THE OHIO STATE UNIVERSITY

Carbon Management and Sequestration Center

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Issue 4 | 2016

INITIATIVE AAA
ADAPTATION OF AFRICAN AGRICULTURE

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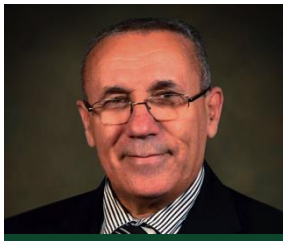
Dr. Mohamed Ait-Kadi
President, General Council of Agricultural Development
Rabat, Morocco



Dr. Mohammed Badraoui
Director, INRA
Rabat, Morocco

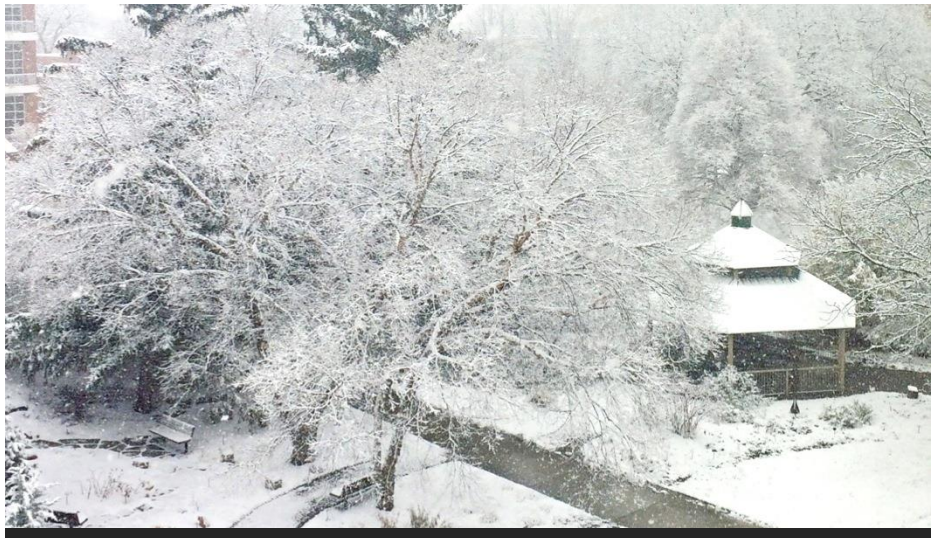
HE Mr. Aziz Akhannouch
Minister of Agriculture and Fisheries
Kingdom of Morocco

Dr. Mohammed Sadiki
Secretary General
Ministry of Agriculture and Fisheries
Rabat, Morocco

Dr. Rachid Mrabet
Research Director, INRA
Rabat, Morocco

The AAA initiative launched at COP22 in Marrakech is: (i) visionary and bold, (ii) critical to ushering the Green Revolution in Africa, (iii) in accord with SDGs of the U.N., (iv) complementary to 4PT initiative of COP21, and (v) essential to global and regional peace and stability. Prof. Lal is a member of the International High Level Advisory Panel to AAA. More about the AAA initiative and COP22 on pages 2 and 3...

Inside this Issue:



Winter at C-MASC: The snowfall on 13th December beautifully decorated the landscape. However, the cold front that followed dipped the temperatures to -15°C (5°F) by early morning of 15th December. The well defined annual cyclic change in seasons in central Ohio are integral to biogeophysical and biogeochemical processes.

Showcase Agriculture and Food Security at COP22

Marrakech, Morocco
14-15 November 2016

Prof. Lal participated in 3 events at COP22:

Adaptation of African Agriculture: From Science to Action. This event was organized on 13th November 2016 by the Ministry of Agriculture of Morocco in collaboration with CCAFS of CGIAR. Prof. Lal's presentation was "Food Security and Climate Change."

Sustainable Oases: A New Moroccan initiative was launched on14th November and was chaired by HE Mr. Aziz Akhannouch, Minister of Agriculture and Fisheries of Morocco.

Showcase Agriculture and Food Security: The Higher Level Session was attended by H.E. Mr. Aziz Akhannouch (2nd from left), Minister of Agriculture of Morocco. H.E. Mr. Stéphane Le Foll, Minister of Agriculture and Fisheries, France (3rd from left above), Mr. José Grazio da Silva (4th from left) and Mr. Emanuel Faber, CEO, Danone (1st from left), and Mr. Miguel Arias Cañete, European Commission, Climate Action and Energy. In addition, many diplomats made presentations in this session which was moderated by Prof. Lal.

