



Carbon Management & Sequestration Center

Issue 2:2014



C-MASC gathers for their weekly seminar. From left to right: Dr. Rattan Lal (Director), Dr. Richard Liu (Post Doc), Dr. Jose Guzman (Post Doc), Klaus Lorenz (Assistant Director), Dr. Atanu Mukherjee (Post Doc), Dr. David Ussiri (Research Scientist), Dr. Sudhir Verma (VS - India), Dr. Jin He (VS - China), Dr. Hrittick Biswas (VS - India), Dr. Rajesh Kaushal (VS – India), Jennifer Donovan (Staff), Chris Eidson (M.Sc student), Ricardo de Olivera Bordonal (VS – Brazil), Dr. Vincent de Paul Obade (Post Doc), Clever Briedis (VS – Brazil), Reed Johnson (M.Sc student), Yiming Zhao (M.Sc student), and Dr. Toru Nakajima (Post Doc).



International Union of Soil Sciences

Dr. Rattan Lal, President Elect of IUSS

Congratulations to Rattan Lal, Distinguished University Professor of soil science in the School of Environment and Natural Resources, who was named president-elect of the Vienna, Austria-based International Union of Soil Sciences. The official announcement was made June 10 in Jeju, South Korea.

The society's 16,000 members are soil scientists from around the world. It's current president is Rainer Horn of Kiel, Germany. It's past president is Jae Yang of Korea.

Recently, Dr. Lal served on the 60-member U.S. National Climate Assessment and Development Advisory Committee (NCADAC).

<http://www.iuss.org/>

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Visiting Scholars - An Integral Component of C-MASC



Dr. Gurmeet Singh Dheri

gsdheri@pau.edu

November 2013 – April 2014



Dr. Gurmeet Singh Dheri, Assistant Soil Chemist at Department of Soil Science, Punjab Agricultural University (PAU), Ludhiana, Punjab, visited C-MASC at OSU from 1st November 2013 to 30th April 2014 under the fellowship of “Training of PAU faculty members in new technologies” sponsored by Punjab Agricultural University.

During his visit to C-MASC, Dr. GS Dheri investigated the effect of fertilizer types, water quality and tillage on greenhouse gas emissions. He conducted a greenhouse experiment to evaluate the effect of urea, ammonium nitrate, sulphur-coated urea and compost on gaseous concentration in soil air under corn cultivation using Gas Chromatograph technique. He showed that selection of fertilizer can lower the N₂O concentration in soil air without compromising the crop productivity. He has used the Photoacoustic Spectrometry techniques to study the effect of water quality and soil amendments on N₂O emissions during incubation study in laboratory. He also monitored greenhouse emissions from long term tillage and compaction experiment at Waterman Farm during winter season.

In the laboratory, he was acquainted with different sophisticated equipment like Gas Chromatograph, Photoacoustic Spectrometer, CN analyzer, TOC analyzer, FIA, Yoder apparatus, Centrifuge etc. and technique of soil air sampling.

As part of his research and training at C-MASC he attended weekly seminars and also presented seminars entitled “Effect of N fertilizers and irrigation water salinity-sodicity on N₂O emission.” He also presented his future line of work to study the emissions of N₂O from salt affected soils. Dr. Dheri attended SENR classes of “Soils and Climate Change” and “Environmental Soil Physics” taught by Dr. Rattan Lal. He visited the experimental farm of North Appalachian Experimental Watersheds (NAEW) near Coshocton at The Ohio Agricultural Research and Development Center (OARDC), Wilds and experiments on restoration of mine soils.

He wrote two manuscripts on the basis of research work done at OSU and one manuscript from the work done at PAU. Dr Rattan Lal invited him to contribute two chapters for Encyclopedia of Soil Science. He actively participated in the discussion with C-MASC research team on various research topics and learned how to calculate greenhouse inventory using IPCC guidelines. He attended various recreational and cultural activities offered at OSU including Taste of OSU, Thanksgiving, and a visit to COSI, etc.

The study conducted at CMASC trained him to plan experiments on greenhouse gas emission and carbon sequestration in relation to soil and climate change scenario of India. The instrumental and analytical skills gained at C-MASC will help him to handle sophisticated equipment of greenhouse gasses emission. Dr. Dheri is looking forward to developing a collective research proposal to investigate the N₂O emissions and mitigation opportunities in corn cultivation.





