Carbon Management & Sequestration Center

Issue 2:2015

Minister Le Foll's Visit to C-MASC

The Honorable Minister of Agriculture of France, Mr. Stéphane Le Foll (center) , was received by Dean Bruce McPheron (left) and Prof. Rattan Lal when the Minster visited the Carbon Management and Sequestration Center on 27th June 2015, and presented a seminar. Minister Le Foll is initiating a program of soil carbon sequestration called "4 per 1000". It implies (*continued on page 2*)…

Brenda Drake and Diana Donlon Visit C-MASC

Mrs. Brenda Drake (center), wife of the President of the Ohio State University, Dr. Michael Drake, visited the Carbon Management and Sequestration Center on 2nd July 2015. Mrs. Drake was accompanied by Diana Donlon (left), Director at the Food Safety Center in San Francisco, CA. Diana's center has produced a film on soil carbon sequestration, which describes potential and challenges of soil C sequestration to mitigate climate change and advance food security.

C-MASC can now be found on Facebook under: **C-masc Osu**

Follow Dr.Lal on Twitter @lal_rattan

What's Inside...

Minister Le Foll's Visit to C-MASC

Columbus, Ohio

Honorable Minister Le Foll presented a seminar explaining the concept of "4 per 1000" (*above*), and Prof. Rattan Lal described the mission and modus operandi of the Carbon Management and Sequestration Center (*right*). Dean McPheron and Minister Le Foll are seated in the front row.

…(*continued from page 1*) sequestration carbon in soil to 0.3m depth at the rate of 0.4% per year through the adoption of best management practices. The strategy is to make agriculture a part of the solution to climate change. The goal of soil C sequestration will be realized by promoting adoption of soil and crop management practices which will create a positive soil/ecosystem C budget. Important among these practices are conservation agriculture, cover cropping, agroforestry systems, integrated nutrient management, and systems which reduce consumption of fossil fuel in performing essential farm operations. Minister Le Foll will present this strategy at the COP-21 meeting planned to be held in Paris in December 2015.

(Continued on Page 3)

The event hosting the visit of Honorable Minister Le Foll provided an opportunity to OSU faculty and administration (below) to explain potential options of synergism and cooperation with France in implementing "4 per 1000" program. Among numerous presentations included those by Dr. Michael Boehm, Vice Provost of Academic Affairs (top left), Dr. Mark Erbaugh, Director, International Programs in Agriculture (lower left) and Prof. Rattan Lal, Director of C-MASC (right) who presented some books published by C-MASC to Minister Le Foll.

Visit to the Farm of Mr. David Brandt

David Brandt began no-till farming on his Fairfield County farm in 1971, and has produced valuable information to help other farmers adopt no-till practices.

You can find out more about his farming operations below:

http://www.sare.org/Events/National-Conference-on-Cover-Crops-and-Soil-Health/Cover-Crop-Innovators-Video-Series/Dave-Brandt-Carroll-Ohio

Honorable Minister Le Foll and his entourage, along with scientific staff and visiting scholars of C-MASC and OSU Faculty, visited the farm of Mr. David Brandt (Carroll, Ohio) in the morning of 27th June. This farm converted to conservation agriculture about 40 years ago. The benefits of cover cropping and residue retention are apparent on soil quality and carbon sequestration in the top 0-30 cm layer in which, according to Mr. Brandt, soil organic concentration has increased at the rate of about 0.5% per (5 per 1000). Mr. Brandt explained the benefits of conservation agriculture, and especially of cover cropping, to climate-resilience by enhancing soil water storage. It was also indicated that cover cropping has distinct to weed control. Thus, Mr. Brandt claimed that inputs of fertilizers, herbicides and pesticides have been reduced by adopting conservation agriculture.

C-MASC Guests

Legislative Fellows Program for South and Central Asia

In June, the International Visitors Council of Columbus hosted the Legislative Fellows Program for South and Central Asia at the Ohio State University. Participants of this event also visited C-MASC to discuss potential cooperation in carbon sequestration and trading carbon credits.

