THE OHIO STATE UNIVERSITY

Carbon Management and Sequestration Center

Carbon Management & Sequestration Center

Issue 3:2014

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

Our old page has been discontinued, please follow the new one for the latest information on C-MASC!

Follow Dr.Lal on Twitter @lal_rattan

C-MASC gathers for a recent weekly seminar. From left to right: Dr. Richard Liu (Post Doc), Maninder Wahlia (M.Sc student), Dr. Meiling Zhang (VS – China), Dr. Xiangbin Kong (VS – China), Dr. Toru Nakajima (Post Doc), Dr. Jose Guzman (Post Doc), Dr. Rattan Lal (Director), Basant Rimal (Staff), Dr. David Ussiri (Research Scientist), Klaus Lorenz (Assistant Director), Dr. Tangyuan Ning (VS – China), Nall Moonilall (M.Sc Student), Yiming Zhao (M.Sc Student), Jennifer Donovan (Staff), Scott Mayhew (M.Sc Student), Clever Briedis (VS – Brazil)

Transition in Management

Jennifer Donovan moves to a new department within OSU, she has been with C-MASC for almost two years. We wish her the best in her future position as she continues to serve OSU!

What's Inside...

Visiting Scholars	2
New Visiting Scholars	6
New Graduate Students	6
New Researchers	6
Graduate Student News	7
C-MASC Alumni	8
Farm Science Review	8
C-MASC Seminar	8
Dr. Lal's Latest	9
Latest Journal Publications	10

Visiting Scholars - An Integral Component of C-MASC

Ricardo de Oliveira Bordonal
rbordonal@yahoo.com.br
December 2013 – August 2014

Mr. Ricardo de Oliveira Bordonal is a PhD student in Agronomy at Faculty of Agricultural Sciences and Veterinary at Jaboticabal campus, São Paulo State University (FCAV/UNESP), studying under scholarship from the CAPES Foundation, Ministry of Education of Brazil. He was a visiting scholar at The Ohio State University, from 5 December 2013 to 31 August 2014 under supervision of Dr. Lal, working with greenhouse gas inventory associated with sugarcane production in south-central Brazil. During his visit at C-MASC, he submitted an article to the journal which is the chapter of his thesis. Also, he wrote an abstract entitled "Greenhouse gas assessment of sugarcane-based ethanol considering direct land use change and its cultivation in Brazil", which was accepted to be presented in the 2014 International Annual Meeting, Long Beach, CA. Presently, he is writing a review article on environmental impacts of sugarcane-based ethanol in Brazil and a book chapter for the Encyclopedia of Soil Science (2nd Edition).

In addition, Ricardo performed the following activities:

- He attended weekly seminars of the research group;
- He presented the two seminars, both entitled "Inventorying greenhouse gas balance from sugarcane production in south-central Brazil", for the weekly seminar and the Research Review Day;
- He attended the following classes as a Visiting Scholar: “Soils and Climate Change” and "Environmental Soil Physics" at The Ohio State University from January through April 2014;
- He visited the Coshocton field research site and had a chance to see the lysometer and USDA research experiments located there. A trip with Dr. Gerald Allen, postdoctoral researcher at C-MASC, to the WILDS in Muskingum County was another great opportunity to observe the surface water runoff and soil erosion experiments there along with the wild animals (www.thewilds.org).

Mr. Ricardo would be very happy to have future collaborations with Dr. Lal and C-MASC for future research, publications and visits and is grateful for his time here at C-MASC.

Visiting Scholars - An Integral Component of C-MASC

Dr. A. Velmurugan
vels_21@yahoo.com
December 2013 – August 2014

CIARI
ICAR
तमसो मा ज्योतिर्गमय

Dr. A.Velmurugan is a Senior Scientist (Soil Science) & Head i/c of Division of Natural Resource Management, Central Island Agricultural Research Institute, ICAR, Port Blair, Andaman and Nicobar Islands, India. He has been engaged in research and developmental work in the field of soil resource assessment, remote sensing and geoinformatics, land degradation management, climate change and biogeochemical cycles. He was deputed by the National Agricultural Innovation Project of the Indian Council of Agricultural Research funded by Global environmental facility (GEF) to undergo training and exposure at Carbon Management and Sequestration Center (C-MASC), School of Environment and Natural Resources, The Ohio State University under the theme "Land degradation management and Carbon Sequestration".

The training program, under the supervision of Dr. Rattan Lal, covered recent advances in the field of soil carbon sequestration, land degradation and land quality measurement with reference to Island ecosystem. Prof. Lal conducted special classes/personal meetings focusing on the importance of carbon sequestration, land degradation and minimum data sets for soil quality assessment. He also discussed about the technological options/measure for the management of degraded land in a tropical Island ecosystem in details.

