THE OHIO STATE UNIVERSITY

Carbon Management and Sequestration Center

Issue 4 | 2017

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World Soil Day at C-MASC

C-MASC celebrated World Soils Day on 5th December 2017. Photographed above (left to right): Rattan Lal, Boris Boincean, Tarik Mitran, Zhenwei Song, Ellen Maas, Basant Rimal, Nall Mooninlall, Kristine Samoy-Pascaul, Milson Serafim, Beau Ingle, David Ussiri, Muhammad Shaukat, Manman Fan, Jingtao Yao, and Laura Conover.

World Soil day celebrates the importance of soil as a critical component of the natural system and as a vital contributor to the human commonwealth through its contribution to food, water and energy security and as a mitigator of biodiversity loss and climate change. It is celebrated particularly by the global community of 60,000 soil scientists charged with responsibility of generating and communicating soil knowledge for the common good. many events focused on increasing the public awareness of soil and its contribution to humanity and the environment.

It is held on December 5th because it corresponds with the official birthday of H.M. King Bhumibol Adulyadej ,The King of Thailand, who has officially sanctioned the event. The FAO Conference in June 2013 unanimously endorsed World Soil Day on 5th December and requested the 68th UNGA to have it officially adopted.

Photographed (right) is Prof. Boris Boincean (Alecu Russo University, Balti, Moldova) discussing the importance of restoring soil health to addressing issues of global significance (e.g., food security, biodiversity, water quality, energy efficiency). Prof. Boincean is writing a book on “Sustainable Soil Management.”

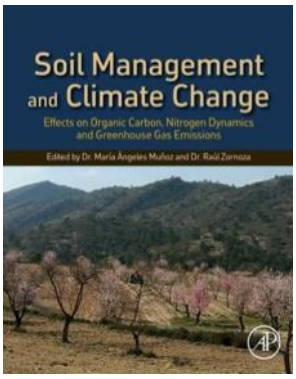
C-MASC Alumni

MARIA A. MUÑOZ

Project Manager
Ramiro Arnedo S.A.
Spain

Recent Publication:

Muñoz, M. & R. Zornoza. 2017. Soil Management and Climate Change: Effects on Organic Carbon, Nitrogen Dynamics, and Greenhouse Gas Emissions. 1st Edition, Elsevier Academic Press, 396 pp. ISBN: 9780128121283



Dr. Maria A. Muñoz was a Visiting Scholar at C-MASC from May-September 2015, and is working as a R&D Project Manager in **Ramiro Arnedo S.A.** (Spain). Ramiro Arnedo S.A. was founded over 75 years ago and began as a seed seller but for more than two decades the company bets strongly for knowledge as the main wealth generator as well as the company internationalization. This effort is managed by a young and highly qualified team and has led to the development and introduction of many new and improved varieties of lettuce, pepper, eggplant, artichoke, onion and melon, among others. To carry out the R&D activities, Ramiro Arnedo S.A. has three major Research Stations in Spain with open air crops and highly technician greenhouses. She has recently published the book entitled "Soil Management and Climate Change" which includes Dr. Rattan Lal´s invaluable collaboration.

ADAM SELHORST

Dean of the College of Liberal Arts
Ashford University
San Diego, CA

Following my graduation from the Environmental Science Graduate Program, OSU I took on a faculty role in the Environmental Science program at Ashford University in San Diego, CA. I was soon promoted to the Chair of the program and used my role to build one of the largest online Environmental Science programs in the United States with enrollments reaching over 700 students. In 2014 I took over as the Dean of the College of Liberal Arts which houses not only the Environmental Science program but also 20 additional in the humanities and social sciences with a total enrollment of over 10,000 students.

While I continue to occasionally publish in the field of soil science with Dr. Lal, my larger focus is on distance education and how to better empower minority and under-represented groups through education and environmental awareness. I attribute much of my success to the rigorous education and training I received at OSU and especially through my work with Dr. Lal in the CMASC lab where I honed my ability to think critically and evaluate the totality of any given situation. I would invite anyone interested in learning more about distance education in the environmental field to reach out to me anytime at adam.selhorst@ashford.edu or at selhorsta@gmail.com.