Pictured (left): Ahmad Nawaz (visiting scholar), Muhammad Farooq (National Democratic Institute), Hassan N. Mirbahar (Democracy Reporting International), Sammi U. Abbasi (State Youth Assembly), Muhammad Q. Janjua (UNDP Pakistan)

Dr. Pradeep K. Sharma

Sher E Kashmir University
Kashmir, India

On June 24th, Dr. Pradeep K. Sharma, soil scientist and Vice Chancellor of the Sher E Kashmir University of Agricultural Science and Technology of Jamma, visited Dr. Lal at C-MASC. Dr. Sharma is a soil physicist with vast experiences in conducting research on basic and applied aspects of soil physical management, and with experiences f working in India, Philippines ad elsewhere. Through appropriate grant support, cooperative programs may be developed between C-MASC and Sher E Kashmir University.

Dr. Didas Kimaro

Sokoine University of Agriculture

Dr. Kimaro from the Sokoine University of Agriculture, visited C-MASC for a week, where he participated in Seminars and field tours. He is a project leader for research funded by USAID Feed the Future (FtF) Innovative Agricultural Research Initiative (iAGRI) Partnership. This project focuses on agricultural innovation for smallholder farmers through locally adapted conservation agriculture for improved food security in the context of climate change.

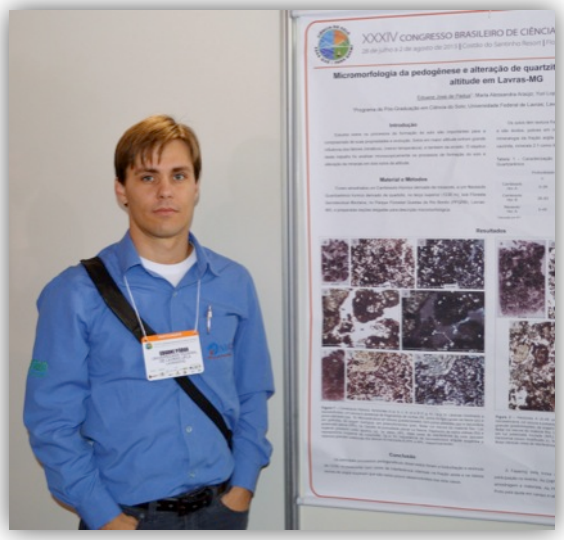
Pictured (from left to right) is Eric Stein (Graduate Student), Dr. Didas Kimaro, Prof. Tangyuan Ning (Visiting Scholar) and Dr. Warren Dick at the OSU Wooster no-till research plots.

New Visiting Scholars

Maria Munoz Garcia

PhD Scholar
Technical University of Cartagena

PhD. Agricultural Engineer with expertise on Rural Development and Environment. She has participated on strategy designs for the environmental sustainability and international cooperative research and development programs in Central and South America. Currently, she is carrying out R&D projects on new technologies in the agricultural and livestock sectors, soil carbon sequestration, waste and wastewater recycling, bioenergy and soil and landscape reclamation at Technical University of Cartagena (Spain).



Eduane Jose de Padua

Ph.D Student
Federal University of Lavras

Eduane Jose de Padua is a Ph.D. student at the Soil Science Graduate Program at the Federal University of Lavras (UFLA), Brazil. He will stay at The Ohio State University like visiting scholar, performing part of his project, entitled “Mechanisms of retention of soil organic carbon: effect of altitude”, under supervision of Dr. Lal (C-MASC/OSU) and Dr. Yuri Lopes Zinn (DCS-UFLA/Brazil). This study aims to assess the soil organic carbon content and stocks in two areas under native vegetation in southern Minas Gerais-Brazil, and how these are influenced by altitude.