Visiting Scholars - An Integral Component of C-MASC



Dr. Jin He is an associate professor in College of Engineering, China Agricultural University, and Conservation Tillage Research Center (CTRC), Chinese Ministry of Agriculture. His short visit to C-MASC, OSU, was funded by Program for Changjiang Scholars and Innovative Research Team in University of China (Grant No. IRT13039). His expertise is in Conservation Agriculture (CA) farming systems and machine development for CA. During his short stay, he had the chance to visit the longest no tillage (since 1962) field in the world in Wooster. He also visited the experimental stations in Zanesville and Hoytville. From these field trips, he understood the positive effects of long-term CA on C sequestration in USA, and received a wealth of information for soil and GHGs sampling and analyzing.

Under the guidance of Dr. Rattan Lal, he reviewed the positive effects of CA on soil erosion, soil restoration, and agricultural productivity in China. The experience in C-MASC will enriched Dr. Jin He's knowledge on mechanisms of soil carbon sequestration and GHGs emission under CA. Dr. He believes this experience will be helpful in his future work.

Dr. Jin He wishes that his team (CTRC) will have the chance to cooperate with Dr. Rattan Lal and C-MASC for future research, publications and scientific communication.

Dr. Jin He

hejin@cau.edu.cn

19th May 2014 -

6th June 2014





Visiting Scholars - An Integral Component of C-MASC



Dr. Rajesh Kaushal is a Senior Scientist (Forestry) at Central Soil & Water Conservation Research & Training Institute (CSWCRTI), Dehradun, India studying under scholarship from National Agricultural Innovation Project (NAIP) of Indian Council of Agricultural Research (ICAR) under theme “Carbon Trading/Carbon Sequestration/ Climate Change (Natural Resource Management)”.

While at C-MASC as a short-term visiting scholar from May 14 – June 13, 2014, Dr. Kaushal focused on learning various analytical techniques for field level monitoring of CO₂ emission using Photoacoustic Spectrometer (PAS) and Infra-red CO₂ gas analyzer (LICR-6400). His lab work while at OSU included analyzing soil samples for soil aggregate stability, total soil carbon and other soil physical properties.

Dr. Kaushal was provided field exposure through visits to Waterman Farm, OSU; biofuel experiment on mine spoils, Zanesville; long-term no-tillage experiments at Wooster Campus; lysimeter and USDA research experiments at North Appalachian Experimental Watersheds (NAEW), Coshocton (OARDC) and eco-restoration activities at wildlife conservation center located in Muskingum County, Ohio (WILDS).

Dr. Kaushal delivered a seminar entitled “Potential of Short Rotation Forestry in Carbon Sequestration” and also took part in the weekly group seminars. With guidance from Dr. Lal, he prepared one manuscript from his earlier works.

C-MASC provided Dr. Kaushal a platform to meet many scientists and scholars working in the field of carbon sequestration and to share their experiences. The field exposure and experiences shared by Dr. Lal at C-MASC have helped Dr. Kaushal to better understand new techniques on carbon research which will be helpful for him in planning and implementing future studies in agroforestry research.

Dr. Kaushal desires future collaboration between C-MASC and CSWCRTI. Dr. Kaushal hopes to have the chance to visit C-MASC and OSU again. Dr. Kaushal can be always reached at kaushalrajesh1@rediffmail.com

Dr. Rajesh Kaushal
kaushalrajesh1@rediffmail.com
14th May 2014 –
13th June 2014





Visiting Scholars - An Integral Component of C-MASC



Dr. Hrittick Biswas is a Senior Scientist (Soil Science) at Central Soil & Water Conservation Research & Training Institute (CSWCRTI), Research Centre, Bellary, Karnataka, India, with over ten years of research experience in the field of soil conservation and management. He was deputed by the National Agricultural Innovation Project (NAIP) of the Indian Agricultural Research Institute (ICAR) for undergoing training at Carbon Management and Sequestration Center (C-MASC), School of Environment and Natural Resources, The Ohio State University under the theme “Carbon Trading/Carbon Sequestration/ Climate Change”.

