

In the Name of Allah, the Beneficent, the Merciful

Soil Science News

Quarterly Newsletter of Soil Science Society of Pakistan

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Editorial

4 per 1000: An ambitious Initiative

Uncontrolled emissions of greenhouse gases (GHGs), mostly due to anthropogenic activities (like burning of fossil fuels), have strongly influenced the global carbon (C) cycle, leading to an increase of the atmospheric concentration of carbon dioxide, CO₂, from 270 ppm in the pre-industrial era to currently about 414 ppm (by volume). The current rate of increase at about 2 ppm yr⁻¹ is the highest since the monitoring commenced in 1959.

In addition to CO₂, the discharge of other greenhouse gases, such as, methane and nitrous oxide, into the atmosphere increasing atmospheric concentrations of GHGs are influencing the radiative forcing and increasing the Earth's mean temperature and causing and climate change. Therefore, reducing atmospheric concentration of CO₂ and other GHGs is important to mitigate climate change and avoid increased volatility (extreme events) and adverse manifestations of regional and global climate change.

At the 21st session of the United Nations Framework Convention on Climate Change (UNFCCC, COP21), December 2015 in France, a voluntary action plan, the '4 per 1000 Initiative: Soils for Food Security and Climate' was proposed under the Agenda for Action. The Initiative underlines the role of soil organic matter in addressing the three-fold challenge of food and nutritional security, adaptation to climate change and mitigation of human-induced greenhouse gases (GHGs) emissions.

The "4 per 1000 initiative is to promote land management practices leading to an increase in the stock (i.e. quantity as opposed to concentration) of SOC at the rate of 0.4% of the initial value (up to the 40 cm depth) per year for 20 years to compensate the global emissions of greenhouse.

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News and Views

National Seminar "Threats to Soil: Changing Climate and Rapid Urbanization"

National Seminar entitled "Threats to Soil: Changing Climate and Rapid Urbanization" was jointly organized by Soil Science Society of Pakistan (SSSP) and Land Resources Research Institute (LRRI), National Agricultural Research Centre (NARC), Islamabad. Dr. Muhammad Azeem Khan, Former DG, NARC/Member, Food Security & Climate Change, Planning Commission of Pakistan, was the Chief Guest and Dr. M. Ibrahim, Director (Rtd.), Soil Salinity Research Institute, Pindi Bhattian, Hafizabad was the Guest of Honor. Proceedings of the Inaugural Session started with recitation from Holy Qur'ān and Dr. Ghulam Murtaza Jamro, General Secretary, briefed the participants about history and activities of the Society. Prof. M. Kaleem Abbasi, President, SSSP/Vice Chancellor, University of Azad Jammu and Kashmir, Muzaffarabad, AJK welcomed the guests and the participants. In his welcome address, he highlighted the theme of the seminar and emphasized that soil science community must strive for conserving the precious soil resource by adopting astute soil management practices. He also appreciated the role of local organizing committee for holding the seminar. Dr. M. Mahmood-ul-Hassan, CSO (Retd.), LRRI, NARC, Islamabad was Keynote Speaker of the seminar. He elaborated the threats to soils from changing climate and rapid urbanization in detail. Chief Guest of the ceremony congratulated the Executive Council of the Society and local organizing committee for holding the seminar on very important current issues related to soil. He also expressed his views on the importance of soil and the role of soil scientists in replenishing the soil health on sustainable basis.

In technical session, five presentations were delivered by renowned speakers including Dr. Fayyaz Hussain, Director, LRRI, Prof. Dr. M. Jamal Khan Khattak, Chairman, Department of Soil and Environmental Sciences, University of Agriculture Peshawar, Dr. Abid Subhani, Agriculture Chemist, Soil and Water Conservation Research Institute,

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Chakwal, Dr. Wajid Nasim Jatoui, Associate Prof./Head Deptt. of Environmental Sciences, COMSATS University Islamabad, Vehari Campus and Dr. M. Sharif, Head, Deptt. of Soil Science, Balochistan Agriculture College Quetta. Prof. Dr. Khalid Saifullah Khan and Dr. Shahid Javid acted Chairperson and Vice-chairperson during session, respectively. Dr. Ijaz Ali was the rapporteur of the seminar. Seminar was attended by large number of researchers, scientists, academicians, students and managers from private and public sectors. In the end, Mr. Sair Sarwar, host of the seminar, acknowledged the logistic support by LRRI and financial by Pakistan Science Foundation.