Jose M. Alvarez de la Puente

Ph.D Student
Huelva University Spain

Jose M. Alvarez de la Puente is a Visiting Scholar from Huelva University Spain. He is working at *Improving Carbon footprint in the greenhouse sector*. He is using biochar as peat replacement for growing floriculture species

Existing Visiting Scholars

Clever Briedis

Ph.D Student
Ponta Grossa State University

I am PhD student in Agronomy at Ponta Grossa State University, Brazil. I was a visiting scholar at The Ohio State University for one year under supervision of Dr. Lal. While at C-MASC, my focus was to study the soil carbon stabilization and saturation in highly weathered soils, whereupon I wrote a paper about this research. In addition, I attended to the weekly seminars, where I could present two seminars about my topics of interest and could learn a little more about the studies developed by the research group. I attended to the “Soils and Climate Change” and "Environmental Soil Physics" classes provided by Dr. Lal. I am very grateful for my time at C-MASC and hope to keep in touch with Dr. Lal and all C-MASC group for future research and collaboration.

Arun Joyti Nath

Assistant Professor
Assam University

It was an excellent opportunity for me to work in prestigious Carbon Management and Sequestration Center, The Ohio State University under the guidance of Dr. Rattan Lal. During my research stay I could collaborate with different staffs, students and visiting research scholars of C-MASC that helped me in effectively implementing a multi-faceted research programme on understanding soil carbon dynamics and carbon sink capacity for climate change adaptation and mitigation. My stay helped me to learn how to write good scientific research paper. As a result of that I published my research in Global Ecology and Conservation and Science of the Total Environment and also could communicate another six research paper in several leading journals. My short term stay was very successful in terms of publication. Besides, attending classes of Dr. Lal helped me to learn the ways of conducting good classes. I am extremely grateful to all the staff and visiting scholars for their kind co-operation during my stay.

Existing Visiting Scholars

Tangyuan Ning

Professor
Shandong Agricultural University

Dr. Tangyuan Ning is a professor in Agricultural College, Shandong Agricultural University. He has been engaged in researches of straw returning and tillage methods on soil carbon sequestration, crop carbon fixation, and water- nutrition utilization in maize and wheat cropping system, and water-soil-waste nexus in maize and wheat cropping system.

He is a visiting scholar at the C-MASC from 5 June 2014 to 7 June 2015 under supervision of Dr. Rattan Lal under themes: Carbon Farming Systems for Food Security and Soil Carbon Sequestration with Higher Use Efficiencies of Water and Nitrogen.

Dr. Ning was exposed to various field experimental sites throughout Ohio, and has learned to test soil characters, GHGs and ^{13}C in soil and plant samples. He attended 2014 Farm Science Review on 16 September, and the 2014 ASA, CSSA, and SSSA International Annual Meeting, Long Beach, CA with Dr. Lal. He has taken part in two classes of Dr. Lal.

He has been a valuable member of C-MASC and shared a lot of thoughtful ideas on conservation agriculture in China with us, e.g., “Diversity tillage systems are important for high-yield sustainability and carbon sequestration”, “Food safety and carbon sequestration in North China”, and “Film mulching for carbon production and sequestration in fields”.

Dr. Ning has submitted 6 journal articles co-authorship with Dr. Lal. And he has published a chapter for the Encyclopedia of Soil Science (Second Edition). Owing to his hard work in the past one year, his visit is successful and fruitful. He is grateful for his visit at C-MASC and believes that the experience gained here will help him in his future work in carbon farming systems. He gratefully acknowledges the support and hospitality received from Dr. Lal, C-MASC staff and visitors.

Graduate Students

Congratulations to recent C-MASC Graduates!

