

C-MASC with Special Guest Presenter Dr. Klaus Lorenz

On 29 October 2012, the C-MASC group was treated to a special presentation "Soil as the Foundation for Sustainable Development" by Dr. Klaus Lorenz, a Research Fellow at the Institute for Advanced Sustainability Studies (IASS) in Potsdam, Germany. Lorenz and his daughter & wife.

Back row: (left to right) Ryan Hottle (SENR student), Dr. Gerald Allen (Post Doc), Dr. Petra Sternberg (Post Doc), Josh Beniston (SENR student), Dr. Xiangbin Kong (Visiting Scholar (VS – China), Daniel Mengistu (VS – Ethiopia), Jennifer Donovan (staff), Dr. Sandeep Kumar (Research Scientist), Dr. (Post Doc), Toru Nakajima, (Post Doc), Molly Moran (SENR student), Dr. Upender Somireddy (Post Doc), Dr. Richard Liu (Post Doc), Hailin Zhang (Visiting Professor), Dr. Rattan Lal (Director).

Front row: (left to right) Andre Andrade (VS – Brazil), Getulio Freitas (VS - Brazil), Vincent Obade (Post Doc), Yanru Liang (VS– China), Dr. Cathi Bonin (Post Doc), Dr. Klaus Lorenz and his daughter & wife.

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Dr. Lal's Travels & Presentations

Dr. Rattan Lal has been busy traveling and promoting soil science both near and far. These are his most recent travels and presentations.

EcoSummit 2012 - Columbus, OH, USA

30 September-5 October, 2012

Global Food Security: Challenges and Opportunities



2012 Drylands, Deserts & Desertification Conference – Sede Boger, Ben Gurion University, Israel

12-15 November, 2012

Restoring Degraded Land & the Flow of Its Provisionary Services

Adapting Drylands to the Climate Change

<http://www.ipost.com/Sci-Tech/Article.aspx?id=291697>

(See page 3.)



First Global Soil Week, IASS – Berlin, Germany

19-22 November, 2012

Soil Carbon and the Science of Soil Security

Strategies for Addressing Land Degradation

Soil Organic Matter: The Elixir of Terrestrial Life

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



Golden Jubilee Symposium - PAU, Ludhiana, India

27-28 November, 2012

Managing Soils for Feeding the Carbon Civilization

<http://www.tribuneindia.com/2012/20121127/punjab.htm#1>

UNU - Institute for Integrated Management of Material Fluxes and of Resources - Dresden, Germany

10 December, 2012

Nexus of Soil, Water, Waste



Dr. Lal attended the Golden Jubilee celebration of the Punjab Agricultural University, Ludhiana, India. The PAU was established in 1962 with technical support from OSU. Thus, OSU was represented by Dr. Mark Erbaugh, Dr. David Hansen, Dr. P. Grewal and by Dr. R. Lal



FROM LEFT: Uriel Safriel of Hebrew University; Wanjira Maathi, daughter of Nobel Prize laureate Wangari Maathai; UNCCD executive secretary Luc Gnacadja; and Rattan Lal, director of the Carbon Management and Sequestration Center, speak at the Drylands, Deserts and Desertification Conference at Ben-Gurion University in Beersheba yesterday. (Sharon Udasin)

Experts: World must achieve zero net land degradation

'We have to go beyond economics. It has to be profitable to planet Earth,' UNCCD adviser urges

• By SHARON UDASIN

In order to combat the ever-increasing threat of desertification on formerly fertile lands, the world's citizens must work to achieve "zero net land degradation" – restoring as much land as has been disturbed, experts on the subject agreed.

"We admit that it is difficult to achieve zero land degradation, but fortunately – in quotes – we have a lot of degraded land," said Prof. Uriel Safriel of Hebrew University, who is also head of Israel's UNESCO Man and Biosphere program and is a focal point for the United Nations Convention to Combat Desertification (UNCCD).

Safriel was speaking at a press conference on Monday evening at the Drylands, Deserts and Desertification Fourth International Conference, on Implementing Rio+20 for the Drylands and Desertification, held at Ben-Gurion University of the Negev campus at Sde Boker. Not only do people need to reduce the rate at which land is being degraded every year, but they also need to offset the amount that has already been degraded by restoring now unusable land, according to Safriel.

"The desert is one of the places least affected by desertification on Earth," Safriel said. "We have to look at areas that are not desert and be careful not to make them desert."

As people continue to encroach upon dryland forests, additional lands that farmers begin to cultivate will fail – as forests are necessary to support agricultural land,

according to Safriel.