More about this on page 3...

MARRAKECH COP22|CMP12
UN CLIMATE CHANGE CONFERENCE 2016

The foreground of The Blue Zone of COP22 in Marrakech has flags of all member states of the U.N. Included in the Photo (from left to right) are Prof. Takalign Mamo (Senior Advisor, IPI), Dr. Amit Roy (former CEO of IFDC) and Prof. Lal.

COP22 (continued)

Dr. Richard Thomas (2nd from left; UNU-INWEH and formerly at CIAT) was at COP22 and joined discussions with Dr. Amit Roy (IFDC) and Dr. Takalign Mamo (IPI). UNU, with HQ in Tokyo, has several institutions around the world including the UNU-FLORES in Dresden, Germany.

Prof. Ólafur Ragnar Grímsson (left), former President of Iceland and recipient of an honorary degree from OSU also attended COP22 Meeting in relation to the Arctic Council. Dr. Lal is an Adjunct Professor of the University of Iceland and has severed as a co-advisor of graduate students along with Prof. Gísladóttir from the University of Iceland. Dr. Lal has also cooperated with scientists from the SCS of Iceland.

High Level Meeting on "Climate Friendly Landscapes"

Lancaster House, London, U.K.
26th October 2016

A high level meeting on "Climate Friendly Landscapes" was held at Lancaster House on 26th October 2016. The meeting was organized and hosted by The Prince of Wales' International Sustainability Unit in cooperation with the U.K. and French Government. The meeting was attended by HRH The Prince of Wales and by the Minister of Agriculture of France, Mr. Stéphane Le Foll. The meeting addressed the "4 per 1000: Soils for Food Security and Climate" initiative adopted at COP21 in Paris in December 2015, and provided background information on COP22 in Marrakech. The meeting was attended by ~100 participants. Prof. Lal's presentation was entitled "Soil Carbon Sequestration: Technical Potential and Options. Prof. Lal also visited Sir David King, a Science Advisor to the U.K. Government, and Sir. Gordon Convoy, Head of the Montpellier Panel. Sir. Gordon is Prof. of Intl. Development at the Imperial College, London.

IUSS Inter-Congress Meeting

Rio de Janeiro, Brazil
20-25 November 2016

The IUSSS Inter-Congress Meeting was organized in Rio from 20-25 November 2016. The meeting was attended by the executive Council of IUSS and represented members of the national society of soil sciences from around the world. In addition to the business meeting of the Executive Council and Executive Committee of IUSS, one-day symposium was held on "Soil Science: Beyond Food and Fuel" which is also the theme of the 21st World Congress of Soil Science to be held in Rio in 2018. Papers presented at the symposium will be reviewed, edited, and published as an IUSS book. During the International Decade of the Soil (2015-2024), IUSS will publish one book each year on a theme of global relevance. Thus, two books already published are entitled, "Soil Matters" and "Soil and the Urban Environment." The forthcoming book, "Soil Science: Beyond Food and Fuel" will be the third book in this series.

The photo above includes members of the Executive Committee of IUYSS and two guests. From left to right: Dr. Kazuyuki Inubushi, Dr. Winfried Blum, Dr. Christian Feller, Dr. Rainer Horn (President), Dr. Takashi Kosaki (President Elect), Dr. Flavio Camargo (Vice President, Chair Organizing Committee, 21st WCSS), Dr. Eduardo Mansoor (FAO, Rome), Dr. Sigbert Huber (Secretary, IUSS), Dr. Manuel Limonta (ICSU, Latin America), and Dr. Rattan Lal (President from 1/1/2017).

Black Rivers of the Tropics

The dark color of some rivers of the tropics comes from leaching of humic acid in sandy soils. Rio Negro, the left tributary of the Amazon, is the largest blackwater river in the world. The black color is due to incomplete breakdown of the phenol-containing vegetation. Contrary to the common belief of "hunger rivers" these blackwaters support a rich diversity of fauna. In the foreground of the photo of a black river near Tampa, Florida, is an alligator bathing in the sun. This river is close to the venue of the meeting of DOD (SERDP-SAB) for which Prof. Lal is a member of the Scientific Advisory Board.