RICARDO BORDONAL

CTBE/CNPEM
São Paulo, Brazil

Recent Publication:

Bordonal, R.D., R. Lal, C.C. Ronquim, E.B. De Figueiredo, J.L.N. Carvalho, W. Maldonado, D. Milori and N. La Scala. 2017. Changes in quantity and quality of soil carbon due to the land-use conversion to sugarcane (saccharum officinarum) plantation in southern brazil. Agriculture Ecosystems & Environment 240: 54-65.

SIMI MEHTA

University of Delhi
New Delhi, India

Recent Publications:

Mehta, S., R. Lal, D. Hansen. 2017. US Land-grant universities in India: assessing the consequences of agricultural partnership, 1952-1972. International Journal of Educational Development 53:58-70.

Mehta, S., R. Lal, D. Hansen. 2017. From traditional agriculture to flourishing agribusiness – tracing the contours of R&D partnerships in Punjab agriculture. Center for Research in Rural and Industrial Development (CRRID). National Seminar on Agribusiness of Punjab State. 11 October 2017, Chandigarh, India.

C-MASC Alumni

Ricard Bordonal's Thesis Award

Every year, the Coordination for the Improvement of Higher Level Education (CAPES) rewards the best doctoral theses defended in the entire country and its respective scientific papers across each of the 48 areas of knowledge recognized by CAPES in graduate courses. My PhD thesis "**Greenhouse gas balance associated with sugarcane production in south-central Brazil, considering the management and expansion"** received an honorable mention (CAPES Thesis Award 2017) in the category "Agricultural Sciences I". The award ceremony was held in the last week, on 7th December 2017, in Brasília.

A special thanks to both my advisor Dr. La Scala and co-advisor Dr. Lal, for offering the opportunity for my personal, scientific and professional developments. The valuable guidance, discussion and contribution during the doctoral period in Brazil and US were really important to reach this goal.

Simi Mehta received a PhD degree from the University of Delhi, New Delhi, India. Photographed above is the viva-voce that was held on Oct 16, 2017. External Examiners were: Prof. Annapura Nautiyal (Dept. of Political Science, HNB Garhwal University, Uttarakhand, India) and Prof. Arvind Kumar (Head, Dept. of Geopolitics and International Relations, Manipal University, India).

Simi's thesis was titled "US-India Agricultural Cooperation: Perspectives, Issues and Challenges, 1996-2012," and this was the topic of her research during her time as a Visiting Scholar at C-MASC from 1st September 2015 to 31st May 2016, under the Fulbright-Nehru Doctoral Research Fellowship. She is currently teaching at the University of Delhi.

12th International Research Exposition

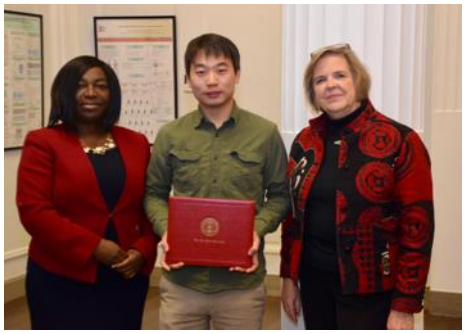
Office of International Affairs
Columbus, OH
17 November 2017

The International Scholar Research Exposition showcases some of the world-class research undertaken by the more than 1,800 international visiting scholars at The Ohio State University. This exposition recognizes the scholars presence on campus and the significant contribution they make to the university and the global community.

Fulbright Scholar Enrichment Seminar

University of San Diego
San Diego, CA
13-16 December 2017

Visiting Scholars



Visiting Scholars Tarik Mitran and Jingtao Yao presented their research at the Office of International Affairs, 12th International Research Exposition, on 17th November 2017. Tarik Mitran (photographed top right with Dr. Gifty Ako-Adounvo, Vice Provost, and Dr. Caroline Whitacre, Senior Vice President for Research) presented his research on "Spatial prediction of soil carbon using satellite based indices and geo-statistical modeling approaches." Jingtao Yao (photographed bottom right with Dr. AkoAdounvo and Dr. Whitacre) presented his research on "Land-use optimization to improve the carbon holding capacity of soil in Beijing, China."