One of the major results of desertification and land degradation in general is hunger and poverty, explained Luc Gnacadja, executive secretary of the UNCCD.

"Land degradation is one of the major causes of food insecurity," Gnacadja said. "If we want [small farmers] to do more we need to reach out to them and help them do more with their degraded lands."

Land degradation has been driven by misplaced investments, and world leaders need to find a way to bridge the gap between activities happening on a grass-roots level and where governments are placing public investments, Gnacadja argued. More attention specifically needs to go to dry forests, rather than rainforests, as much more of the Earth's life is contained in these spaces, which are rapidly degrading into desert land, he explained.

Some ways to restore the land properly involve using drip irrigation techniques and fertilizers that increase efficiency, explained Prof. Rattan Lal, director of the Carbon Management and Sequestration Center at Ohio State University and adviser to the UNCCD.

"As long as we eat food we cannot discard agriculture," Lal said. "Agriculture has to be the number one solution to the problem of mitigating climate change."

While land restoration may not always be financially profitable, Lal argued that "we have to go to look beyond the profit issue," as land restoration is "a question of survival."

Meanwhile, it is crucial to incentivize farmers to use modern technology as agricultural tools, but to ensure that they are using such tools wisely and without excess, Lal stressed.

"We have to go beyond economics," he said. "It has to be profitable to planet Earth."

A goal of the UNCCD is to achieve zero net land degradation by 2030, and beyond that year, to restore more than is degraded, Gnacadja explained.

"There is now a kind of understanding that no one can stand on the ground of being non-affected by land degradation," he said, stressing that previously unaffected countries can no longer simply look on from afar.

"Land degradation has been for too long in the blind spot of the global plan for sustainability," said Prof. Alon Tal, co-chairman of the Green Movement and a professor at BGU's Blaustein Institutes for Desert Research.

He noted that desertification has for a long time been "the orphan of global environmental challenges."

"For too long the world has seen this as a problem of Africa and Asia and one that doesn't affect all of us," he said.

Looking at the situation with some optimism, however, Tal stressed that the knowledge for soil conservation and renewable energy development does, in fact, exist.

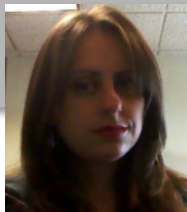
"If you go around the planet you can see that trend does not need to be destiny," he said.



Dr. Upender Somireddy

Dr. Upender Somireddy obtained his Ph.D. from the Dept. of Horticulture and Crop Science, The Ohio State University, with a specialization in weed science under the supervision of Dr. S. Kent Harrison. Upender started working at C-MASC in July, 2012.

Upender is originally from India. He received his Bachelors degree in agriculture and Masters Degree in agronomy from Acharya N.G. Ranga Agricultural University, Hyderabad, India. Before joining OSU for his Ph.D., Upender worked for three years in private and public sector organizations in India. His master's and Ph.D. research focused on integrated weed management practices in corn, and nursery and landscape situations, respectively. As a post-doctoral researcher at C-MASC, Upender is going to work on projects related to biofuels, assist in analysis of soil/water/gas samples, as well as in teaching.



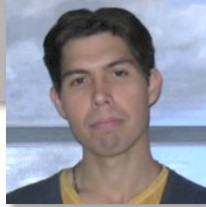
Marla Alessandra de Araujo

M.S. Marla Alessandra de Araujo is a Ph.D. Student and a visiting scholar at OSU working under the supervision of Dr. Rattan Lal. She received her B.S. in Agronomy and M.S. in Soil Science at Federal University of Paraná (UFPR), State of Paraná, Brazil. She began her doctorate at the Soil Science Graduate Program at the Federal University of Lavras (UFLA), Brazil, in 2010.

The objective of her doctoral research is to study the influence of parent rock on soil organic carbon retention. Her research areas include: soil organic carbon, soil micromorphology, soil mineralogy and soil physics.

Marla has been awarded a full scholarship from the CAPES Foundation, an agency under the Ministry of Education of Brazil, to perform part of her doctoral research during her nine months stay at the Carbon Management and Sequestration Center.

Jose Guzman



Jose Guzman is from Kansas, graduating in 2005 from Kansas State University with a B.S. in Agronomy. He received his M.S. in 2008 from Iowa State University in Soil Science under supervision of Dr. Mahdi Al-Kaisi. Most of his research dealt with soil carbon dynamics in prairie and agro-ecosystems. The main focus of the project evaluated the effects of time, topography, and ecological factors on soil carbon sequestration of newly established prairies in previously cultivated land. This work has implications on how farmers can improve on sustainable land management practices that mimic nature to improve on soil quality.