The training program, under the supervision of Prof. Rattan Lal covered recent advances in the field of soil carbon sequestration and carbon budgeting with reference to soil loss and conservation. In this respect, Dr. Lal conducted special classes/meetings focusing on the importance of carbon sequestration and methods of measuring and computing changes in carbon stocks across land uses and treatments. In terms of practical exposure, Dr. Biswas understood the working principles of some important equipment such as Photoacoustic Spectrometer, infra-red CO₂ gas analyzer (LICR-6400), mass spectrometer and CN Analyzer. Further, he refreshed his knowledge on the working of instruments used to measure the physical properties of soils.

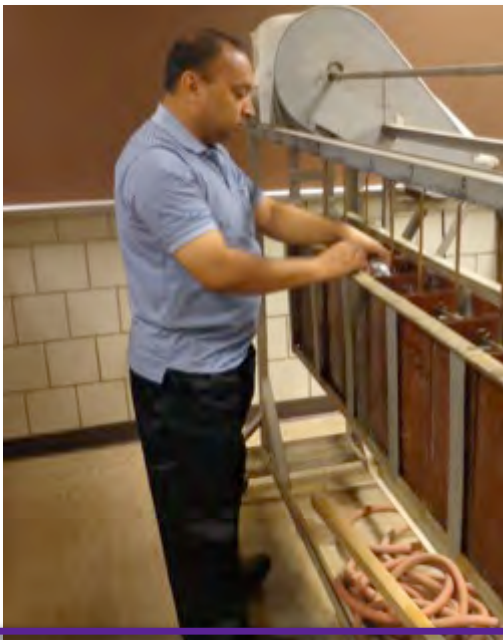
During his stay at OSU, Dr. Biswas worked on the aggregate size analysis and tensile strength of aggregates of soils (four depths, 0-60 cm) sampled from the drainage-tillage project conducted at the Waterman Farm. The aggregates from each sample were separated into macro- and micro-aggregates for determining the carbon contents. The program was strengthened through various field-based exposure visits to Waterman Farm, OSU; biofuel experiment on mine soils, Zanesville; long-term no-tillage experiments at Wooster Campus; lysimeter and USDA research experiments at North Appalachian Experimental Watersheds, Coshocton (OARDC) and eco-restoration activities at wildlife conservation center located in Muskingum County, Ohio.

During the one-month long stay, Dr. Biswas attended the weekly seminars delivered by different C-MASC researchers and also delivered a seminar entitled “A Decade of Soil and Water Conservation Research in Bundelkhand, India”. There were frequent interactions with other researchers of C-MASC which added to his understanding of different aspects of soil quality. He feels deeply indebted to Dr. Lal for the rich and satisfying experience gained at C-MASC, OSU, and hopes to carry out some of the approaches learned at the center. The kind hospitality and help received from the staff and scientists of C-MASC are duly acknowledged by Dr. Biswas. He can be contacted at hritbis@yahoo.co.in and intends to stay in touch with the people of C-MASC.

Dr. Hrittick Biswas

hritbis@yahoo.co.in

14th May 2014 –
13th June 2014





New Visiting Scholars



Clever Briedis
Visiting Scholar – Brazil
cleverbriedis@yahoo.com.br
Ph.D Student
Universidade Estadual
de Ponta Grossa
May 2014 – April 2015

Dr. Tangyuan Ning
Visiting Scholar – China
ningty@sdau.edu.cn
Associate Professor
Shandong Agricultural University
June 2014 – June 2015

Dr. Ayyamperumal Velmurugan
Visiting Scholar – India
vels_21@yahoo.com
Head i/c
Central Agricultural Research Institute, Port Blair
June 2014

Obama's big environmental move: Demanding power plants cut carbon

By Josh Levs, Kevin Bohn, and Erin McPike, CNN



http://www.cnn.com/2014/06/02/politics/epa-carbon-emissions/index.html?hpt=hp_t2 (Photo from <http://www.forbes.com/sites/mindylubber/2011/07/22/time-to-replace-eisenhower-era-power-plants/>)





Visiting Scholars - An Integral Component of C-MASC



Dr. Lal is shown with Dr. La Scala and Dr. Marques in April 2014, visitors from São Paulo State University, Brazil.