Nall Moonilall

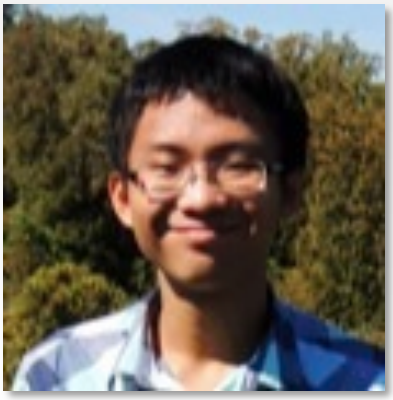
Nall will graduate with his Mc.S degree and pursue a Ph.D at OSU beginning this autumn semester. His thesis titled, "Impact of Amendments on Soil Properties and Agronomic Productivity in Guyana," was the product of a research program he developed though connections made with scientists and institutions in Guyana.

Claire Sutton

Claire will graduate with a Mc.S degree summer term 2015 after successfully defending her thesis titled, "Sustainable Agriculture in Smallholder Farms of Tanzania." Claire's research in Tanzania was in collaboration with the iAgri Project.

Chris Eidson

Chris' thesis titled, "Cereal rye, soil quality, and corn-soybean yields at threes sites in the U.S. Corn Belt" involved a considerable use of statistical procedures. Having received his Mc.S degree and a minor in statistics, he will pursue a Ph.D at OSU beginning autumn 2015.

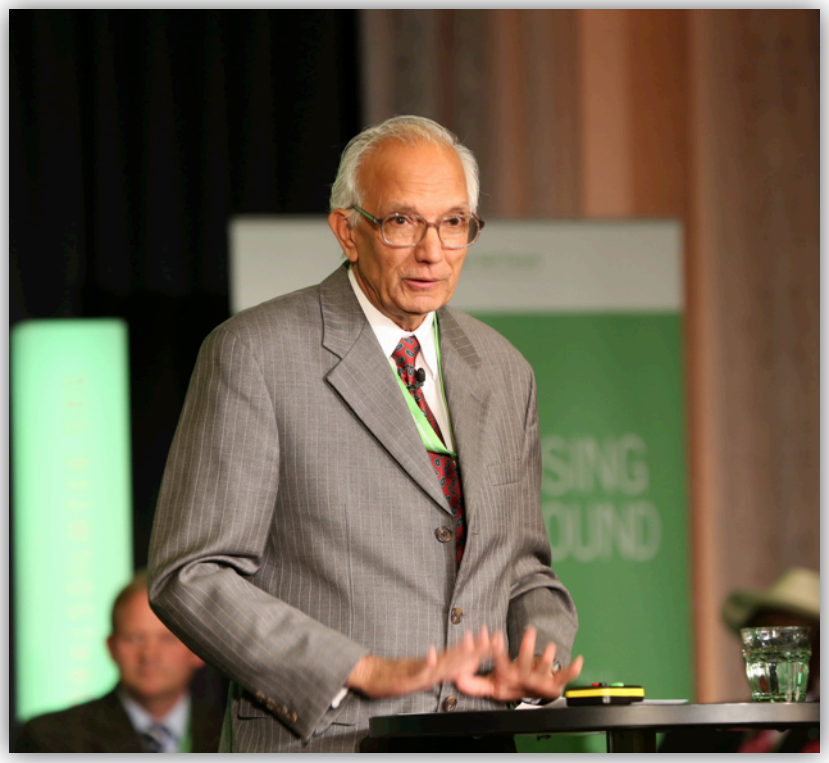


Yiming Zhang

Yiming conducted research on comparative assessments of trends in climate change for similar ecoregions in China and USA, and submitted multiple manuscripts for publication in climate-oriented journals. His thesis, "Trends of Air Temperature, Precipitation and Potential Evapotranspiration in Southeastern United States and East-central China," was successfully defended, and he graduated with a Mc.S degree Spring 2015.

Global Soil Week

Berlin, Germany



The Third Global Soil Week, organized by the Institute for Advanced Sustainability Studies (IASS, Potsdam, Germany) was organized in Berlin from 19-23 April, 2015. The event was attended by over 600 participants from 80 countries. Prof. Lal presented two articles (*below*), and held discussions with several visitors for potential cooperation on themes of mutual interest.