Jose continued on for a Ph.D. in Soil Management at Iowa State University. Most of his research deals with the impacts of crop residue removal on soil carbon dynamics, soil physical and chemical properties, and greenhouse gases emissions as affected by nitrogen fertilization and tillage management. His research addresses how much crop residue can be removed without negatively impacting soil organic carbon, erosion, and yields. This entailed using a field carbon budgeting approach and modeling to evaluate soil carbon sequestration in agriculture soils. Jose's future research and teaching goals are to stress the importance of sustainable agriculture by practicing sound soil and water conservation techniques by managing for soil carbon.

Jennifer Donovan



Jennifer Donovan is an Ohio native from Napoleon. She graduated from Bowling Green State University with a B.S. in Visual Communications where she completed 3 internships. She has over 12 years experience as a graphic designer.

Jennifer recently worked as a Front Desk Coordinator for zulily.com. She joined C-MASC in October and now supports Dr. Lal and his staff as an Office Associate. She is married and has 2 children ages 11 and 14.

New to C-MASC

Welcome!



Cathi, after a successful summer.

Dr. Cathi Bonin

Cathi began as a postdoc at OSU last June and has worked on biofuels and carbon sequestration. While here, she has had five manuscripts accepted for publication. Her greatest achievement while at OSU was in the summer of 2012, when she kept a recently planted biofuels experiment alive through the scorching and dry summer by hand watering 250 Miscanthus plants. Cathi is leaving to start a postdoc at Iowa State University in Ames, where she will continue her research in biofuel crops, this time with an ecological foci of biofuel establishment and invasion potential.



Planting day, with the help of Petra Sternberg, Jenni Dungait and Mostafa Ibrahim.



Miscanthus flourishing at Waterman Farm.



Dr. Xiangbin Kong



Dr. Kong was a visiting scholar at the C_MASC at The Ohio State University, during 2011 to 2012. He is a professor from the Department of Land Resource and Management, College of Resource and Environmental Sciences, China Agricultural University.

His research focuses on Carbon Sequestration, Soil Quality, Land Use Change and the Effects. He has finished some research on Soil Carbon, Climate Change and Soil Quality under the supervision of Professor Rattan Lal. Some manuscripts about his research referred to the effects of long-term fertilization managements on soil carbon pool and crop yields in HHH (Huang Huai Hai) plains in China. He also finished analyzing the effects of agricultural intensification on groundwater depletion in the HHH.

His research results indicated that the HHH region has become the highest agricultural intensification region in China. The increasing agricultural intensification not only improves crop yield quickly, but also increases SOC in the HHH. However, the agricultural intensification, especially water irrigation, led to groundwater depletion across the whole region. Thus, how to sustainably use arable land is the key issue in the HHH.



<http://www.thegef.org/gef/sites/thegef.org/files/SCCF-china.jpg?1314022816>



Daniel Mengistu



Mr. Daniel Mengistu was a visiting scholar from Addis Ababa University (AAU), Ethiopia. He was sponsored by World Bank RSM Fellowship program. He received his MA in Geography and Environmental Studies in 2006 from AAU, with a specialization in the area of Land Resources Management. His research dealt with vulnerability of water and soil resources to the impact of climate change. His research site was the Upper Blue Nile river basin, Ethiopia.

While here, he analyzed the climate and soil data of the basin to determine any trends in climate change using rainfall and temperature data for 30 years (1981-2010), analyzed soil properties for soil organic carbon, structure, texture, and permeability to estimate soil erodibility and vulnerability to soil erosion by water, collated and synthesized the rainfall data on monthly basis to compute rainfall erosivity and plot the iso-erodent map of the basin, calculated aridity index of the basin, assessed vulnerability of the soil of basin to water erosion, and evaluated comparative effectiveness of conservation practices for reducing water runoff and soil erosion for two sites within the basin.

Daniel will continue his PhD research at AAU. He will prepare manuscripts on Climate variability and change in the Upper Blue Nile Basin of Ethiopia, Climate change and soil erosion hazard in the Upper Blue Nile Basin of Ethiopia, and Effectiveness of soil and water conservation measures as climate change adaption option in the Upper Blue Nile Basin of Ethiopia. Furthermore, he will compute soil quality index based on key soil properties and collate data for climate projection (2020's, 2050's and 2080's) in the Upper Blue Nile Basin.