Dr. Newton La Scala Jr. is an associated professor São Paulo State University. His current research is focused on the characterization of soil CO₂ emission, mostly in agricultural areas, and on the GHG balance in sugarcane areas under different management scenarios

José Marques Jr. is also an associated professor from São Paulo State University. He is an agronomist, an expert in pedology, mineralogy and soil properties and landscape relationships.

They visited C-MASC to meet with Dr. Lal and to follow-up with their Ph.D student, Ricardo de Oliveira Bordonal, who is a current visiting scholar with Dr. Lal at C-MASC through August 2014.



Dr. Lal recently hosted a lunch for his visiting scholars at OSU's Fawcett Center. Attendees from left to right are: Dr. Rajesh Kaushal (India), Dr. He Jin (China), Ricardo Bordonal (Brazil), Clever Briedis (Brazil), Dr. Hrittick Biswas (India), Mark Erbaugh (Director of International Programs - College of Food, Agricultural & Environmental Sciences), Jeff Sharp, (Interim Director of the School of Environment & Natural Resources – also from CFAES), Jitendra P. Srivastava (The World Bank), Dr. Sudhir Verma (India), and Rattan Lal (Director of C-MASC)





C-MASC Alumni



Samantha Sekar

Ohio State research on reduced carbon emissions

New research by Samantha Sekar, research assistant with Washington, D.C.-based Resources for the Future who holds master's degrees from Ohio State in agricultural economics and environmental science, and Brent Sohngen, professor, Department of Agricultural, Environmental and Development Economics and director of the Environmental Policy Initiative, finds that state-level implementation of renewable portfolio standards in the U.S. reduced national carbon emissions by 4 percent in 2010, with more substantial reductions expected in the future.

See the following link for more information:

<http://cfaes.osu.edu/news/articles/ohio-state-research-shows-substantial-link-between-state-level-renewable-energy>

Samantha gave a special seminar on estimates of climate change impacts on agriculture to the C-MASC group on May 22, 2014.

She was an undergraduate & graduate student advisee of Dr. Lal. After graduating with a M.S. from C-MASC, Samy Sekar went on to pursue a Master's in applied economics in OSU's Ag. Econ program. She then began working as a research assistant at the environmental policy think tank Resources for the Future. Samy's primary projects at RFF include: the use of U.S. electricity industry models to project greenhouse gas emissions and large scale (U.S.-wide) estimates of climate change impacts on agriculture through changes agricultural land values and profits. Samy plans to pursue a interdisciplinary doctoral degree beginning in fall 2015.

Dr. V. Sejian - International Recognitions

Dr. Sejian is a visiting scholar alumni of C-MASC. Some of his recent recognitions are listed below:

- **Springer Verlag Publisher:** Dr. Sejian was selected to act as Editor-in-chief for a book entitled "**Climate Change and Livestock Production: Adaptation and Mitigation**" involving 29 chapters. The book contains 800 pages, 150 figures including 75 colour figures. The book is due in August 2014.
- Selected as Associate Editor in **Frontiers in Interdisciplinary Climate Studies**
- Selected as Editorial board member in **Journal of Climatology and Weather Forecasting**



Dr. Veerasamy-Sejian





C-MASC Alumni

Prof. Guðrún Gísladóttir, University of Iceland, receives Wahlberg's Gold Medal

Prof. Guðrún Gísladóttir (right), from the University of Iceland and a former visiting scholar at C-MASC, received the Wahlberg's Gold Medal from the King of Sweden, Carl XVI Gustaf (center) and the Swedish Anthropology and Geography association during a ceremony at the Royal Palace.



The Association's Gold Medal, awarded to Gísladóttir, is named after Johan August Wahlberg, a well-known Swedish natural scientist and explorer in the early 19th Century. The Association's board said that Gísladóttir received the medal for her scientific contribution to geography; not the least the least of which is her knowledge and research on soil erosion and vegetation depletion, and for encouraging international collaboration between geographers.

On the left is Professor Compton James Tucker who was awarded The Vega Medal.

http://english.hi.is/frettir/professor_awarded_for_her_contribution_geography



SSAG

Conference for farmers planned - August 5-7, 2014 Save the dates and plan to attend!