C-MASC Visitors and News

Dr. Alfred Hartemink

Professor and Director
Department of Soil Science
University of Wisconsin-Madison

Prof. Hartemink, former Secretary General of IUSS, visited C-MASC on 2nd December. He presented the SENR seminar entitled "Digital Soil Morphometrics: New Ways of looking at the Soil Profile." Alfred's pedology research focuses on digital soil morphometrics, soil mapping, and soil carbon. Alfred has global experience in conducting research on soil science in Tanzania, Congo, Indonesia, Kenya, Australia and Papua New Guinea. He was a senior researcher at ISRIC: World Soil Information Center, Wageningen, Netherland. Alfred obtained his PhD degree in soil science from teh University of Reading, U.K. under the guidance of the late Prof. Dennis Greenland

Bill Richards:

A no-till Pioneer, Innovator and Role Model Farmer in Circleville, Ohio

The tillage radish, also called the oilseed radish or daikon radish (*Raphanus sativus*), is an important vegetable in Asia. In central Ohio, it is grown as a cover crop to improve soil structure and capture nutrients. Bill Richards grows this on about 300 acres. The tuberous tap root can be 30 to 40 cm long and 2-4 cm in diameter, part of which grows aboveground and part below ground.

An informal meeting was held at the farm of Mr. Bill Richards (first on the left) on 30th November. The meeting was initiated by Mr. Ernie Stea (second from left), working with "Solutions From the Land." The meeting was also attended by Mr. Reid Detchon, Senior Vice President for Energy and Climate with the U.N. Foundation, Prof. Lal (right) and Mr. Randall Reeder (Prof. Emeritus, FABE) attended the discussions and benefitted from the views of Mr. Bill Richards on sustainable management of soils. Mr. Richards was Chief of SCS (now NRCS) from 1990 to 1993. He is a no-till pioneer, spokesman, innovator, a role model and a source of inspiration to all academician, land managers and farmers

Visiting Scholars: New

Dr. Gulab Singh Yadav

Indian Council of Agricultural Research
ICAR Research Complex for NEW Region
Tripura Centre, Lembucherra, West Tripura – 799 210
India

I Dr. Gulab Singh Yadav, scientist (Agronomy) at ICAR Research Complex for NEH Region Tripura Centre, Lembucherra, Tripura, India. I have been selected under Department of Biotechnology, Govt. of India's oversees associateship programme for North Easter Region for 20115-16. I has joined the C-MASC on 27th September 2016 to work on "Role of carbon dynamics in mitigation of greenhouse gases emissions'' for one year as a visiting scholar. I have done my Master and Doctoral degree in Agronomy from Indian Agricultural Research Institute (IARI), India.

My research mainly focused on sustaining the productivity of rice–rice cropping system in north East Region of India, Carbon sequestration in paddy soils, conservation agriculture, integrated farming system, climate resilience agriculture. I also act as co-partner of project on "Increasing the food legumes production by small farmers to strengthen the food and nutritional security through adoption of improved technologies and governance within South-South cooperation" funded by OCP Foundation, Morocco in collaboration with ICARDA office of New Delhi, India. I was also nodal officer of "National Mission for Sustaining the Himalayan Ecosystems (NMSHE) Taskforce 6" (Funded by Department of Science and Technology, Govt. of India) for Tripura Centre. I have support more 10000 farmers of Tripura for enhancing their livelihood under varies project (NAIP, NICRA, TSP, NMSHE etc.) by providing training, technical knowledge and critical inputs. I have developed the sustainable lentil production technology for rice fallow land of Tripura, Developed the Groundnut–Potato–Baby Corn cropping system for irrigated medium land of Tripura, Rice-fish-duck based farming system models, and standardized the system of rice intensification (SRI) and integrated crop management technology for rice production in Tripura. I have published more 50 articles, books chapters, technical manual. I am a member of two reputed societies and attended several national and international seminar, conferences, workshop etc. I have coordinate and organized varies training programme, one short courses, one national seminar and one workshop.

Qingqing Cao

Environmental Research Institute
Shandong University
P. R. China

I am a second year Ph.D. Student from Shandong University, China. My major during B.S. and M.S. are Biological Engineering in Shandongjianzhu University and Analytical Chemistry in Shandong University, respectively. And now, my major is Environmental Science. My research in China focuses on the carbon composition and distribution in sediments of river wetland and constructed wetland in China. And meanwhile, I also work on heavy metal contamination and microbial ecology in wetland. I hope I can understand the transformation mechanism of carbon and nitrogen from plants to soils and sediments comprehensively.