2nd International Salinity Conference (ISC-2019) held at Department of Soil Science, UCA&ES, The Islamia University of Bahawalpur

The Second International Salinity Conference (ISC-2019) was organized by Department of Soil Science, University College of Agriculture & Environmental Sciences, The Islamia University of Bahawalpur. The two-day event brings together about 200 national and international delegates from Canada, Bahrain, Turkey, UAE. The Conference provides opportunity to international researchers, academicians, administrators, students and farmers to discuss and share expertise relevant to social and economic impacts of salinization. Prof. Dr. Muhammad Mukhtar, Rector Dadbhoy Institute of Higher



Education, Karachi and Prof. Dr. Asif Ali, Vice Chancellor MNS-UA Multan was the chief guests. Prof. Dr. Shabbir Ahmad Shahid (UAE) and Prof. Dr. Javed Akhtar (UAF) were invited speakers. Prof. Dr. Moazzam Jamil, Principal, University College of Agriculture & Environmental Sciences, The Islamia University of Bahawalpur said the conference will explore new dimensions and challenges to develop plants with improved salt tolerance and use of brackish water on sustainable basis. Conference focal person Dr. Ghulam Hassan Abbasi said conference will share theoretical and practical findings for the reclamation of salt affected lands and get sustainable production through saline agriculture.



Promotions/Appointment/Posting

Dr. Fayyaz Hussain, Dr. Muhammad Sarwar, Dr Ghulam Nabi and Dr. M. Mahmood-ul-Hassan, Principal Scientific Officers, Land Resources Research Institute, National Agricultural Research Centre, Islamabad have been promoted as Chief Scientific Officers.



Dr. Muhammad Munir Ahmad. Chief Scientific Officer/Director, Agricultural & Biological Engineering Institute, NARC (and life member of Soil Science Society of Pakistan) is posted as Director General, Planning & Development Division, Pakistan Agricultural Research Council, Islamabad.

Dr. Muhammad Arshadullah, Principal Scientific Officer, Land Resources Research Institute, NARC has been transferred and posted as PSO/Director, Directorate of Scientific Information and Publication, NARC, Islamabad.

Mr. Ahmad Khan, Principal Scientific Officer, Land Resources Research Institute, National Agricultural Research Centre, Islamabad has been posted as Program Leader, Soil Fertility and Plant Nitration Research Program, LRRI, NARC, Islamabad.

Dr. Khahid Mahmood, Assistant Agricultural Chemist (SF), Soil & Water Testing Laboratory, Toba Tek Singh has been promoted as Agricultural Chemist (BPS 18+ Rs. 165/SP) and posted as AC (Plant Nutrition), Soil Salinity Research Institute, Pindi Bhattian.

Mr. Khahid Mahmood, Assistant Agricultural Chemist (SF), Soil & Water Testing Laboratory, Rahim Yar Khan has been promoted as Agricultural Chemist (BPS 18+ Rs. 165/SP) and posted as AC (Water Quality), Soil Salinity Research Institute, Pindi Bhattian.

Mr. Muhammad Nadeem Iqbal, Assistant Soil Fertility Officer, Rapid Soil Fertility Survey and Soil Testing Institute, Lahore has been promoted as Soil Fertility Officer (BPS 18+ Rs. 165/SP) and posted in Ayub Agricultural Research Institute, Faisalabad.

Mr. Aleem Sarwar, Assistant Soil Fertility Officer, Soil & Water Testing Laboratory, AARI, Faisalabad has been promoted and posted as Agricultural Chemist (SF) (BPS 18+ Rs. 165/SP), Soil & Water Testing Laboratory, AARI, Faisalabad.

Dr. Abid Niaz, Assistant Agricultural Chemist (Soil), Soil Chemistry Section, AARI, Faisalabad has been promoted as Agricultural Chemist (BPS 18+ Rs. 165/SP) and posted as Associate Chemist, Soil Chemistry Section, AARI, Faisalabad

Dr. Rehmat Ullah, Assistant Soil Fertility Officer, Soil & Water Testing Laboratory, AARI, Faisalabad has been promoted and posted as Agricultural Chemist (SF) (BPS 18+ Rs. 165/SP), Soil & Water Testing Laboratory, AARI, Faisalabad.

Mr. Shahid Yaqoob Naz, Assistant Soil Fertility Officer, Soil & Water Testing Laboratory, Rawalpindi has been promoted as Soil Fertility Officer/Agricultural Chemist (SF) (BPS 18+ Rs. 165/SP).

Mr. Mumtaz Hussain Farooqi, Assistant, Agriculture Chemist (SF), Soil & Water Testing Laboratory, Dera Ghazi Khan has been entrusted additional charge of the Agricultural Chemist (SF) (BPS 18+ Rs. 165/SP), Soil & Water Testing Laboratory, Dera Ghazi Khan

Mr. Abdul Aleem Memon, Senior Scientist has been transferred to newly established Orchard Nutrients Management Research Institute, Mirpurkhas from Agriculture Research Institute, Tandojam.