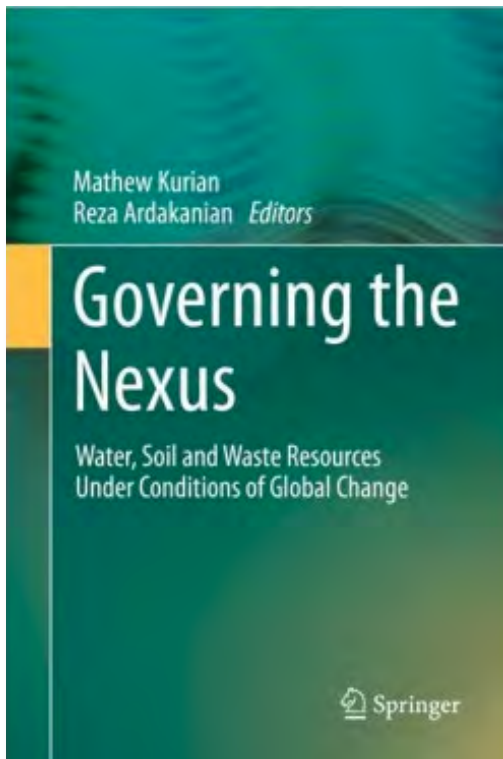
August 5-7, 2014: SustainableCorn.org is partnering with 25x25 to share the findings of this project's research with Midwestern farmers. You won't want to miss this opportunity to meet and talk with other farmers, scientists and industry leaders who are testing and monitoring cropping practices for a changing climate in the Midwestern United States.

<http://sustainablecorn.org/conf-pages/2014NationalConference.html>





New Book/Briefs
**Governing
the Nexus:
Water, Soil and
Waste Resources
Under Conditions of
Global Change**



- Provides a conceptual framework for discussing the nexus approach to environmental governance
- Discusses key science-policy challenges relating to the nexus approach to environmental governance
- Explores, based on selected case studies, consolidation of the nexus approach in the form of institutional good practice with potential to guide implementation of integrated management of water, soil and waste resources
- Global trends such as urbanization, demographic and climate change that are currently underway pose serious challenges to sustainable development and integrated resources management

The complex relations between demands, resource availability and quality and financial and physical constraints can be addressed by knowledge based policies and reform of professional practice. The nexus approach recognizes the urgent need for this knowledge and its interpretation in a policy- relevant setting that is guided by the understanding that there is a lack of blueprints for development based on integrated management of water, soil and waste resources in the Member States. Generation and application of knowledge is both a priority for individual but also institutional capacity development.

It is against this background the UNU-FLORES Institute for Integrated Management of Material Fluxes and of Resources was established in Dresden. UNU-FLORES is supposed to extend and upscale the concept of integrated resource management through adopting a truly integrative perspective by considering inter-related resources (water, soil, waste) and emphasizing fluxes of resources between phases and compartments. Thus instead of traditional input-output model, UNU-FLORES focused on whether the consistent tracing (follow up) and management of resources as fluxes (passage, flow, transport, transfer) would result in sustainable management outcomes. UNU-FLORES will pursue the achievement of sustainable environmental outcomes by serving as a think tank that promotes integrated resources management.

<http://www.springer.com/environment/sustainable+development/book/978-3-319-05746-0>

Also, there are three Springer Briefs titled “Life-Cycle Cost Approach: Concept, Relevance and Applicability in Advancing the Nexus Approach to Management of Environmental Resources”, “Intergovernmental Fiscal Relations” and “Rethinking Infrastructure Design for Multi-Use Water Services”.