Visiting Scholars

Dr. Jayanta Layek's research summary was selected to to be presented at the International Scholar Research Exposition on 18th November 2016. His presentation entitled "Land use model for sustainable production and climate resilience in Eastern Himalayas" focused on developing a land use model in sloping hill for sustaining forest ecosystem and enhancing livelihood security of farmers by supplying diversified food, fodder and conserving natural resources.

Photographed above right: Dr. Caroline Whitacre, Senior Vice President for Research; Dr. Rattan Lal; Dr. Layek; Dr. Gifty Ako-Adounvo, Assistant Vice Provost for International Affairs.

Visiting Scholars at C-MASC in 2016

1.	Eduane Padua	Federal University of Lavras	Brazil	2015-2016
2.	Simi Mehta	Jawaharlal Nehru University	India	2015-2016
3.	Xin Zhao	China Agricultural University	China	2015-2016
4.	Sajid Hussain	University of Agriculture, Faisalabad	Pakistan	2015-2016
5.	Muhammad Azhar	University of Agriculture, Faisalabad	Pakistan	2016
6.	Huifang Han	Shandong Agricultural University	China	2016
7.	Jayanta Layek	ICAR, Research Complex for NEH	India	2016-2017
8.	Qingbiao Wu	Forestry College of Guangxi University	China	2016-2017
9.	Ram Swaroop Meena	Banaras Hindu University	India	2016-2017
10.	Qingqing Cao	Shandong University	China	2016-2017
11.	Gulab Singh Yadav	ICAR, Research Complex for NEH	India	2016-2017

C-MASC Alumni and Awards

Dr. Sajid Hussain
University of Agriculture, Faisalabad

Dr. Sajid Hussain, visiting scholar at C-MASC, completed his Ph.D degree in Agronomy on 15th December 2016 at the University of Agriculture, Faisalabad, Pakistan. The title of his thesis is "Mitigation of Drought Stress in Maize Hybrid Through Different Nutrient Management Strategies". C-MASC congratulates Dr. Sajid Hussain at this important accomplishment

Nall Moonilall
Current Ph.D Student

Second year ESGP Ph.D. student, Nall I. Moonilall, was recently selected as a recipient for the 2016-2017 Ohio State University Office of Energy and Environment Research Grant as well as a 2017 Ohio Nursery and Landscape Association (ONLA) Scholarship. Congrats Nall!

Dr. Toru Nakajima
Tokyo University of Agriculture

Toru has been appointed as an Assistant Professor at Tokyo University of Agriculture (TUA), Department of Bioproduction and Environmental Engineering (BEE). He will start the role as an Assistant Professor in TUA from April 2017 with a focus on land and water use engineering and farmland engineering, including theories and techniques for utilizing soil, water, and natural resources with conserving environment and ecosystem.

He was a postdoctoral researcher at C-MASC from October 2011 to October 2014, and returned to Japan as a postdoctoral researcher at Tokyo Metropolitan University (TMU) under the supervision of Prof. Kosaki. He secured another postdoctoral position at Meiji University. At Meiji University, he studied GHG emissions from paddy rice field using CO_2 and CH_4 isotope gases analyzer, and conducted research on energy crop such as *Miscanthus*, Corn, and Sunflower in a contaminated region by radioactive cesium in Fukushima, Japan.

Toru is excited about his new position at BEE, TUA. He also would like to give credit to C-MASC, TMU, and Meiji University for shaping my career to secure an academic position. He his looking forward to start collaborative research opportunities with C-MASC.

Congratulations Toru!

Dr. Lal is the recipient of Elsevier Atlas Award

Dr. Rattan Lal's article "*Food security in a changing climate*," published in the journal *Ecohydrology & Hydrobiology,* has been selected from thousands of recently published articles in 1800 journals to be awarded the Elsevier Atlas Award. The award will be presented by Elsevier Publishers in March 2017. Find more information about this, including an interview with Dr. Lal here.