Dr. Velmurugan was also exposed to various field experimental sites at Waterman Farm, OSU; biofuel experiment on mine soils, Zanesville; long-term no-tillage experiments at North Appalachian Experimental Watersheds, Coshocton (OARDC) and Olentangy River wetland research park, OSU along with other research scholars of CMASC.

During his stay at C-MASC, Dr. Velmurugan learned to use some important equipment such as Photoacoustic Spectrometer, infra-red CO_2 gas analyzer (LICR-6400), mass spectrometer, gas chromatography and CN Analyzer. He took observation of green house gas flux at tillage experimental farm at Coshocton (OARDC) and Waterman Farm, OSU. He also learned about soil aggregate analysis.

In addition, Dr. Velmurugan delivered a lecture on "Degraded coastal land management and food security: A case study of Andaman Islands, India" and attended the weekly seminars delivered by different C-MASC research scholars. 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 Prof. Lal, his staff and the research scholars for enriching his knowledge and warm hospitality at C-MASC, OSU. He strongly believes that his experiences at C-MASC will be helpful in fine tuning his current and future research work in Island ecosystem. He wishes to stay in contact with C-MASC.

Visiting Scholars - An Integral Component of C-MASC

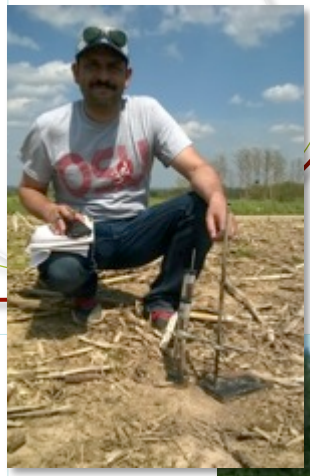
Dr. Sudhir Verma
sudhir.verma@outlook.com
August 2013 – August 2014

Dr. Sudhir Verma, Assistant Professor in Dr YS Parmar University of Horticulture and Forestry at Regional Horticulture Research & Training Centre and Krishi Vigyan Kendra, Sharbo, Kinnaur, Himachal Pradesh, India visited C-MASC from 16th August 2013 to 13th August 2014 under Raman Post-Doc Fellowship from UGC, New Delhi. He conducted his research under the guidance of Dr. Lal at the North Appalachian Experimental Watershed (NAEW), near Coshocton, Ohio, USA. Study objectives were to 1) quantify the impact of residues removal on soil organic carbon (SOC) concentration, stock, soil structure, soil water retention, hydraulic conductivity and relative gas diffusivity; 2) quantify redistribution of SOC derived from corn residues across the slope under continuous no-till system; 3) study the effect on soil physical properties at various landscape positions across the slope, and 4) study the CO_2 emissions at various landscape positions across the slope.

As part of his research and training at C-MASC, he was acquainted with greenhouse gas (GHG) sampling and different equipment like Gas Chromatograph, CN analyzer, TOC analyzer, FIA, and techniques of soil air sampling. He also learned field level monitoring of GHG emissions using Photoacoustic Spectrometer (PAS) and Infrared CO_2 gas analyzer (LICR-6400), and measurement of soil gaseous diffusivity. He attended weekly seminars at C-MASC; presented a seminar entitled “Impact of stover removal on soil physical properties and carbon stocks under no-till corn”; and attended SENR courses on “Soils and Climate Change” and “Environmental Soil Physics” taught by Dr. Lal. He successfully completed Environmental Health and Safety (EHS) program (online) on “Hazard Communication (CFR 1910.1200) related to occupational exposure to hazardous chemicals in the workplace.

During his stay at C-MASC, he visited the historical Coshocton wheel and Lysimeter at the experimental farm of NAEW near Coshocton; the oldest no-tillage experiment (started in 1962) at The Ohio Agricultural Research and Development Center (OARDC), Wooster, OH; eco-restoration activities at the wildlife conservation center (WILDS) in Muskingum County, Ohio; the experiment on restoration of mine soils using biofuel crops at Zanesville, OH and various experiments at Waterman Farm, OSU. He also visited the 2013 Farm Science Review in London, Ohio. He attended the ASA, CSSA, and SSSA 2013 International Annual Meeting on theme “Water, Food, Energy and Innovation for a Sustainable World” from Nov. 3-6, 2013 at Tampa, Florida, USA, and various activities at OSU including Taste of OSU, Thanksgiving and OIA programs (India Gateway Program, visit to COSI, etc.).