Challenges of Measuring and Managing Soil C Sink for Mitigating Climate Change
http://cmasc.osu.edu/images/Measuring_and_Managing_(Germany)_04062015.pdf

Soil as a Sink of Atmospheric CO_2 and CH_4
http://cmasc.osu.edu/images/Soil_as_Sink_(Germany)_05132015.pdf

Global Soil Week

Global soils week (GSW) is an international forum to discuss emerging concepts, and to deliberate options of translating scientific knowledge into action for implementation of proven technology. Prof. Rattan Lal is a member of the International Steering Committee, and has worked very closely with IASS since 2010. He was the Senior Science Advisor to IASS when Global Soil Forum and Global Soil Week were initiated. Dr. Klaus Lorenz and Prof. Lal organized several conferences during 2012 and 2013 which led up to the initiation of GSW.

Outcomes of the conference including short summary videos and presentations can be found here:

http://globalsoilweek.org/global-soil-week/gsw-2015/outcomes

International Conference on Climate Change and Multi-Dimensional Sustainability in African Agriculture

Morogoro, Tanzania

Dr. Lal attended Second iAgri Conference in Morogoro, Tanzania from 2nd-6th June 2015. Photographed (*above, left to right*) are Bal Ram Singh, Rattan Lal, David Hansen, and Lars Eik in front of a Baobab tree.

The Baobab tree (*Adansonia digitata*) is a prominent landmark in the semi-arid region of sub-Saharan Africa. It is a tree protected by the rural community and plays an important role in culture and tradition. These trees can store up to 100,000 L of water, enabling them to survive harsh drought conditions particular to this region. Most trees can survive for a longtime. A tree was dated and found to be 1275 years old. Some species are sources of fiber, dye, fuel and decorative crafts. Leaves of some species are eaten as a leaf vegetable, and seeds are a source of vegetable oil. Baobabs are also a habitat for birds including the weaver (*Ploceidae spp*).

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iAGRI Innovative Agricultural Research Initiative

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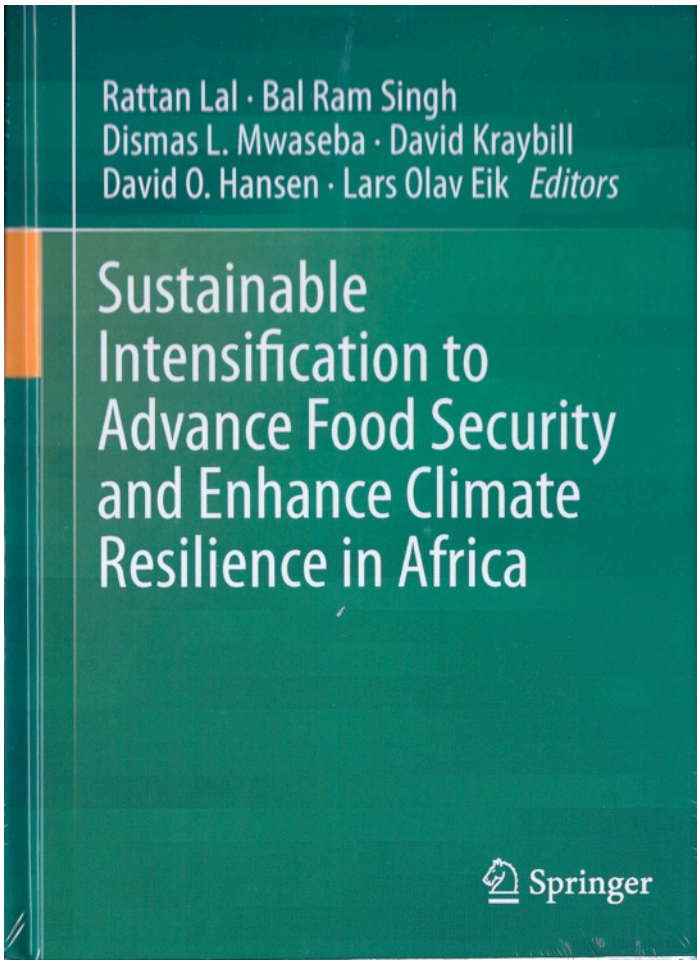
FEED THE FUTURE The U.S. Government's Global Hunger & Food Security Initiative