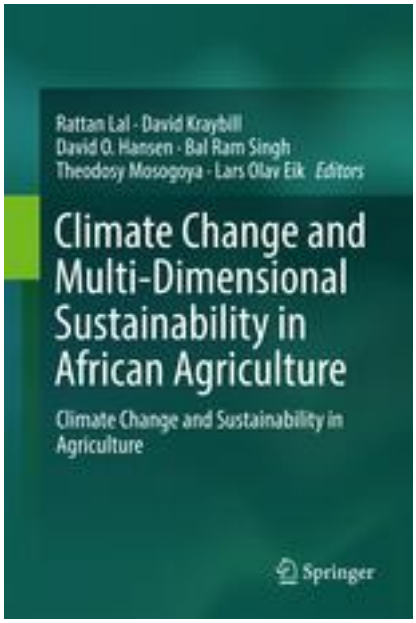
New Books

Encyclopedia of Soil Science

Third Edition

The third edition of Encyclopedia of Soil Science now spans three volumes and covers ground on a global scale. A definitive guide designed for both coursework and self-study, this latest version describes every branch of soil science and delves into trans-disciplinary issues that focus on inter-connectivity or the nexus approach. Find more information including a table of contents here.

Lal, R (Ed). 2016. Encyclopedia of Soil Science. Third Edition, CRC Press, pp. 2804. ISBN 9781498738903



Climate Change and Multi-Dimensional Sustainability in African Agriculture

This 35-chapter book is based on the international conference on Climate Change and Multi-Dimensional Sustainability in African Agriculture held at Morogoro, Tanzania, 3-5 June 2015. The book is thematically based on four pillars of sustainability, with focus on sub-Saharan Africa (SSA): Environment, Economic, Social and Institutional. Find more information including a table of contents here.

Lal, R., Kraybill, D., Hansen, D.O., Singh, B.R., Mosogoya, T., Eik, L.O. (Eds) 2016. Climate Change and Multi-Dimensional Sustainability in African Agriculture. Springer International Publishing, pp.717. ISBN 978-3-319-41236-8

Happy Holidays & Season's Greetings

Photographed above: C-MASC students, visiting scholars and staff celebrate the Thanksgiving holiday in November.

SENR Holiday Party

SENR hosted an annual holiday party for faculty and staff. Photographed above (left; from left to right) is Jayanta Layek, Gulab Singh Yadav, Dr. Jeff Sharp (Director of SENR), Laura Conover, Jose Guzman, Peter Renz, Basant Rimal, Nicola Lorenz, Klaus Lorenz, Rattan Lal and Ram Swaroop Meena. The event was set up and organized by Audrey McCray (right) and other SENR staff.

2016 C-MASC Publications

Books Edited

1. Lal, R. and B.A. Stewart. 2016. Soil-Specific Farming: Precision Agriculture, Taylor and Francis, Boca Raton, FL, 431 pp.
2. Lal, R., Kraybill, D., Hansen, D.O., Singh, B.R., Mosogoya, T., Eik, L.O. (Eds) 2016. Climate Change and Multi-Dimensional Sustainability in African Agriculture. Springer, Cham, Switzerland.
3. Lal, R (Ed). 2016. Encyclopedia of Soil Science. Third Edition, CRC Press, pp. 2804. ISBN 9781498738903