Sudhir is grateful for his time at C-MASC and believes that the experience gained here will help him in his future work. He gratefully acknowledges the support and hospitality received from Dr. Rattan Lal, C-MASC staff and students.



Visiting Scholars - An Integral Component of C-MASC

Dr. Alexander Gennadyiev
alexagenna@mail.ru
August 2014

Dr. Gennadiyev is a professor of Soils and Environmental Geochemistry, Head of Laboratory of Biosphere's Carbonaceous Substances Faculty of Geography, Moscow State University (MSU), Moscow, Russia. He visited C-MASC for the period of July 30th to August 9th. His areas of expertise: include natural evolution and human-induced changes of soils, environmental geochemistry of organic pollutants (especially polycyclic aromatic hydrocarbons), soil classification and mapping, US soil conservation policy. He teaches "Soils of the World", "Fundamentals of Soil Science", "Environmental Protection within Off-Shore Oil and Gas Extraction Areas", etc.

Dr. Gennadiyev and Dr. Rattan Lal had meetings with OSU Vice Provost for Global Strategies and International Affairs, Dr. William Brustein, and the Director of International Programs in Agriculture, Dr. Mark Erbaugh. Topics of discussion were possible research and academic cooperation between OSU and MSU in the field of environmental protection and soil conservation as well as other areas of natural and agricultural sciences.

Dr. Gennadiyev visited Carbon Analysis Lab and discussed with Dr. David Ussiri the application of isotope in agricultural soils. They also discussed about the application of isotope ratios in quantifying geogenic (fossil) materials including coal, oil, natural gas as well as soils, and techniques for distinguishing old (fossil) and new carbon in soil.

Dr. Gennadiyev visited the Ohio Agricultural Research and Development Center at Wooster and North Appalachian Watershed in Coshocton.

Dr. Gennadiyev also presented the seminar titled "Quantitative Assessment of Soil Erosion by Magnetic Tracer Method at the sites within Russia and USA".

New Visiting Scholars

Dr. Xiangbin Kong
Visiting Scholar – China
Professor
China Agricultural University
kxb@cau.edu.cn
August 2014 – January 2015

Antonio Pereira Filho
Visiting Scholar – Brazil
Ph.D Student, UNICAMP
Assistant Professor, UNIVASF
tonyunivasf@gmail.com
September 2014 – February 2015

Dr. Meiling Zhang
Visiting Scholar – China
Associate Professor
Gansu Agricultural University
657936537@qq.com
July 2014 – June 2015

New Graduate Students

Reed Johnson, ESGP, M.Sc
Hometown: Laura, OH
Undergraduate: B.S. Environmental Science - OSU
Research: Soil Carbon Dynamics
Hobbies: Hiking/Fishing/Hunting, Basketball, Church Activities

Scott Mayhew, ESGP, M.Sc
Hometown: Beavercreek, OH
Undergraduate: B.S. Environmental Science - OSU
Research: Soil Water Movement
Hobbies: Soccer, Biking, Cooking, and Reading

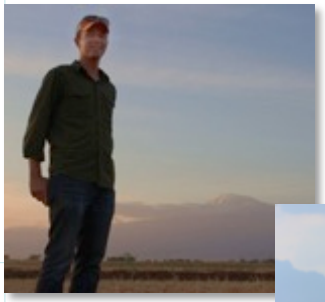
New Researchers

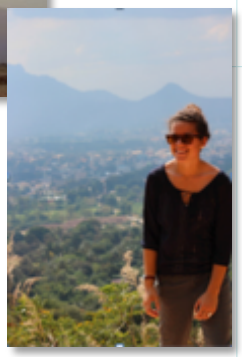
Klaus Lorenz, Research Scientist
Columbus, OH

David Ussiri, Research Scientist
Columbus, OH

Sami Khanal, Research Scientist
Wooster, OH

C-MASC Graduate Students





iAGRI Project – Tanzania

The Office of Outreach and Engagement at The Ohio State University awarded the University's 2014 Emerging International Engagement Award to iAGRI, or the Innovative Agricultural Research Initiative, on May 1, 2014 at the Outreach and Engagement Recognition Ceremony at the Ohio Union. iAGRI , which is administered by the Office of International Programs in Agriculture within the College of Food, Agricultural, and Environmental Sciences, is a 5 year food security project funded by the United States Agency for International Development (USAID) and is a major Feed the Future project in Tanzania.

