



Food and Agriculture  
Organization of the  
United Nations

7<sup>th</sup> Asian Soil  
Partnership  
MEETING

9-10 March 2022

# National updates on soil: country

By Waqar Ahmad  
Agriculture & Development  
Consultant

National Focal Point -

# PAKISTAN



# Main activities implemented under Pillar 1

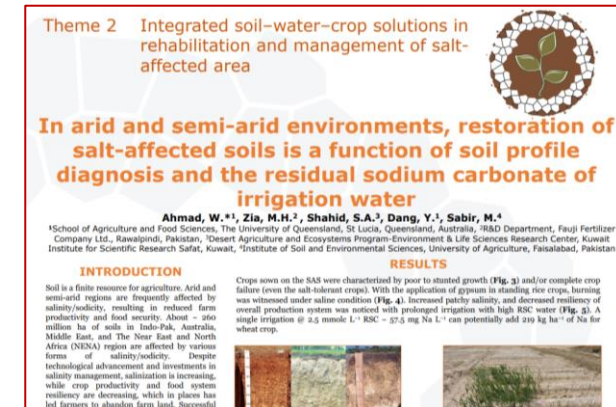


**Promote SMS resources for soil protection, conservation and sustainable productivity**

**Members: Muhammad Salim, Muhammad Sabir, Waqar Ahmad and Munir Zia**

## CIRCULAR ECONOMY

- ✓ Wise use of resources – Soil Use and Management, Wiley/ FAO- Symposium
- ✓ Animal waste management – Designed projects (PhDs/MS Level Students)
- ✓ Residues management – Sustainability, MDPI
- ✓ Conservation tillage to tackle smog issue and improve carbon sequestration in rice-wheat cropping system, Pakistan. In: *Best soil management practices for soil organic carbon maintenance and sequestration: A technical manual*. Rome, FAO.



1. **Waqar Ahmad, Let's Connect through Our Soils – Sustainable Future. Invited Speaker by the National Centre of Excellence in Geology (NCEG), University of Peshawar. August 21, 2021**

# Main activities implemented under Pillar 2

*Encourage investment, technical cooperation, policy, education, awareness and extension in soil*



**Members: Waqar Ahmad, Muhammad Jamal Khan Khattak, Ghulam Murtaza**

1. Policy Brief for Asia “The multi-faced role of soil in Asia”
2. **Implementation of Global Soil Doctors Program – Asia**  
There has been a relatively slow progress made during the last year and was a scattered (not well coordinated effort in Pakistan). *CALL FOR PROPOSALS – End of May 2022 (Partnership building)*
3. **Certified Professional Soil Scientist (CPSS) Program in collaboration with scientists from the developed countries particularly Australia**
4. Staff training of the Agriculture Department, abroad in Natural Resource Management (NRM)
5. Mapping: Salt-affected soils, soil organic carbon, and Soil Atlas for Asia

# Main activities implemented under Pillar 2

What did your country do on the World Soil Day?



1. **CELEBRATIONS/COMMITMENTS**
2. **COVERAGE IN PRINT AND ELECTRONIC MEDIA**



7<sup>th</sup> Asian Soil Partnership Meeting | 9-10 March 2022



# Main activities implemented under Pillar 3

*Promote targeted soil research and development focusing on identified gaps, priorities and synergies with related productive, environmental and social development actions*



**Members: Riaz H. Qureshi, Muhammad Jamal Khan Khattak and Waqar Ahmad**

1. National Soil Policy Document (*working paper drafted in consultation with key experts. Pakistan would need support from GSP Secretariat for publishing this policy document*) – *We can share after the Soil Governance Webinar (May 2022)*
2. A commodity-specific Manual on 4R Nutrient Stewardship – IN PROCESS
3. Linking Research, Development and Extension (RD&E) for Sustainable Development - IN PROCESS
4. How to Communicate the Message of SSM to the End User? – Strategy Document (DRAFTED)
5. **Special issues:**
  - Biodiversity and Natural Resources Management (**Sustainability**)
  - Genotype X Environmental X Management (GxExM) – Moving Beyond Wheat
  - Global Food and Nutrition Security under Changing Climates (**Frontiers in Agronomy**)
  - Adaptation of Plants to Waterlogging and Hypoxia (**Frontiers in Plant Science**)

## Editorial: Global Food and Nutrition Security Under Changing Climates

Waqar Ahmad<sup>1,2\*</sup>, Najeeb Ullah<sup>3,4\*</sup>, Ling Xu<sup>5</sup> and Ayman El Sabagh<sup>6,7</sup>

