feeding 9 billion. 8-10 December 2016 at University of Haripur, Pakistan.
28. International Conference on "Significance of Potash use in Pakistani Agriculture" November 24-25, 2016, at Institute of Agricultural Sciences University of the Punjab, Lahore, Pakistan
29. International workshop on "Current status of fertilizer use in Pakistan" November 29 – December 1, 2015 held at University of Agriculture Faisalabad
30. International Conference on Soil Sustainability for Food Security, 15-17 November 2015 at University of Agriculture Faisalabad Pakistan
31. National Seminar on sustainable pulses production for food security. August 11, 2015, A BZU Campus Layyah
32. World Environment Day, "Seven Billion Dreams for sustainable Life Style" June 5, 2015 at ISES, University of Agriculture of Faisalabad
33. International workshop on Biofortification of Staple Crops 29-31 March 2015 at University of Agriculture Faisalabad Pakistan
34. Workshop on Balanced use of Fertilizers in Pakistan 17 March, 2015 at University of Agriculture Faisalabad Pakistan
35. IPI-BZU Awareness Seminar on "Potash Use in Pakistani Agriculture" held on 4 December 2014 at Bahauddin Zakariya University (BZU), Multan, Pakistan. Funds were generated from International Potash Institute Switzerland.
36. IPI-ISES Seminar on "Balanced Use of Fertilizers for Quality Produce and Sustainable Agriculture in Pakistan", 20 August 2014, Serena Hotel Faisalabad, Pakistan. Funds were generated from International Potash Institute Switzerland, Engro Fertilizers Ltd. Pakistan, and Fatima Fertilizers Pakistan.
37. Member Technical Committee for 5th International Conference on Agriculture, Food Security and Climate Change organized by PAS Forum and University of Poonch Rawalakot at Rawalakot AJK on 9-11 September 2014.
38. An international conference on crop management in changing climate in February 2013 at University of Agriculture Faisalabad
39. A Seminar on Allelopathic research perspectives in Pakistan December 2013 at University of Agriculture Faisalabad
40. International advisory Committee Member for an "International Seminar on Cutting Edge Science & Technologies towards, Food, Environment and Health"13-15 September 2012, Gottingen, Germany.

7.3. Internship Program for Undergraduate Students (Farmer Advisory)

Internship Program for undergraduate students in collaboration with Fauji Fertilizer Corporation, Engro Fertilizers and Fatima Fertilizers funded by International Potash Institute, Switzerland to highlight the significance of Balanced fertilizer use. About 25 Interns were sent to District Vehari, Faisalabad, Multan, Sukkur and Mitiari.

7.4. Services to Scientific Forum

- Member British Society of Soil Science
- Global Partnership on Nutrient Management
- Lifetime member of Soil Science Society of Pakistan
- Lifetime member of Pakistan Agricultural Scientists Forum
- Director/Chairman, Pakistan Agricultural Scientists Forum
- Member of UK-Pak Science & Innovation and Global Network
- Member German Society of Plant Nutrition