Dr. Boris Boincean attended a Scholar Enrichment Seminar on competitive basis for Fulbright program participants, organized by the Fulbright program of US Department of State. The seminar was held in San Diego, California at the San Diego State University from December 13-16, 2017.
The topic of the seminar was "Leveraging strategic innovation and entrepreneurship for long term success."

Representatives from 90 countries participated in the seminar. The event was very useful for improving both research and educational skills in order to provide mutual understanding between future policymakers in accordance with the United Nation Sustainable Development Goals.

New Visiting Scholars

ZHENWEI SONG

Associate Professor
Chinese Academy of Agricultural Sciences
Beijing, China

Dr. Zhenwei Song is an associate professor of Institute of Crop Sciences, Chinese Academy of Agricultural Sciences (ICS, CAAS). He completed his Ph.D. in farming system from China Agricultural University. During Sept. 2007 to Setp. 2008, he was a visiting scholar in Department of Land, Air, and Water Resources at University of California, Davis.

In recent years, his research focuses on agro-ecosystem and farming system. He is interested in sustainable crop production with high yield, high resource yield, high resources use efficiency, and low environmental costs; soil carbon sequestration and greenhouse emission in different cropping systems such as rotation, intercropping; as well as the response of crop growth, soil carbon and nitrogen cycling to climate change. He has several projects funded by National Natural Science Foundation of China (NSFC), Ministry of Science and Technology of China (MOST), and Global Environmental Facility (GEF).

In October, 2017, he joined the Carbon Management and Sequestration Center (C-MASC) as a visiting scholar. He hopes to come to a better understanding of soil carbon cycling in agro-ecosystem at C-MASC, and to promote scientific exchange and cooperation between ICS, CAAS and C-MASC, Ohio State University.

MUHAMMAD SHAUKAT

Ph.D Student
University of Agric., Faisalabad
Faisalabad, Pakistan

Signature areas

- Climate Change Impact Assessment
- Application of Crop Growth Modeling
- Soil Carbon Sequestration

Research Interests

- Carbon and Nitrogen Dynamics in Relation to GHGs Emission
- Sustainable Management of Agro-Ecosystems
- Modeling the Impact of Management Strategies on Growth, Development and Final Output of Crops
- Low Emission Development
- Abiotic Stresses and Their Management

I am a PhD scholar from Department of Agronomy, University of Agriculture, Faisalabad (UAF)-Pakistan. I am an awardee of International research support initiative programme (IRSIP) funded by Higher Education commission (HEC)-Pakistan. I joined the Carbon Management and Sequestration Center (C-MASC), Ohio State University (OSU), USA on October 07, 2017 for the period of six months. I have set-up a pot experiment on "Assessing greenhouse gases mitigation potential of biochar in rice culture" at Kottman Hall greenhouse.

I have also performed my duties as research assistant and research officer in **Agricultural Model Inter-comparison and Improvement Project (AgMIP)-Pakistan Phase-I and Phase-II respectively. Furthermore, I have completed two years field experiments at university research area, UAF-Pakistan. The title of PhD dissertation is** *"Assessing Carbon Sequestration Potential of Tillage and Nutrient Management Practices in Rice-Wheat Cropping System using Modeling Approach".*

About the Borlaug Fellowship Program:

The Borlaug International Agricultural Science and Technology Fellowship Program promotes food security and economic growth by providing training and collaborative research opportunities to fellows from developing and middle-income countries.

Since the program's inception in 2004, approximately 800 fellows from 64 countries have participated in research and training focused on a wide array of agriculture-related topics.

In 2017, C-MASC hosted three Borlaug Fellows: Cristina Chinchilla Soto (University of Costa Rica, San Jose, Costa Rica), Somanagouda Patil (International Center for Agricultural Research in the Dry Areas, Rabat, Morocco), and Kristine Samoy-Pascual (Philippine Rice Research Institute, Los Baños, Philippines).