Referred Journal Articles

4. Aishwath, O.P., R. Lal. 2016. Resilience of Spices, Medicinal and Aromatic Plants With Climate Change Induced Abiotic Stresses. Annals of Plant and Soil Research 18(2):91-109.
5. Beniston, J.W., R. Lal and K.L. Mercer. 2016. Assessing and managing soil quality for urban agriculture in a degraded vacant lot soil. Land Degradation & Development 27(4): 996-1006.
6. Briedis, C., J.C.D. Sa, R. Lal, F. Tivet, A.D. Ferreira, J.C. Franchini, R. Schimiguel, D.D. Hartman and J.Z. Dos Santos. 2016. Can highly weathered soils under conservation agriculture be C saturated? Catena 147: 638-649.
7. Chambers, A. R. Lal, K. Paustian. 2016. Soil carbon sequestration potential of US croplands and grasslands: Implementing the 4 per Thousand Initiative. Journal of Soil and Water Conservation 71(3):68A-76A.
8. Das, A., D.P. Patel, R. Lal, M. Kumar, G.I. Ramkrushna, J. Layek, J. Buragohain, S.V. Ngachan, P.K. Ghosh, B.U. Choudhury, K.P. Mohapatra and B.G. Shivakumar. 2016. Impact of fodder grasses and organic amendments on productivity and soil and crop quality in a subtropical region of eastern Himalayas, India. Agriculture Ecosystems & Environment 216: 274-282.
9. Das, A., R. Lal, U. Somireddy, C. Bonin, S. Verma and B.K. Rimal. 2016. Changes in soil quality and carbon storage under biofuel crops in central Ohio. Soil Research 54(4): 371-382.
10. Guo, L. T. Ning, L. Nie, Z. Li, R. Lal. 2016. Interaction of deep placed controlled-release urea and water retention agent on nitrogen and water use and maize yield. European Journal of Agronomy 75:118-129.
11. Guzman, J.G., R. Lal, S. Byrd, S.I. Apfelbaum and R.L. Thompson. 2016. Carbon life cycle assessment for prairie as a crop in reclaimed mine land. Land Degradation & Development 27(4): 1196-204.
12. Hassan, A., S. S. Ijaz, R. Lal, D. Barker, M. Ansar, S. Ali, S. Jiang. 2016. Tillage effect on partial budget analysis of cropping intensification under dryland farming in Punjab, Pakistan. Archives of Agronomy and Soil Science 62:151-162.
13. Hassan, A., S.S. Ijaz, R. Lal, S. Ali, Q. Hussain, M. Ansar, R.H. Khattak and M.S. Baloch. 2016. Depth distribution of soil organic carbon fractions in relation to tillage and cropping sequences in some dry lands of Punjab, Pakistan. Land Degradation & Development 27(4): 1175-85.
14. Khan, M.N., Y. Gong, T. Hu, R. Lal, J. Zheng, M.F. Justine, M. Azhar, M. Che and H. Zhang. 2016. Effect of Slope, Rainfall Intensity and Mulch on Erosion and Infiltration under Simulated Rain on Purple Soil of South-Western Sichuan Province, China. Water. 8 (528). DOI: 10.3390/w8110528
15. Kong, X, X. Zhang, R. Lal, F. Zhang, X. Chen, Z. Niu, L. Han, W. Song. 2015. Groundwater depletion by Agricultural Intensification in China's HHH Plains Since 1980s. Agronomy Journal 135:59-106
16. Lal, R. 2016. Beyond COP21: Potential and challenges of the "4 per Thousand" initiative. Journal of Soil and Water Conservation 71:20A-25A
17. Lal, R. 2016. Global food security and nexus thinking. Journal of Soil Water Conservation 71:85A-90A.
18. Lal, R. 2016. Managing Soil and Water Resources for Sustainable Intensification of Agroecosystems in India. Indian Journal of Fertilisers 11
19. Lal, R. 2016. Potential and challenges of conservation agriculture in sequestration of atmospheric CO_2 for enhancing climate-resilience and improving productivity of soil of small landholder farms. CAB Reviews 11:009 doi: 10.1079/PAVSNNR201611009
20. Lal, R. 2016. Soil health and carbon management. Food and Energy Security 10.1002/fes3.96
21. Li, H.W., J. He, Z.P. Bharucha, R. Lal, J. Pretty. 2016. Improving China's food and environmental security with conservation agriculture. International Journal of Agricultural Sustainability 14(4): 377-91. doi: 10.1080/14735903.2016.1170330
22. Liu, M.Y., D.A.N. Ussiri and R. Lal. 2016a. Soil organic carbon and nitrogen fractions under different land uses and tillage practices. Communications in Soil Science and Plant Analysis 47(12): 1528-41. DOI: 10.1080/00103624.2016.1194993
23. Liu, R., H. Zhang, R. Lal. 2016. Effects of stabilized nanoparticles of Copper, Zinc, Manganese, and Iron Oxides in low concentrations on Lettuce (Lactuca sativa) seed germination: nanotoxicants or nanonutrients? Water, Air and Soil Pollution 227:42
24. Lorenz, K., R. Lal. 2016. Environmental impact of organic agriculture. Advances in Agronomy 139:99-152.
25. Mengistu, D., W. Bewket and R. Lal. 2016. Conservation effects on soil quality and climate change adaptability of Ethiopian watersheds. Land Degradation & Development 27: 1603-1621.
26. Munoz, M.A., J.G. Gusman, R. Zornoza, F. Moreno, A. Faz, R. Lal. 2016. Effects of biochar and marble mud on mine waste properties to reclaim tailing ponds. Land Degradation & Development 27:1227-1235.