Dr. Sanaullah Yasin, Scientific Officer, Cotton Research Station, Ghotki assumed the charge of Officer Incharge, Cotton Research Station, Ghotki. He has recently completed his PhD under the supervision of Dr. Hafiz Naeem Asghar, Institute of Soil & Environmental Sciences, University of Agriculture Faisalabad.

Dr. Shafaqat Ali, Assistant Professor (TTS) Department of Environmental Sciences and Engineering, Government College University, Faisalabad, has been promoted to Associate Professor (TTS).



Dr. Sabir Hussain, Assistant Professor (TTS) Department of Environmental Sciences and Engineering, Government College University, Faisalabad, has been promoted to Associate Professor (TTS).

Dr. Muhammad Riaz, Assistant Professor (TTS) Department of Environmental Sciences and Engineering, Government College University, Faisalabad, has been promoted to Associate Professor (TTS).

Dr. Tahira Yasmeen, Assistant Professor (TTS) Department of Environmental Sciences and Engineering, Government College University, Faisalabad, has been promoted to Associate Professor (TTS).



PhD Degrees

Dr. Ali Akbar Maitlo, Assistant Agriculture Chemist, Agriculture Research Institute, Tandojam has completed PhD degree from Institute of Agricultural Resources and Regional Planning, Chinese Academy of Agricultural Sciences, Beijing, P.R. China in the field of Soil Science. His PhD thesis was "Nitrogen use efficiency relates with soil fertility in Fluvo-aquic soil".



After PhD completion, he has joined back his parent Department.

Dr. Jhaman Das Suthar, PhD Scholar at Department of Soil Science, Sindh Agriculture University, Tandojam has successfully defended his PhD research on "Evaluating saline-water tolerance of cluster bean (*Cyamopsis tetragonoloba* L.) genotypes



of Pakistan". He worked under the supervision of Dr. Inayatullah Rajpar, Professor and Chairman, Department of Soil Science, Sindh Agriculture University, Tandojam. During his PhD research, he also availed HEC fellowship under International Research Support Initiative Program (IRSIP) at Texas A&M University, Texas, USA.

Dr. Muhammad Adnan, Lecturer, Department of Agriculture, University of Swabi, has successfully completed PhD under the supervision of Prof. Dr. Zahir Shah. University of Agriculture, Peshawar. He conducted his PhD research on "Exploring the role of phosphate solubilizing bacteria in phosphorus availability from organic and inorganic sources in soil with varying levels of lime".



Awards

Mr. Nizakat Ali Kandhro, M.Sc Student, Department of Soil Science, Sindh Agriculture University, Tandojam has received 3rd Best Poster Award during 6th International Conference on "Sustainable Agriculture in Changing Climate: Strategies and Management held on 19-21 June, 2019 at University of Poonch, Rawalakot.



Publications

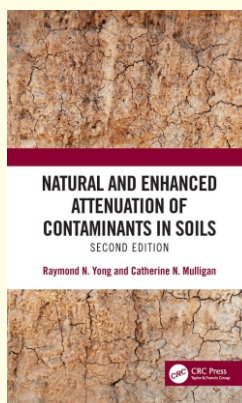
Urbanization: Challenge and Opportunity for Soil Functions and Ecosystem Services. Edited by Viacheslav Vasenev, Elvira Dovletyarova, Zhongqi Cheng, Tatiana V. Prokofeva, Jean Louis Morel, and Nadezhda D. Ananyeva. Published in the Springer Geographybook series, 2019.

This proceedings book discusses the monitoring, analysis and assessment of the effects of urbanization on soil functions and services. Further, it helps to find solutions to the environmental consequences of urbanization and discusses best management practices such as management and design of urban green infrastructure, waste management, water purification, and reclamation and remediation of contaminated soils in the context of sustainable urban development.



Natural and Enhanced Attenuation of Contaminants in Soils (2nd Edition). Raymond N. Yong, Catherine N. Mulligan. Published by CRC Press, April 23, 2019, 308 pages.

Natural attenuation has become an effective and low-cost alternative to more expensive engineered remediation. This new edition updates the principles and fundamentals of natural attenuation of contaminants with a broader view of the field. It includes new methods for evaluating natural attenuation mechanisms and microbial activity at the lab and field scales. It discussed case studies, actual treatments and protocols, theoretical processes, numerical models, and legal aspects in the natural attenuation of organic and inorganic contaminants are examined. Challenges and future directions for the implementation of natural attenuation and enhanced remediation techniques are also considered.