Exiting Visiting Scholars

Tarik Mitran

National Remote sensing Centre
Indian Space Research Organization
Hyderabad, India

Dr. Mitran joined C-MASC from 13th January 2017 – 3rd January 2018 studying under the *SERB Indo-US Postdoctoral Fellowship Program: 2016 by Science and Engineering Research Board (SERB) & Indo-US Science and Technology Forum (IUSSTF), India*. He studied themes of "Assessing spatial pattern of carbon sequestration potential of selective soils of India through Geospatial technology and Modelling approach," and was presented a Certificate of Recognition at his farewell event on 18th December 2017.

Frederico Terra de Almeida

Professor
UFMT – SINOP,
Mato Grosso, Brazil

Dr. Frederico Terra de Almeida joined C-MASC from August – December 2017 studying under the *Universidade Federal de Mato Grosso — Campus Sinop*. He studied themes of "Models of soil loss prediction based on USLE: A Review," and was presented a Certificate of Recognition by Prof. Lal with Mike Chrisman at his farewell event on 18th December 2017.

Kristine Samoy-Pascual

Senior Science Research Specialist
Philippine Rice Research Institute
Philippines

Dr. Kristine Samoy-Pascual joined C-MASC from 18th September – 15th December 2017 studying under the *The Norman E. Borlaug International Agricultural Science and Technology Fellowship Program*. She studied themes of "Climate-Smart Agriculture: Research wetting-dry production system to sustain rice yield and reduce methane emissions," and was presented a Certificate of Recognition by Prof. Lal with Beau Ingle at her farewell event on 5th December 2017.

LIVELIHOODS FUNDS ACT TODAY FOR A BETTER FUTURE

The Livelihoods funds are supported by private companies who believe in working and learning together to effect change. They believe practical, efficient and replicable solutions build more resilient communities and ecosystems, and sustainable businesses.

patagonia

Mission Statement: Build the best product, cause no unnecessary harm, use business to inspire and implement solutions to the environmental crisis.

Oxfam

Oxfam is a global organization working to end the injustice of poverty. They help people build better futures for themselves, hold the powerful accountable, and save lives in disasters. Their mission is to tackle the root causes of poverty and create lasting solutions.

C-MASC at COP 23, Bonn, Germany

Panelists and presenters at the event "There is Hope in Soil" organized the Danone Co. in Bonn are (above, from right to left): Eric Soubeiran (Danone), Rattan Lal (OSU), Bernard Girad (Livelihoods Funds), Rick Ridgeway (Vice President of Patagonia), Raijeli Nicole (Oxfam) Emanuel Faber (CEO of Danone), Vincent Crasnier (Danone).

Soil scientists are conducting research on assessing the potential of regional, national and global soils on sequestration of atmosphere CO_2 for adaptation and mitigation of climate change, advancing food and nutritional security, and improving water quality and renewability. Professor Rattan Lal, Director of the Carbon Management and Sequestration Center, was invited to the COP23 Summit in Bonn. He was the Keynote Speaker at three global events. (1) "4 Per Thousand" organized by the French Government since the COP21 Climate Summit in Paris, in which Professor Lal made a presentation entitled "Soil Organic Carbon for Climate, Food and Peace" (Photo 1, 2). The session was attended by policy makers from Europe and around the world, (2) "One World No Hunger in a Changing Climate" organized by the German Government (BMZ and GIZ) in which Professor Lal made a presentation entitled "Translating Science into Policy." His presentation specifically addressed two questions: (i) How to save land, water and energy for nature, and (ii) How to incentivize land managers through payments for ecosystem services. (3) Danone, the France-based yogurt company, organized an event entitled "There is Hope in Soil" in which Professor Lal's presentation was entitled "The Soil-Centric Agronomic Management" (Photo 3). During this event, Professor Lal also met the CEO of Danone and Vice President of Patagonia (Photo 4) and Minister of Agriculture of France (Photo 5).