<http://www.springer.com/environment/sustainable+development/book/978-3-319-06286-0>

<http://www.springer.com/environment/sustainable+development/book/978-3-319-06295-2>

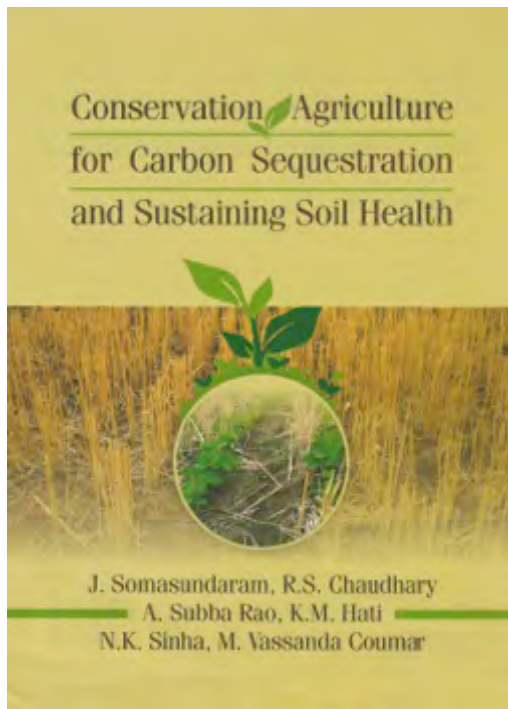
<http://www.springer.com/environment/sustainable+development/book/978-3-319-06274-7>



New Book

Conservation Agriculture for Carbon Sequestration and Sustaining Soil Health

41 chapters dealing with various issues, prospects and importance of conservation agricultural practices followed across different regions with special emphasis on rainfed regions. info@nipabooks.com www.nipabooks.com



CONTENTS

- Conservation Agriculture: Issues and Prospects in Rainfed Regions of India
- Conservation Agriculture: Biomass Recycling and Nutrient Dynamics
- Greenhouse Gas Mitigation with Conservation Agriculture in Rice-Wheat System
- Crop Residue Management in Relation to Conservation Agriculture
- Effect of Conservation Tillage on Soil Physical Properties
- Diversification of Crop and/or Allied Crop Enterprises in Conservation Agriculture: Why and How?
- Soil Water Balance under Cover Crops and Residue Retention for Conservation Agriculture
- Weed Management in Conservation Agriculture
- Resource Conservation Technologies for Sustainable Crop Production in Indo-Gangetic Plains of India
- Conservation Agriculture for Resource Conservation in North-Western Himalayan Region
- Resource Conservation Technologies for Sustaining Productivity in North-eastern Hilly Eco-systems
- Conservation Agriculture for Sustainable Hill Farming
- Resource Conservation in Rice – Wheat Cropping System under Reclaimed Sodic Soils
- Conservation Agriculture in Rice Based Cropping System in Alluvial Plains of Eastern India
- Resource Conservation Technologies in Relation to GHGs Emission in Different Rice Ecologies in Eastern India
- Conservation Agriculture in Cotton Production System
- Conservation Agriculture: Limitations and Prospects in Hot Arid Region of India
- Conservation Agriculture with Trees for Rainfed Agriculture
- Prioritizing Areas for Soil Carbon Sequestration: A Step for Conservation Agriculture
- Soil Carbon Sequestration in Rainfed Agriculture
- Soil Carbon Management: Conservation Agriculture Perspective
- Climatic Variability and Climate Change on Soil Organic Carbon Stocks: Its Impact and Mitigation Strategies
- Conservation Agriculture in Mitigating Effects of Climate Change
- Soil Carbon for Carbon Sequestration and Trading
- Conservation Agricultural Management Practices in Minimizing Soil Erosion and Enhancing Crop Productivity
- Impact of Resource Conservation Technologies for Increasing Crop Productivity in Black Soil Regions of Rajasthan
- Impact of Conservation Tillage on Soil Aggregation
- Climate Resilient Technologies for Mitigating GHGs Emission in Agriculture
- Role of Farm Machinery in Success of Conservation Agriculture
- Evaluation of Conservation Agriculture Machinery on Carbon Emission : A Case Study
- Soil Biodiversity and Integrated Soil Quality Assessment
- Soil Microbial Biomass: A Potential Indicator to Assess Soil Quality
- Soil Biological Parameters as Reflection of Soil Carbon Dynamics and Conservation
- Conservation Agriculture vis-a-vis Organic Farming
- Biochar: An Alternative to C Sequestration
- Participatory Soil Quality Assessment Tools
- Assessing Soil Quality Changes under Conservation Agriculture
- Socio-Economic Assessment of Conservation Agriculture in India
- Remote Sensing of Soil Residue Cover and Conservation Tillage
- Exploring Soil Organisms for SOC Storage
- Effect of Crop Cover on Runoff, Soil and Nutrient Losses