Retirements

Dr. Ghulam Nabi, Chief Scientific Officer, Land Resources Research Institute, retired from NARC, Islamabad on June 20, 2019 after serving 33 years of professional career. Dr. Nabi did his B. Sc. (Hons.) Agri. M.Sc. (Hons.) from University of Agriculture Faisalabad in 1983 and 1985, respectively. He completed Ph. D. from University of Aberdeen,



UK in 1998. He started his professional career by joining PARC as Scientific Officer in 1986. He worked on different issues of national interest and generated valuable data. Initially, he worked on sulfur nutrition of oilseed crops and its

management under barani areas. Later on he focused on soil physical constraints to plant growth and its amelioration through better soil management practices. His main research interest included changes in soil physical and hydraulic characters under zero till wheat sowing, rice residue management in rice wheat system, soil carbon sequestration and impacts of tillage, green manuring and irrigation on soil quality, temporal variability and crop productivity under different soil moisture regimes. Dr. Nabi executed a number of research projects as team member, and as project Incharge and published more than 70 research articles in various Journal of national and international repute, conference proceedings and reports.

Dr. Nabi has supervised one Ph.D. and 3 M.Sc. (Hons) student. He is life member to Soil Science Society of Pakistan and voluntarily served the Society in various positions including Joint/General secretary, Councilor and as well as Editor Soil Science News during different times in past.

Mr. Shahid Yaqoob Naz, Soil Fertility Officer/Agricultural Chemist, Soil & Water Testing Laboratory, Rawalpindi has been retired from government services on 19-05-2019 on attaining the age of superannuation.

We pray for good health and prosperous retired lives of our respected colleagues.

4 per 1000: An ambitious Initiative

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The increase in SOC stock by 0.4% per year would provide a global SOC sequestration of 2.8 and 3.4 GtC·yr⁻¹ over 0–30 and 0–40 cm, respectively. These values are in the range (2.6–5.0 GtC·yr⁻¹) of technical SOC sequestration rates with 1.2 GtC yr⁻¹ from all agricultural soils. These rates can only be achievable when harnessing all land use types and combining different sequestration practices to maximize soil C gains. However, the increase of SOC at a rate of 0.4% per year is not plausible in most of the practical situation because of:

- Soil carbon sequestration saturation and potential. The results of long-term experiments (started in 1972), conducted by Indian Council of Agricultural Research in different part of India, revealed that maximum of 300 kg ha⁻¹ yr⁻¹ carbon sequestration was achieved

with best possible management practices (15 tones FYM + recommended doses of NPK).

- In country like Pakistan, farmers do not have the necessary organic amendments resources available, e.g. insufficient manure due to lack of animals or insufficient crop residues because they are required for other purposes.
- Implementation of 4 per 1000 initiative on all agricultural soils would require a SOC sequestration @ 1200 Tg C yr⁻¹. Assuming an average C-to-N, P and S ratios of 12:50:70 in SOM, this would require 100 Tg N yr⁻¹. This equals an increase of ~75% of current global N-fertilizer production, or extra symbiotic N₂ fixation rates equaling twice the current amount in all agricultural systems. Similarly, 24 Tg phosphorus yr⁻¹ and 15 Tg sulfur yr⁻¹ should also be required.
- In developed countries (European and North American), the practice (return of crop residues to soil) is already widely used (and soil are near to soil carbon saturation) giving limited scope for achieving increased SOC accumulation through 4 per 1000 adoption.
- The necessary change of management, for adoption of 4 per 1000, could be uneconomic to the farmer or impractical for some other reason. The implementation such changes would probably require changes in government policies and regulations.




CALL FOR PAPERS

18th INTERNATIONAL CONGRESS OF SOIL SCIENCE

Wise Soil Management Ensures Better Environment and Livelihood

11-13 February 2020, Sindh Agriculture University Tandojam, Pakistan



Important Dates

October 30, 2019	Last date of receipt of abstracts (as per given format) and registration forms
December 15, 2019	Notification of accepted abstracts
January 5, 2020	Last date for receipt of accommodation reservation requests

Organized By:

Soil Science Society of Pakistan

In Collaboration with:

Sindh Agriculture University, Tandojam, Pakistan

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News and Views for next issue of the 'Soil Science News' may be conveyed to Society office bearers of your chapter or to **Dr. M. Mahmood-ul-Hassan** (mmh@comsats.net.pk), Editor/ **Dr. Azhar Hussain** (azharhaseen@gmail.com), Assoc. Editor, Soil Science News. The news can also be mailed at info@sss-pakistan.org