The OSU team to attend the conference was led by Dr. Steve Slack (*below, front row, left*) and included Dr. Mark Erbaugh, Dr. David Hansen, Dr. Robert Agunga and Prof. Lal. Other participants from OSU included Mr. Pat Bell (graduate student at C-MASC), and Dr. David Kraybill, Chief of the Party. Proceedings of the 2013 conference were published in 2015 (*left*), and those of 2015 Conference will be published by March 2016.

Prof. Lal presented a keynote paper, "Environmental Sustainability." He also provided that synthesis report as the conclusion of the conference. These presentations, following a review and revision will be included in the book to be published by Springer.



During the field tour, participants from the Ohio State University, Rattan Lal and David Hansen (*right, center*) and Norwegian University of Life Science, Drs. Eik and Singh (*right, outside*) visited the traditional system of producing wood charcoal in the Morogoro area. Wood charcoal is a fuel sources in rural areas of sub-Saharan Africa, and in suburbs of large cities.

NC-1178 Annual Meeting

The Ohio State University
Columbus, OH

On 2-4 June, C-MASC hosted the Annual NC-1178 Regional Planning Meeting. There is a strong interest in harvesting crop residues to produce cellulosic ethanol. It is, thus, pertinent to assess the impacts of residue removal on soil properties and crop growth. Therefore, long-term field experiments on residue management under no-till (NT) system of seedbed preparation were established in 2004 at the experimental farm of the North Appalachian Experimental Watershed of USDA-ARS at Coshocton, Ohio.

All cooperators and the Scientific Advisor, Dr. Gary Pierzynski (*above, front row, second from left*) attended the meeting, which included a field tour to Wooster and Coshocton sites (*photographed right*)

Relevant Publications:

Beniston, J.W., Shipitalo, M.J., Lal, R., Dayton, E.A., Hopkins, D.W., Jones, F., Joynes, A., Dungait, A.J. 2014. Carbon and macronutrient losses during accelerated erosion under different tillage and residue management. European Journal of Soil Science, DOI: 10.1111/ejss.12205

Lal, R. 2014. Biofuels and carbon offsets. Biofuels. 5(1), 21-27.

Lal, R. 2014. Societal value of soil carbon. Journal of Soil and Water Conservation 69: 186A-192A.

Lal, R. 2015. Sequestering carbon and increasing productivity by conservation agriculture. J. Soil Water Conserv. 70(3):55A-62A

Lal, R. 2015. A System Approach to Conservation Agriculture. Journal of Soil and Water Conservation. (In press)

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.

Soil Carbon Sequestration and Food Security

INRA, Paris, France

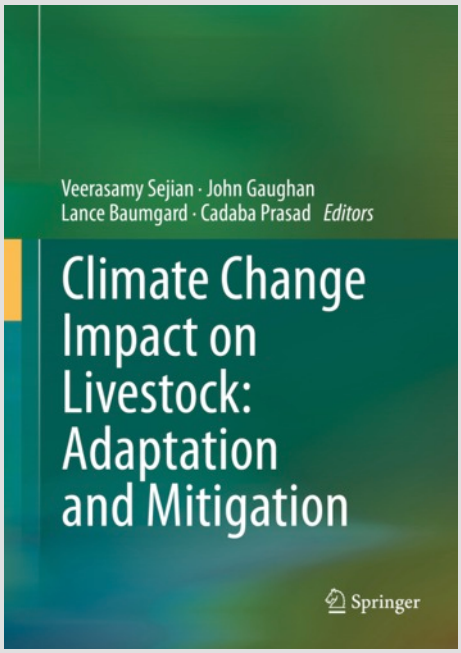
The workshop entitled, "Soil Carbon Sequestration and Food Security" was held at the Headquarters of INRA, Paris on 7th July 2015. The side event was convened by three French research organizations (CIRAD, INRA, and IRD). The workshop was organized by Dr. Jean-François Soussana, Scientific Director of INRA. The workshop, attended by about 50 participants from around the world, was supported by several international organizations (CGIAR, CFAES, GRA, Global Soil Partnership AGMIP, FACCE-JPI, UNEP, African Soil Carbon Network, Global Soils Weeks, etc). The Honorable French Minister of Agriculture, Mr. Stéphane Le Foll, delived the opening speech. Prof. Lal presented a talk entitled, "Estimating the Potential of Soil Carbon Sequestration" (*Link below*).