2014, 528pages, colour pages, figures, tables, 25cm

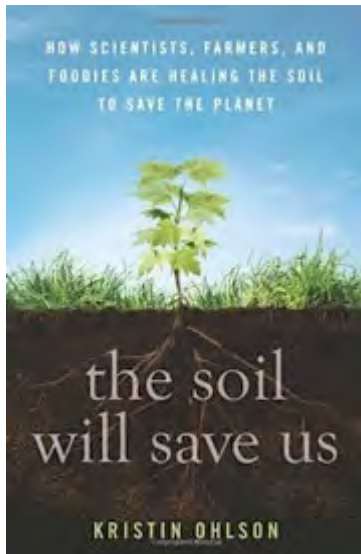


3rd row from left: Drs S. Rajendiren, J.K.Thakur, J.Somasundaram, J.K. Saha, S.Kundu, D.L.N. Rao, Rattan Lal, Muneshwar Singh, R.S.Chaudhary, Mrs. Asha Sahu, Mrs. S. Neenu, Mrs. T.K. Radha, Mrs. I. Rashmi.
2nd row from left: Drs. Asit Mandal, A.K.Vishwakarma, R.K.Singh, K.M. Hati, Pradip Dey, R.Saha, V.D. Meena, N.K.Lenka, K. Ramesh, D.M. Mishra, M.C. Manna, Tapan Adhikari, Pankaj K.Tiwari, Nishant K.Sinha



A Book Based on the Research of C-MASC...

The Soil Will Save Us



Thousands of years of poor farming and ranching practices—and, especially, modern industrial agriculture—have led to the loss of up to 80 percent of carbon from the world’s soils. That carbon is now floating in the atmosphere, and even if we stopped using fossil fuels today, it would continue warming the planet. In *The Soil Will Save Us*, journalist and bestselling author Kristin Ohlson makes an elegantly argued, passionate case for "our great green hope"—the ancient partnership between plants and soil microorganisms that created our planet and could put that carbon back in the ground.

As the granddaughter of farmers and the daughter of avid gardeners, Ohlson has long had an appreciation for the soil. A chance conversation with a local chef led her to the crossroads of science, farming, food, and environmentalism. She discovered that there is a vast kingdom of creatures under our feet – billions of microorganisms in a tablespoon of soil – that take the carbon dioxide that plants pull from the atmosphere and turn it into life-giving soil carbon.

Ohlson introduces the visionary scientists, farmers, foodies, ranchers, and landscapers—whose work shows that earth can be healed and offers the hope that seemingly intractable problems like climate change, air and water pollution, food quality, and even obesity have the same low-tech solution.

"This will surely be called an important book. Ohlson conveys her information in the lively manner of writers such as Michel Pollan and Rowan Jacobsen, making complicated ideas easily accessible to the reader, so that we see the ground at our feet not as dead dirt but rather as, in her words, a "coral reef"

teeming with life, a 'massive biological machine' on which the health of our species depends. We're lucky to have this account."—Michael Ruhlman, author of *The Soul of a Chef*

"On the long list of things we have to do to fight climate change, learning to pay attention to soil again is near the top. It's not just dirt, it's not just something that holds plants upright—as this book points out, it's pretty damned vital."—Bill McKibben, author of *Earth: Making a Life on a Tough New Planet*

"I was barely a dozen pages into *The Soil Will Save Us* when I felt the ground shifting under my feet—the literal ground, as in the composition of the rich humus of old-growth forests compared to the exhausted, scorched, and ruined ancient fields of global farming—and the psychic ground.... This is a remarkable book, which tells—with a light touch and a breezy, readable manner—a story of modern science of the most crucial importance."—Melissa Fay Greene, author of *Praying for Sheetrock* and *There Is No Me Without You*

"At last, soil has been included in the conversation about food. And you don't need a degree in soil sciences to see how the web of life below the surface that infuses soil—*is soil*—is strongly affected by the various webs of life that occur aboveground, for better and worse. . . . This book is eminently readable, well-researched, and important."—Deborah Madison, author of *The New Vegetarian Cooking for Everyone* "*The Soil Will Save Us* is a convincing argument that those of us who care about the environment have to start from the ground up—that is, if we are going to give a better world to our grandchildren, we're going to have to develop a deep interest in dirt. Fortunately, all you need to become fascinated by dirt is a book like this, which reveals just how intricate and important it is."—Nathanael Johnson, author of *All Natural*