<sup>1</sup> School of Agriculture and Food Sciences, The University of Queensland, St Lucia, QLD, Australia, <sup>2</sup> National Centre of Excellence in Geology, University of Peshawar, Peshawar, Pakistan, <sup>3</sup> Queensland Alliance for Agriculture and Food Innovation, Centre for Plant Science, The University of Queensland, St Lucia, QLD, Australia, <sup>4</sup> Faculty of Science, Universiti Brunei Darussalam, Bandar Seri Begawan, Brunei, <sup>5</sup> Zhejiang Province Key Laboratory of Plant Secondary Metabolism and Regulation, College of Life Sciences and Medicine, Zhejiang Sci-Tech University, Hangzhou, China, <sup>6</sup> Department of Field Crops, Faculty of Agriculture, Sirt University, Sirt, Turkey, <sup>7</sup> Department of Agronomy, Faculty of Agriculture, Kafrelsheikh University, Kafrelsheikh, Egypt

**Keywords:** food security, climate change, micronutrient quality of food, sustainable yields, farm-level strategies, sustainable future

Editorial on the Research Topic

Global Food and Nutrition Security Under Changing Climates

Global climatic change poses a serious threat to crop production and food security. For instance, unpredictable weather events affecting the frequency of rains, floods, droughts, and extreme heat have already impacted global output and quality of staple crops and thus food and nutrition

# Main activities implemented under Pillar 4



## Information and Data

Members: *Waqar Ahmad, Muhammad Jamal Khan Khattak, Muhammad Salim*

1. Data collection and sharing and coordinating for the activities in relation to International Network of Soil Information Institutions
2. Data collection, processing and quality assurance for mapping Salt-affected Soils, SOC mapping and Asian Soil Atlas

*For the data required for Asian Soil Atlas, Pakistan was far behind in terms of re-classification of the soils. Our dedicated team worked hard for classifying the soils as per The World Reference Base (WRB)/correlation matrix*



# Main activities implemented under Pillar 5



*Harmonization of methods, measurements and indicator for the sustainable management and protection of soil resources*

**Members:**

***Muhammad Sabir, Waqar Ahmad, Muhammad Salim, Riaz H. Qureshi, Munir Zia***

Coordinating for the activities in relation to Global Soil Laboratory Network-  
*National Accredited Laboratory in Islamabad, Pakistan*

Activities in SEALNET are coordinated by the Chair with the support of the vice-Chair and, from 2021, a Steering Committee.

**2021-2023**

**Chair:** Dr. Gina P. Nilo (Philippines)

**Vice-Chair:** Dr. Muhammad Abbas Aziz (Pakistan)

# BOOK ON MICRONUTRIENTS – 4R STEWARDSHIP PAKISTAN

Munir Zia and Waqar Ahmad



Treesource & SUMMERFIELD BOOKS EST. 1985

Search...

BSBI Members

0

HOME BOOKS POPULAR CATEGORIES RECENT TITLES FORTHCOMING TITLES SPECIAL OFFERS SECOND HAND TREESOURCE BOTANY

EQUIPMENT BLOG

Home / Environment & Earth Sciences / Earth Science / Soil Science

**Micronutrient Fertilizer Use in Pakistan: Historical Perspective and 4R Nutrient Stewardship**

£130.00

Available for Pre-order. Due August 2022.

7<sup>th</sup> Asian Soil Partnership Meeting | 9-10 March 2022





# BOOK ON MICRONUTRIENTS – 4R STEWARDSHIP PAKISTAN

**Munir Zia and Waqar Ahmad**

New books: 1 - 6 of 6

#	Bookseller	Notes	Price
1.	amazon.com United States	Hardcover, ISBN 9781032307626 Publisher: CRC Pr I Llc, 2022 Hardcover. 272 pages. This title has not yet been released. You may pre-order it now and we will deliver it to you when it arrives. Fulfillment by Amazon.	<del>\$179.99</del>
2.	amazon.co.uk United Kingdom	Hardcover, ISBN 9781032307626 Publisher: CRC Press, 2022 Hardcover. Edition: 1. 272 pages. This title will be released on August 17, 2022. Pre-order now. Fulfillment by Amazon.	<del>\$182.91</del>
3.	amazon.ca Canada	Hardcover, ISBN 9781032307626 Publisher: CRC Press, 2022 Hardcover. Edition: 1. 272 pages. This title has not yet been released. You may pre-order it now and we will deliver it to you when it arrives. Fulfillment by Amazon.	<del>\$188.81</del>
4.	amazon.fr France	Hardcover, ISBN 9781032307626 Publisher: Taylor & Francis Ltd, 2022 Relié. 272 pages. Cet article paraîtra le 28 août 2022. Précommandez dès aujourd'hui. Fulfillment by Amazon.	<del>\$193.57</del>
5.	amazon.it Italy	Hardcover, ISBN 9781032307626 Publisher: CRC Press, 2022 Copertina rigida. Edition: 1. 272 pages. Questo articolo non è ancora disponibile. Se prenoti ora, effettueremo la consegna non appena arriverà. Fulfillment by Amazon.	<del>\$195.67</del>
6.	amazon.es Spain	Hardcover, ISBN 9781032307626 Publisher: CRC Press, 2022 Tapa dura. Edition: 1. 272 pages. Este producto está en preventa. Compralo en Preventa ya. Fulfillment by Amazon.	<del>\$200.73</del>