The aim of the initiative is to demonstrate that agriculture, and in particular agricultural soils can play a crucial role where food security and climate change are concerned.

An annual growth rate of 0.4% in the soil carbon stocks, or 4% per year, would halt the increase in the CO2 concentration in the atmosphere related to human activities.

4 PER 1000
SOILS FOR FOOD SECURITY AND CLIMATE

COP 23 (continued)

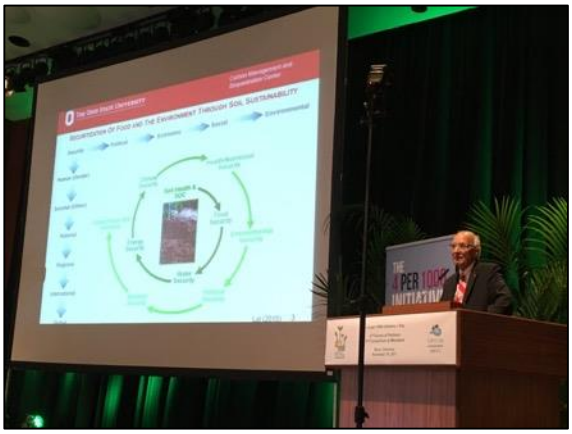


Photo 1. Keynote presentation on 16th November at the "4 per Thousand" event organized by the French government. In this picture, Prof. Lal is pointing out the significance of soil health to security of food and nutrition, climate, water quality and renewability, and energy. He emphasized that restoration of soil health through carbon sequestration is also critical to national, regional and international security. Indeed, when people are poverty stricken, miserable and desperate, they pass on their sufferings to the soil.

Photo 2. Overview of the conference room at the time when Prof. Lal presented his lecture at the "4 Per Thousand" event. Seated at the podium are Mr. Stéphane Le Foll (former Minister of Agriculture of France, who visited Ohio State in 2015), Dr. Ibrahim Mayaki (former Prime Minister of Niger, Member of African Union), and Dr. Paul Luu (coordinator of 4 Per Thousand).

Photo 3. Presentation of Prof. Lal at the event called "There is Hope in Soil" was convened by Danone. The session was coordinated by Mr. Eric Soubeiran (Director Global Nature and Climate, Danone). The opening presentations at the event were made by Mr. Stephane Travert (French Minister of Agriculture) and Mr. Emanuel Faber (CEO of Danone).

DANONE
ONE PLANET. ONE HEALTH

Dannon's Mission:

To bring health through food to as many people as possible. Our ambition is to foster healthier eating practices that are reflective of local cultures and agricultural systems, in balance with nature's ecosystem and that sustains the ability to produce food for many generations to come.

COP23 (continued)

Photo 4. Mr. Emanuel Faber (CEO of Danone), Prof. Rattan Lal (OSU) Mr. Rick Ridgeway (Vice President of Patagonia), and Mr. Eric Soubeiran discussing the importance of soil health just before the event "There is Hope in Soil". Patagonia has a program of regenerative agriculture for production of cotton by small landholder farmers in India.

Photo 5. Mr. Stephane Travert (French Minister of Agriculture) discussing the "4 Per Thousand" and the Danone Emission Neutral Pledge with Prof. Lal and Mr. Eric Soubeiran.

Much of ICSU's work on science for policy takes place at the international level, working with the United Nations (UN), predominantly through the 'Major Groups' model of participation, in which ICSU works as organizing partner for the Scientific and Technological Community Major Group.