The photo above shows some of the participants at the workshop. Prof. Lal is standing with Dr. Martial Bernoux (*right*), Dr. Claire Chenu (*left*) and Dr. Niels Batjes of ISRIC (*back row*). Partly visible in the back row is Dr. Mingsheng Fan of the CAU, Beijing, who was a Visiting Scholar at C-MASC during 2012

Dr. Lal's presentation can be found here: http://cmasc.osu.edu/images/Paris_6192015_FINAL.pdf

C-MASC Alumni and Announcements

Endeavour Research Fellowship
Dr.Veerasamy Sejian, Senior Scientist, ICAR-National Institute of Animal Nutrition and Physiology received the prestigious Endeavour Research Fellowship from the Australian Government. Dr.Sejian was a visiting scholar at C-MASC, The Ohio State University. The award is given to Dr.Sejian for his outstanding contribution in establishing the impact of climate change on livestock production and its amelioration. The award is for six month duration. Dr.Sejian will be working on "Metabolic and inflammatory responses of feedlot cattle exposed to chronic heat load" at The University of Queensland, Gatton, Australia under the guidance of Dr.John Gaughan between August 2015 to February 2016.



New Springer Book Published
Dr.Veerasamy Sejian published a new Springer book entitled "Climate Change impact on Livestock: Adaptation and Mitigation" involving 27 chapters 532 pages and 67 figures including 50 color figures.

A Surprising View from the Roof

Rooftop garden in the Howlett Hall of the Ohio State Univerity.

C-MASC Publications

Books Edited

- Lal, R., B.R. Singh, D.L. Mwaseba, D. Kraybill, D.O. Hansen, L.O. Eik (Eds). 2015. Sustainable Intensification to Advance Food Security and Enhance Climate Resilience in Africa. Springer, Dordrecht, Holland, 665 pp.
- Lal, R. B. Stewart. 2015. Precision Agriculture, Taylor and Francis, Boca Raton, FL.