ISBN is **9781032307626 / 1032307625**

## Micronutrient Fertilizer Use in Pakistan: Historical Perspective and 4r Nutrient Stewardship

by [Rashid, Abdul; Zia, Munir; Ahmad, Waqar](#)

**Publisher:** CRC Pr I Llc, 2022

**Edition:** Hardcover

**Language:** English

**Prices INCLUDE standard shipping to Pakistan**

[Show prices without shipping](#)

[Change shipping destination/currency](#)

Shipping prices may be approximate. Please verify cost before checkout.

[https://www.amazon.com/Micronutrient-Fertilizer-Use-Pakistan-Perspective/dp/1032307625/ref=sr\\_1\\_2?qid=1646805821&refinements=p\\_27%3AAbdul+Rashid&s=books&sr=1-2](https://www.amazon.com/Micronutrient-Fertilizer-Use-Pakistan-Perspective/dp/1032307625/ref=sr_1_2?qid=1646805821&refinements=p_27%3AAbdul+Rashid&s=books&sr=1-2)



7<sup>th</sup> Asian Soil Partnership Meeting | 9-10 March 2022



# PROMOTION OF SSM – CONFERENCES + RESEARCH ARTICLES



Article

## Synergistic Effects of Acacia Prunings-Derived Biochar and Nitrogen Application on the Mineral Profile of Maize (*Zea mays* L.) Grains

Habib Ullah<sup>1,2</sup>, Sahib Alam<sup>1</sup>, Waqar Ahmad<sup>3,4,\*</sup>, Stuart Morrow<sup>2</sup>, Muhammad Sabir<sup>5</sup> and Yacine Hemar<sup>2,6</sup>

<sup>1</sup> Department of Agricultural Chemistry and Biochemistry, The University of Agriculture, Peshawar 25130, Pakistan; noorezi121@gmail.com (H.U.); dralam@aup.edu.pk (S.A.)

<sup>2</sup> School of Chemical Science, The University of Auckland, Auckland 1142, New Zealand;

**Acknowledgement:** We acknowledge the Higher Education Commission (HEC) of Pakistan for the financial support under the International Research Support Initiative Program (IRSIP), and the School of Chemical Sciences, University of Auckland, New Zealand for facilitating the laboratory analysis for this study. The need for this manuscript partially emerged during the Food and Agriculture Organization of the United Nations project (FAO; Project Reference, GCP/PAK/143/USA, “4R Nutrient Stewardship for Sustainable Agriculture Intensification in Pakistan: Baseline Input Atlas and Promotion of Best Soil Management Practices”). WA is thankful to Khalid Mahmood (Rothamsted Research, United Kingdom) and Hana’a Burezq and Shabbir A. Shahid (Desert Agriculture and Ecosystems Program, Environment and Life Sciences Research Center, Kuwait Institute for Scientific Research, Kuwait) for thought-provoking discussions on how to tailor the properties of biochar and devise technology packages for small, medium, and large-scale growers of semi-arid and arid regions. The authors are thankful to three anonymous reviewers for their comments and suggestions to improve the quality of this manuscript. All the views expressed in this manuscript are authors’ own views and do not necessarily reflect the opinion of their respective organizations.