ICSU's activities in this arena ranges from:

- Sustainable Development Goals (SDGs)
- Disaster Risk Reduction
- Climate change
- Urbanization
- Biodiversity

INTERNATIONAL COUNCIL FOR SCIENCE

ICSU Conference

Taipei, Taiwan
23-24 October 2017

The International Council of Scientific Unions (ICSU) has been merged with International Social Science Council (ISSC). The decision about the merger was mat at the joint meeting of both in Taipei on 23-24 October 2017. The name of the new organization is International Council of Science. The ICS is devoted to international cooperation in the advancement of science. Its members are national scientific bodies and international scientific unions. As of 2017. it comprises 122 multi-disciplinary national scientific members, associates, and observers representing 142 countries and 31 international unions. Its mission is:

1. *Identify and address major issues of important to science and society,*
2. *Facilitate interaction among scientists across all disciplines, from all countries.*
3. *Promote the participation of all scientists in the international scientific endeavor, and*
4. *Provide independent, authoritative advise to stimulate constructive dialog between the scientific community and governments, civil society and the private sector.*

The U.S. delegation was led by NAS Foreign Secretary and included staff of the NAS. The IUSS delegation consisted of Prof. Rattan Lal (President), Prof. Rainer Horn (Past President) and Prof. Takashi Kosaki (Incoming President).

Ben-Gurion University of the Negev
Beer-Sheva, Israel

The university has three main campuses, around 20,000 students, and 4,000 faculty members. It ranked 46th in the world rankings of universities with sustainable policies, and operates programs to promote awareness of environmental protection, a reduction in the use of resources, energy efficiency, promotion of research and wide-ranging educational and community activities.

Deserts, Drylands and Desertification

Ben Gurion University of the Negev
6-9 November 2017

DDD Drylands, Deserts & Desertification

United Nations Convention to Combat Desertification

Ben-Gurion University of the Negev

The Jacob Blaustein Institutes for Desert Research

The International Conference on Drylands, Deserts and Desertification (DDD) has emerged as an important global gathering of scientists, practitioners, industry and government representatives and decision-makers, members of CSOs, NGOs, and international development aid agencies and other stakeholders from over 60 countries concerned about land and environmental degradation in drylands and living conditions in and around them, as well as their sustainable use and development.

The 6th DDD conference will focus on Combating Desertification and Dryland Management—Theory and Practice. Additional sessions will be held considering a broad range of topics associated with sustainable living in the drylands and means to address desertification, as well as achieving the target of a zero net rate of land degradation.

Photographed (right): Dr. Lal presents on "The Importance of Organic Matter in Soils of Dryland Ecosystems" and "Carbon sequestration for combating Desertification in Drylands."

Farmers Association of Mato Grosso

Ohio State University
16-17 October 2017

The world's largest soybean farm is in Mato Grosso, Brazil. The Bom Futuro farm, founded in 1982, grows 555,000 acres of soybean, 170,000 acres of cotton and 260,000 acres of corn. The farm also raises 50,000 heads of cattle. The average soybean yield is 53 bushels/acre.

C-MASC Visitors

Farmers Association of Mato Grosso has 4,000 farmer members. Its objective it to improve the farmers' economic, social, and environmental sustainability. Thirteen farmer members visited OSU on 16th October and participated in a seminar organized by the faculty from FAES. Staff and faculty participants from OSU included those from C-MASC (Laura Conover, Frederico Almeida, Milson Serafim, Boris Boincean, and Rattan Lal), Crop and Horticultural Science Department (Mark Sulc), and IPA (Mike Chrisman). The farmers also visited the farm of Mr. Bill Richards in southern Ohio.

Leaders of the Farmers Association met with Prof. Lal to discuss potential cooperation on soil carbon sequestration, soil health restoration, and identifying techniques of reducing the use of agrochemicals, while sustaining productivity of soils of the Cerrado region

Books Edited

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2. Lal, R. & B.A. Stewart (Eds). 2017. Urban Soils. Taylor & Francis, Boca Raton, FL, 400 pp.
3. Sejian, V., R. Bhatta, J. Gaughan, P.K. Malik, S.M.K Naqvi, R. Lal (Eds). 2017. Sheep Production Adapting to Climate Change. Springer, Singapore, 441 pp.
4. Ussiri, D.A.N, R. Lal. 2017. Carbon Sequestration for Climate Change Mitigation and Adaptation. Springer, Cham, 549 pp.