**Do you have contributions for our next newsletter?
Please contact us!**

Carbon Management and Sequestration Center (C-MASC)
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Columbus, OH 43210 donovan.205@osu.edu

Latest C-MASC Journal Publications

- Sá, J.C.M.; Tivet, F.; Lal, R.; Briedis, C.; Hartman, D.C.; Zuffo, J.; Santos, J.B. 2014. Long-term tillage systems impacts on soil C dynamics, soil resilience and agronomic productivity of a Brazilian Oxisol. *Soil & Tillage Res.*, 136: 38-50.
- de Sousa Neto, E.L., I. Andrioli, R.G. de Almeida, M.C.M. Macedo and R. Lal. 2014. Soil physical quality under integrated crop-livestock-forest in the Brazilian cerrado. *R. Bras. Ci. Solo*, 38:608-618.
- Vilmundardóttir, O.K., Gísladóttir, G., Lal, R. 2014. Early stage development of selected soil properties along the proglacial moraines of Skaftafellsjökull glacier, SE-Iceland. *Catena* 121:142–150. DOI: 10.1016/j.catena.2014.04.020
- Mukherjee, A., and Lal, R. 2014. The biochar dilemma. *Soil Research*. 52(3): 217–230. <http://dx.doi.org/10.1071/SR13359>
- Mukherjee, A., Lal, R., and Zimmerman, A. 2014. Impacts of biochar and other amendments on soil-carbon and nitrogen stability: A laboratory column study; Soil Science Society of America. doi:10.2136/sssaj2014.01.0025
- Mukherjee, A., Lal, R., and Zimmerman, A. 2014. Effects of biochar and other amendments on the physical properties and greenhouse gas emissions of an artificially degraded soil. *Science of the Total Environment*. 487: 26-36.
- Xue, J.F., Lui, S.L., Chen, Z.D., Chen, F., Lal, R., Tang, H.M., Zhang, H.L. 2014. Assessment of carbon sustainability under different tillage system in a double rice cropping system in southern China. *International Journal of Life Cycle Assessment*. Int J Life Cycle Assess (Springer-Verlag Berlin Heidelberg). DOI: 10.1007/s11367-014-0768-4
- Ussiri, D, Jacinthe, PA, Lal, R. 2014. Methods for Determination of Coal Carbon in Reclaimed Minesoils: A Review. *Geoderma*. 214-215:155-167.
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- Lal, R. 2014. Biofuels and carbon offsets. *Biofuels*. 5(1), 21-27.
- Bonin, C. and Lal, R. 2014. Aboveground productivity and soil carbon storage of biofuel crops in Ohio. *GCB Bioenergy*. 6, 67-75. DOI: 10.1111/gcbb.12041.
- Olson, K. R., M. Al-Kaisi, R. Lal, B. Lowery. 2014. Experimental considerations, treatments and methods in determining soil organic carbon sequestration rates. *Soil Sci. Soc. Am. J.* 78:348–360 DOI:10.2136/sssaj2013.09.0412
- Bonin, C., Lal, R. 2014. Aboveground productivity and soil carbon storage of biofuel crops in Ohio. *GCB Bioenergy* 6:67-75.
- Stavi, I., Lal, R. 2014. Achieving Zero Net Land Degradation: challenges and opportunities. *Journal of Arid Environments Ref: JAE13-389R1* DOI: 10.1016/j.jaridenv.2014.01.016
- Adhikari, S., Lal, R., Wang, H.P. 2014. Carbon sequestration in the soils of aquaculture ponds, crop land, and forest land in southern Ohio, USA. *Environmental Monitoring and Assessment* 186:3, 1569-1574. DOI: 10.1007/s10661-013-3474-y
- Liu, R. & Lal, R. 2014. Quality change of mine soils from different sources in response to amendments - A laboratory study. *Environmental and Natural Resources Research* 4:2 20-38.
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