Ohio State leads five other U.S. land-grant institutions in the effort to build the long term training and research capacity of Sokoine University of Agriculture and Tanzania's Ministry of Agriculture, Food Security, and Cooperatives. Dr. Mark Erbaugh, Director of International Programs in Agriculture, Dr. Dave Hansen, iAGRI Project Coordinator, gratefully accepted the award.

Dr. Lal's graduate students, Claire Sutton (M.Sc) and Patrick Bell (Ph.D), have been working on the iAGRI project, just finishing their second summer of research in Tazania. Patrick Bell will continue in Tazania for the next year on a Borlaug Fellowship.

Ohio Farm Bureau Foundation

Twelve young Ohioans have been named recipients of $1,500 college scholarships from the Ohio Farm Bureau Federation Foundation. Supported by the Ohio Farm Bureau Federation, the Foundation annually recognizes Ohio students for their academic effort, engagement in their communities and career interests that link agriculture to community service, education or scientific research.

One of these winners for 2014 is Nall Moonilall of Miami, FL. He is a recipient of the Ohio Farm Bureau Foundation Scholar Award, which recognizes students for academic effort, community service and career interests that use agriculture to enhance the partnership between farmers and consumers. Moonilall graduated from Florida International University in Miami, Fla., and is pursuing a master's degree at Ohio State University in environmental science with emphasis on soil science. He is advised by Dr. Rattan Lal.
http://ofbf.org/media-and-publications/news-room/650/

C-MASC Alumni

Alumni Receives ICAR National Fellow

Dr. Debashis Mandal, a Senior Scientist, Division of HRD&SS, CSWCRTI, was visiting scholar with C-MASC from September-December 2013

Dr. Mandal was recently awarded the ICAR National Fellow.

He would like to thank C-MASC for their support, encouragement and motivation. The detailed project proposal was prepared during his time as a visiting scholar. He is grateful for the kind help and valuable suggestions given to improve the quality of the proposal.

Congratulations Dr. Mandal! dmandalcswcrti@gmail.com

2014 Farm Science Review

The annual Farm Science Review was held in London, Ohio again this year, 16-18 September 2014. Chris Eidson, an M.Sc graduate student advisee of Dr. Lal's, took a group of our current visiting scientist to see the latest innovations in agriculture.

http://fsr.osu.edu/

Thomson Reuters: The World's Most Influential Scientific Minds

Rattan Lal, Distinguished University Professor of Soil Science, CFAES's School of Environment and Natural Resources, recently was named to Thomson Reuters' list of The World's Most Influential Scientific Minds. The list includes more than 3,200 scientists from around the world,12 from Ohio State. Thomson Reuters created the list "by analyzing data using its Web of Science and Incites platforms to determine which researchers have produced work that is most frequently acknowledged by peers," a company website said. "These individuals are influencing the future direction of their fields, and of the world."
Congratulations, Dr. Lal!
http://sciencewatch.com/sites/sw/files/sw-article/media/worlds-most-influential-scientific-minds-2014.pdf

Dr. Lal's Latest

Lal Named to UNU-FLORES Advisory Committee

Dr. Lal was recently appointed as the chair to the UNU-FLORES Advisory Committee. The International Advisory Committee is an organ providing advice and guidance to the Director of UNU-FLORES in accordance with the general principles, policies and criteria formulated by the Council of the United Nations University to govern the activities of the University.

http://flores.unu.edu/advisory-committee/

UNITED NATIONS UNIVERSITY
UNU-FLORES

Dr. Lal recently visited the Norwegian University Life Sciences (UMB) in As, Norway. He received an honorary doctorate (honoris causa) by former UMB (2005). He gave a lecture on the relationship between soil and peace. Lal was one of two opponents for a Ph.D exam. The other was Thomas Kattere, who has a doctorate in ecology and the environment.

Norwegian University of Life Sciences

Professor Bal Ram Singh, Professor Rattan Lal, Rector Mari Sundli Tveit and Professor Thomas Katterer in September 2014. (Photo: Ruth Lothe)