Referred Journal Articles

5. Anghinoni, G., C.A. Tormena, R. Lal, W.H. Moreria, E.B. Júnior, C.J.B. Ferreira. 2017. Within cropping season changes in soil physical properties under no-till in Southern Brazil. Soil and Tillage Research 166:108-112.
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7. Bordonal, R.D., R. Lal, C.C. Ronquim, E.B. De Figueiredo, J.L.N. Carvalho, W. Maldonado, D. Milori and N. La Scala. 2017. Changes in quantity and quality of soil carbon due to the land-use conversion to sugarcane (saccharum officinarum) plantation in southern brazil. Agriculture Ecosystems & Environment 240: 54-65.
8. Daigh, A.L.M., W.A. Dick, M.J. Helmers, R. Lal, J.G. Lauer, E. Nafziger, C.H. Pederson, J. Strock, M. Villamil, A. Mukherjee, R. Cruse. 2017. Yields and yield stability of no-till and chisel-plow fields in the Midwestern US Corn Belt. Field Crops Research (In press)
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13. Hussain, M., S. Ahmad, S. Hussain, R. Lal, S. Ul-Allan, A. Nawaz. 2017. Rice in saline soils: physiology, biochemistry, genetics, and management. Advances in Agronomy doi.org/10.1016/bs.agron.2017.11.002
14. Hussain, S., M. Maqsood, R. Lal, M. Hussain, M.A. Sarwar, M. Bashair, A. Ullah and I. Ul Haq. 2017. Integrated nutrient management strategies to alleviate drought stress in hybrid maize in punjab, pakistan. Romanian Agricultural Research 34: 233-42.
15. Jat, B.L., K.K. Dahiya, R. Lal and R. Niwas. 2017. Effect of weather parameters on seasonal incidence of pod borer complex in pigeonpea. Journal of Agrometeorology 19(3): 255-58.
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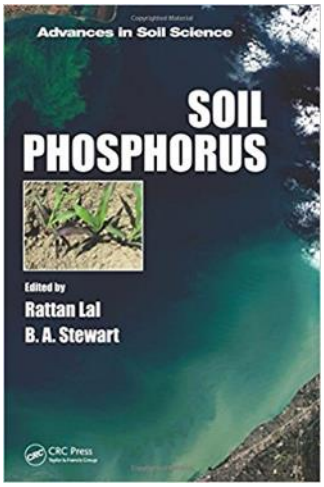

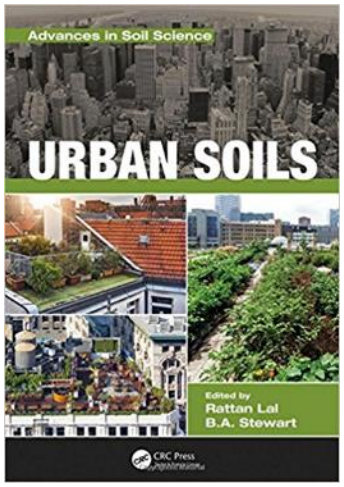

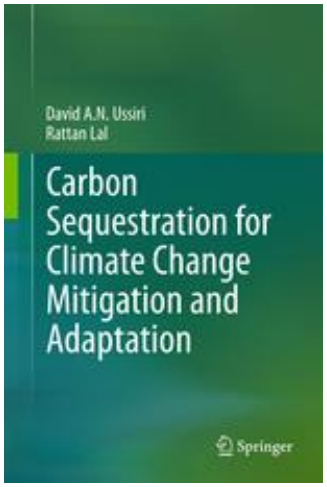

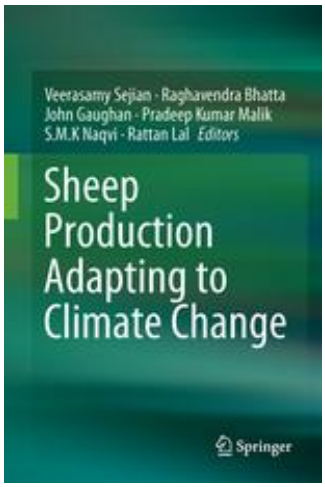

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