Journal Articles

- Antille, D.L., W.C.T. Chamen, J.N. Tullberg, R. Lal. 2015. The Potential of controlled traffic farming to mitigate greenhouse gas emissions and enhance carbon sequestration in arable land: a critical review. Am. Soc. Ag. Biol. Engin. 58(3):707-731.
- Beniston JW, Shipitalo M, Lal R, Dayton EA, Hopkins DW, Jones FS, Joynes A, Dungait JAJ.(2015) Carbon and macronutrient loss during accelerated erosion from different tillage and residue management systems. European Journal of Soil Science 66: 218-225 DOI: 10.1111/ejss.12205.
- Bandyopadhyay, K. and R. Lal. 2015. Effect of long term landuse management practices on distribution of C and N pools in water stable aggregates in Alfisols. J. Indian Soc. Soil. Sci. 63(1):
- Gour, S.P., S.K. Singh, R. Lal, R.P. Singh, J.S. Bohra, J.P. Srivastava, S.P. Singh, M. Kumar, O. Kumar, A.M. Latare. 2015. Effect of organic sources of plant nutrients on growth and yield of rice (oryza sativa) and soil fertility. Indian Journal of Agronomy 60(2):18-21.
- Lal, R. 2015. Managing soil carbon through sustainable intensification of agro-ecosystem. Tropical Agricultre Association, Spring 2015, 24:13-18.
- Lal, R. 2015. Restoring soil quality to mitigate soil degradation. Sustainability 7:5875-5895
- Lal, R. 2015. Sequestering carbon and increasing productivity by conservation agriculture. J. Soil Water Conserv. 70(3):55A-62A
- Lal, R. 2015. A System Approach to Conservation Agriculture. Journal of Soil and Water Conservation 70(4):82A-88A
- Lal, R. 2015. Soil Carbon Sequestration in Agro Ecosystems of India. J. Indian Soil Sci. Soc. 63(2):125-143.
- Li, N., T. Ning, Z. Cui, S. Tian, Z. Li, R. Lal. 2015. N_2O emissions and yield in maize field fertilized with polymer-coated urea under subsoiling or rotary tillage. Nutr. Cycl. Agroecosyst. DOI 10.1007/s10705-015-9713-6
- Nath, A.J., R. Lal, A.K. Das. 2015. Ethnopedology and soil quality of bamboo (Bambusa sp.) based agroforestry system. Science of the Total Environment 521:372-379.
- Nath, A.J., R. Lal, A.K. Das. 2015. Managing woody bamboos for carbon farming and carbon trading. Global Ecology and Conservation 3:654-663.
- Velmurugan, A., T.P. Swarnam, R. Lal. 2015. Effect of land shaping on soil properties and crop yield in tsunami inundated coastal soils of Southern Andaman Island. Agriculture, Ecosystems and Environment 206:1-9.
- Vilmundardóttir, O.K., R. Lal. 2015. Between ice and ocean; soil development along an age chronosequence formed by the retreating Breiðamerkurjökull glacier, SE-Iceland. Geoderma 259-260:310-320
- Xue, J., C. Pu, S. Liu, Z. Chen, F. Chen, X. Xiao, R. Lal, H. Zhang. 2015. Effects of tillage systems on soil organic carbon and total nitrogen in a double paddy cropping sstem in Southern China. Soil & Tillage Research 153:161-168.

Invited Keynote Presentations

- Lal, R. 2015. Soil Security and Carbon Sequestration. Malaysian Society of Soil Science, Soil Security for Increasing Crop Production, Kuala Lumpur, Malaysia, 7-8 April 2015
- Lal, R. 2015. Challenges of Measuring and Managing Soil C Sink for Mitigating Climate Change. Global Soil Week 2015, Berlin, Germany, 20-23 April 2015 .
- Lal, R. 2015. Soil as a Sink of Atmospheric CO_2 and CH_4. Global Soil Week 2015, Berlin, 20-23 April 2015
- Lal, R. 2015. Global Issues and IUSS. U.S. National Committee for Soil Science, Washington D.C., 7-8 May, 2015.
- Lal, R. 2015. Environmental Sustainability. International Conference on Climate Change and Multi-dimensional Sustainability in African Agriculture, Morogorro, Tanzania, 3-5 June, 2015
- Lal, R. 2015. Synthesis. International Conference on Climate Change and Multi-dimensional Sustainability in African Agriculture, Morogorro, Tanzania, 3-5 June, 2015
- Lal, R. 2015. Managing Landscape for Environmental Sustainability. International Conference on Climate Change and Multi-dimensional Sustainability in African Agriculture, Morogorro, Tanzania, 3-5 June, 2015
- Lal, R. 2015. Global Issues and IUSS. International Conference on Climate Change and Multi-dimensional Sustainability in African Agriculture, Morogorro, Tanzania, 3-5 June, 2015
- Lal, R. 2015. Achieving Emission Neutrality in Australia by Managing Terrestrial Carbon Pool and Using Nuclear Energy. National Workshop on Nuclear Energy for Australia, Cooperative Research Center for Contamination Assessment and Remediation of the Environment (CRC-CARE) National Workshop on Nuclear Energy for Australia, Adelaide, Australia, 16 June, 2015.

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

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