Latest C-MASC Journal Publications

- Klaus Lorenz, K., Lal, R. 2014. Soil organic carbon sequestration in agroforestry systems: A review. Agron. Sustain. Dev. 34:443–454.
- Morel, J.L., Chenu, C., Lorenz, K. 2014. Ecosystem services provided by soils of urban, industrial, traffic, mining, and military areas (SUITMAs). J Soils Sediments. DOI: 10.1007/s11368-014-0926-0
- Guzman, Jose G., Lal, Rattan, Byrd, Shana, Apfelbaum, Steven I., Thompson, Ry. L. 2014. Carbon Life Cycle Assessment For Prairie As A Crop In Reclaimed Mine Land. Land Degrad. Develop. DOI: 10.1002/ldr.2291
- Guzman, J.G., and R. Lal. 2014. Miscanthus and switchgrass feedstock potential for bioenergy and carbon sequestration on minesoils. Biofuels 5(3): 313-329.
- Sekar, S., Hottle, R., Lal, R. 2014. Effects of biochar and anaerobic Digester Effluent on Soil Quality and Crop Growth in Karnataka, India. Agric Res. 3(2): 137-147. DOI: 10.1007/s40003-014-0104-z
- Liu, Richard. 2014. Effects of Low Level Aqueous Hydrogen Sulfide and Other Sulfur Species on Lettuce (Lactuca sativa) Seed Germination. Communications in Soil Science and Plant Analysis. (accepted)
- Beniston, Josh. 2014. Soil organic carbon dynamics 75 years after land-use change in perennial grassland and annual wheat agricultural systems Biogeochemistry. 120(1):37-49. doi:10.1007/s10533-014-9980-3
- Alfred E. Hartemink , Rattan Lal, , Martin H. Gerzabek, Bashir Jama, Alex B. McBratney, Johan Six , C. Gustavo Tornquist. 2014. Soil carbon research and global environmental challenges. PeerJ PrePrints. http://dx.doi.org/10.7287/peerj.preprints.366v1
- Mukherjee, A. 2014. Comparison of soil quality index using three methods. PLOS One. DOI:10.1371/journal.pone.0105981
- Shadrack Batsile Dikgwatlhe, Zhong-Du Chen, Rattan Lal, Hai-Lin Zhang, Fu Chen. 2014. Changes in soil organic carbon and nitrogen as affected by tillage and residue management under wheat–maize cropping system in the North China Plain. Soil & Tillage Research. 144:110–118.
- Mukherjee, A., Lal, R., and Zimmerman, A. 2014. Impacts of 1.5-year field-aging on biochar-amended soil; Soil Science; Accepted, in press.
- Gelaw AM, Lal R, Singh B R. 2014. Carbon Footprint and Sustainability of Smallholder Agricultural Production Systems in Ethiopia. Journal of Crop Improvement, DOI:10.1080/15427528.2014.938283
- Das, Anup, R. Lal, D. P. Patel, R.G. Idapuguganti, J Layek, S.V. Ngachan, P. K. Ghosh, J. Bordoloi and M. Kumar. 2014. Effects of tillage and biomass on soil quality and productivity in lowland rice cultivation by small scale farmers in North Eastern India. Soil and Tillage Research. 143: 50-58. DOI: 10.1016/j.still.2014.05.012
- Meng, Fanqiao, Lal, R, Kuang,X, Ding, G, Wu, W. 2014. Soil organic carbon dynamics within density and particle-size fractions of Aquic Cambisols under different land use in northern China. Geoderma Regional 1:1–9.
- de Freitas Seben Jr., G., J.E. Corá, R. Lal. 2014. Land Use and Soil Management effects on Physical Attributes of an Oxisol in Southeast Brazil. Revista Brasileira de Ciência do Solo 38(4). (July-August/2014)
- Bandyopadhyay, K.K. and R. Lal. 2014. Effect of land use management on greenhouse gas emissions from water stable aggregates. Geoderma. 232-234: 363–372. DOI: 10.1016/j.geoderma.2014.05.025.
- Liu, R. & Lal, R. 2014. Synthetic apatite nanoparticles as a phosphorus fertilizer for soybean (Glycine max). Scientific Reports. 4:5686. DOI: 10.1038/srep05686.
- Gelaw AM, Singh BR, Lal R. 2014. Soil organic carbon and total nitrogen stocks under different land uses in a semi-arid watershed in Tigray, Northern Ethiopia. Agriculture Ecosystems and Environment. 188:256-263. DOI: 10.1016/j.agee.2014.02.035
- Khanal, S., Anex, R.P., Anderson, C.J., Herzmann, D.E. 2014. Streamflow Impacts of Biofuel Policy-Driven Landscape Change. PLoS One (in Press).
- Vincent de Paul Obade, Rattan Lal, and Richard Moore. 2014. Assessing the Accuracy of Soil and Water Quality Characterization Using Remote Sensing. Water Resources Management:1-19. doi: 10.1007/s11269-014-0796-7. http://link.springer.com/article/10.1007/s11269-014-0796-7

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

Carbon Management and Sequestration Center (C-MASC)
210 Kottman Hall, 2021 Coffey Rd.
Columbus, OH 43210 email rimal.1@osu.edu