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30. Obade, V. & Lal, R. 2016. A standardized soil quality index for diverse field conditions. The Science of the total environment, 541,424-34.
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32. Obade, V., R. Lal. 2016. A standardized soil quality index for diverse field conditions. Science of the Total Environment 541:424-434.
33. Olson, K.R., M. Al-Kaisi, R. Lal, L. Cihacek. 2016. Impact of soil erosion on soil organic carbon stocks. Journal of Soil and Water Conservation 7(3):61A-67A
34. Peiera Filho, A, J. Teixeira Filho, V. Giongo, W.L. Simoes, R. Lal. 2016. Nutrients Dynamics in Soil Solution at the Outset of No-Till Implementation with the Use of Plant Cocktails in Brazilian Semi-arid. African Journal of Agricultural Research 11:234-246.
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36. Seben Jr., G., J.E. Corá, R. Lal. 2016. Soil aggregation according to the dynamics of cabon and nitrogen in soil under difference cropping systems. Pesq. agropec. bras., Brasília 51(9): 1652-1659.
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41. Teague, R.W, S. I. Apfelbaum, R. Lal, U.P. Kreuter, J. Rountree, C. A. Davies, R. Conser, M. DeLonge, M. Rasmussen, J. Hatfield, T. Wang, P. Byck. 2016. The role of ruminants in reducing agricultrure's carbon footprint in North America. Journal of Soil and Water Conservation 71(2):156-164.
42. Tian, S.Z., T.Y. Ning, Y. Wang, Z. Liu, G. Li, Z.J. Li and R. Lal. 2016. Crop yield and soil carbon responses to tillage method changes in north china. Soil & Tillage Research 163: 207-213.
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47. Zhang, X., Kong, X., Lal, R., Zhang, F., Niu, Z., Song, W., Han, L. 2015. Groundwater depletion by agricultural intensification in China's HHH Plains since 1980s. Advances in Agronomy 135:59-106.
48. Zhang, X.Q., C. Pu, X. Zhao, J.F. Xue, R. Zhang, Z.J. Nie, F. Chen, R. Lal, H.L. Zhang. 2016. Tillage effects on carbon footprint and ecosystems services of climate regulation in a winter wheat-summer maize cropping system of the North China Plain. Ecological Indicators 67:821-829.
49. Zhao, X, S. Liu, C. Pu, X. Zhang, J. Xue, R. Zhang, Y. Wang, R. Lal, H. Zhang, F. Chen. 2016. Methane and nitrous oxide emissions under no-till farming in China: a meta-analysis. Global Change Biology22:1372-1384

Chapters in Multi-Authored Books

49. Aydin, G., M.A. Çullu, S. Ersahin, E. Akça, E. Erdogan, L. Atatanir, A. Yorulmaz, A. Cilek, M. Ersoy, S.R. Miavaghi, S. Kapur, R. Lal. 2016. Mapping soil carbon: stocks in Turkey. In R. Lal (Ed) Encyclopedia of Soil Science 3rd Edition, Taylor and Francis, pp. 1412-1415
50. Blanco-Canqui, H., R. Lal. 2016. Aggregates: tensile strength. In R. Lal (Ed) Encyclopedia of Soil Science 3rd Edition, Taylor and Francis, pp. 51-54

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93. Lal, R. 2016. Soil research in the Joint Programming Initiative on Agriculture, Food Security and Climate Change FACCE-JPI. FACCE-JPI Pre-Event on International Soil Research, January 27, 2016, Brussels
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96. Lal, R. 2016. Tenets of Soil Quality Management. Pakistan
97. Lal, R. 2016. Soil Health and Environmental Management for Sustainable Agricultural Production Systems. International Conference on Pulses for Health, Nutrition and Sustainable Agriculture in Drylands. Marrakesh, Morocco 18-20 April 2016.
98. Lal, R. 2016. Soil C for Climate Change, Food Security and SDGs of the U.N. FACCE-JPI Meeting, Brussels, Belgium 30-31 May 2016.
99. Lal, R. 2016. Environment and Agriculture. Federal University of Mato Grosso (UFMT), Cuiaba, Brazil 9-13 May 2016
100. Lal, R. 2016. Evolution of Conservation Agriculture. Federal University of Mato Grosso (UFMT), Cuiaba, Brazil 9-13 May 2016
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116.Lal, R. 2016. Nexus Thinking on Soil Carbon Dynamics and Soil Health. AGU Meeting, San Francisco, 12 December 2016
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Do you have a 2016 publication with Dr. Lal that you do not see on this list? Please contact Laura Conover (conover.55@osu.edu) with the reference information.

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

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