The abstract is titled "19th INTERNATIONAL CONGRESS OF SOIL SCIENCE SOIL HEALTH AND SUSTAINABLE DEVELOPMENT GOALS" and "DEVELOPMENT OF TAILOR-MADE BIOCHAR TO ADDRESS SOIL, PLANT AND ENVIRONMENTAL ISSUES". It lists authors: Azam Saleem<sup>1</sup>, Waqar Ahmad<sup>2</sup>, Saleem H<sup>3</sup> and Zu-ol-Nasran<sup>4</sup>. Affiliations include: <sup>1</sup>Department of Soil Science, South Agriculture University, Taidong; <sup>2</sup>School of Agriculture and Food Science, The University of Queensland, St. Lucia, QLD, 4072, Australia; <sup>3</sup>National Centre of Excellence in Geology, University of Peshawar, Pakistan; <sup>4</sup>Author(s) Correspondence: Azam Saleem (azam.saleem@gmail.com).

**Rationale:** Our soils are predominantly alkaline and calcareous in nature, with poor built-up of organic matter and are deficient in major and micro-nutrients. The population is increasing rapidly (~ 2 percent annually) and would be ~ 340 million by 2050. The burgeoning population will have its environmental implications. United Nations (UN)'s agenda for the Sustainable Development Goals (SDGs) provides guidelines for addressing such issues. Farm-level strategies are being devised to value the inclusion of locally developed amendments, with an over-reliance on biochar, for targeting both quality and quantity parameters. Various biochar are being used for the development of biochar without any objectivity to simultaneous focus on soil-plant and environment continuum. This study provides an insight on such gaps for a sustainable green future for Pakistan.

**WHAT?**

- A carbonized biomass/material
- Intended purpose of use
- Controlled conditions
- Pyrolysis (Slow vs. Fast)
- Variety of feedstock

**WHAT WE FOUND?**

- Characterization of various biochar (locally produced)
- Higher pH of biochar (variable solutions and rates)
- Higher EC (variable solutions and rates), a considerable amount of soil loading to our soils with per ha rate of application (5kg biomass)
- Variable C/N (different methods) with apparently available micronutrients
- Higher lab solubility (mostly not provided)
- Mostly freshly prepared from the biomass over rat locally generated
- Only 3% of the studies provided data on CEC, cEC on the surface area

**Waste examples**

- Animal waste production 7,200 tons of waste per day (Lundi Dairy)
- DM (%) - grossly variable of N = 27-48%
- K (%) 0.5 - 1.8%
- P (%) 0.4 - 0.8%

**Human waste residue**

- In India, human in grows ~ 35,000 ha, and disposal of human residue (urine, pseudo stool, feces, etc.) is becoming a problem for the farming community.
- One tonne of human residue contains about 15kg N, 9kg P and 23kg K.

**Figure 1:** Effect of biochar (B) (average across 30 levels) on the water-gate density of water and macromolecules, EC, and pH of the soils at 0.15%, 0.3%, 0.45%, 0.6%, 0.75%, and 0.9% (C/N) (average across 30 levels) in the case of potassium (K), phosphorus (P), calcium (Ca), and potassium (K) (C/N) (average across 30 levels) of biochar. The results of biochar, biochar, by means of other factors, it can be used in other ways that would be beneficial to the environment and society with an increased level of EC as compared to the control (without B). However, we calculated carbon sequestration of B on the macromolecules gate density.

**METHODOLOGY**

- Desk review (1-50 selected published articles/studies - last 5-10 years), and various published reports of United Nations Development Programme (UNDP), International Center for Agricultural Research in the Dry Areas (ICARDA), and Food and Agriculture Organization of the UN
- Characterization of waste samples from (local animal and human)
- Consultation with national experts and representatives of Asian Soil Partnership (ASP-UN), Society for Environmental Geochemistry and Health (SEGH), and SAWIE Ecosystems

**Bio-remediation strategies**

- Rice is grown on 61.28 million hectares (ha) with an average yield of 2 tons per ha, whereas the area under wheat is ~ one (1)M with average yield ~ 0.4 tons per ha.

**TAKE-HOME?**

- The protocols used to characterize the finished products (biochar) are still need to be harmonized. No serious collaborative efforts have been reported addressing the multidimensional issues of soil-plant-environment continuum.
- We propose a framework for the rice-wheat cropping system to initiate a collaborative agenda promoting the concept of circular economy and environmental sustainability.
- The main emphasis will be on the development of human waste-based biochar with benign and beneficial effects on soil properties, following a pertinent methodology. It is hoped that this technology would be highly practicable to promote low-input sustainable agriculture and environmental safety.
- Let's join hands in the perfection of biochar technology and solving waste management for addressing multidimensional issues of soil-plant-environment continuum

09 - 11, March 2022, University of Agriculture Faisalabad





**Thanks for  
your  
attention**



2022





Food and Agriculture  
Organization of the  
United Nations

# 7<sup>th</sup> Asian Soil Partnership MEETING

9-10 March 2022