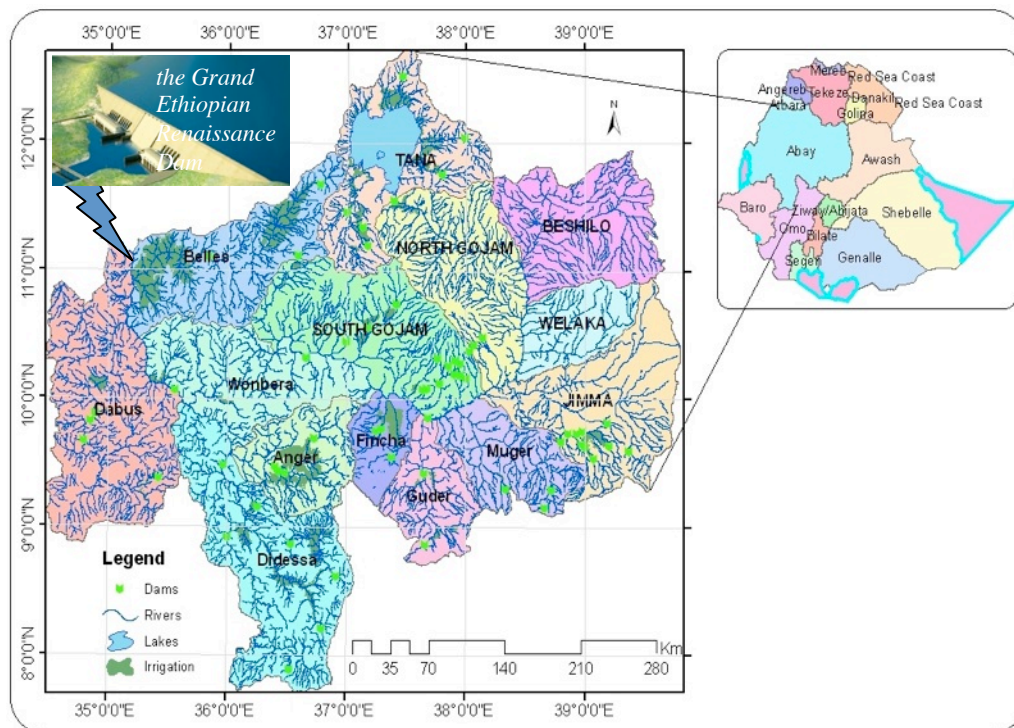


Figure 1: Relative location of the study basin



Dr. Sandeep Kumar

Dr. Sandeep Kumar graduated with a Ph.D in Soil Science from University of Missouri-Columbia in 12-2009 and is presently working as an Assistant Professor at South Dakota State University. Dr. Kumar joined C-MASC at The Ohio State University in 01-2011 and worked there as a Postdoctoral Researcher (01-2011 to 03-2012) and Research Scientist (04-2012 to 10-2012).

Dr. Kumar's major research focuses on : (i) soil management, (ii) simulation of non-point source pollutants from watersheds using hydrological tools (ArcAPEX and ArcSWAT), (iii) predicting spatial distribution of soil organic carbon (SOC) pool using GIS and remote sensing applications, (iv) modeling and mapping greenhouse gas (GHG) emissions at field and regional scales using de-nitrification and decomposition (DNDC) model.

During his Post-Doctoral experience at OSU, Dr. Kumar developed a research grant entitled "Quantifying the Spatial Location of Small-Scale Land Management Changes in Large Watershed using Hydrological Modeling", and was funded by USDA-NIFA in March 2012 with the amount of \$0.482 Million USD received for the period of 04-2012-to 04-2015 (3 years).



Dr. Kumar "outstanding" in his field!



Dr. Gönül Aydın



Dr. Gonul Aydın is a Soil Physics scientist at Adnan Menderes University in Turkey. Her Master and Ph.D. degrees were from Turkey.

She was at The Ohio State University as a visiting scholar for three months. She worked in the area of “Carbon sequestration in soils” with Dr. Dr. Rattan Lal during her fellowship period from 20th June through September 2012.



Pre-Doctoral Fellowship Award

Josh Beniston, doctoral candidate in the ENR Soil Science graduate specialization track, was awarded a pre-doctoral fellowship from the USDA’s National Institute of Food and Agriculture’s (NIFA) Doctoral Fellowship program. Beginning this fall semester, the fellowship provides one year of funding for Josh to complete his PhD dissertation research with his advisor, Rattan Lal. Josh’s project is “Assessing soil quality for urban agriculture,” and he is responsible for the design, organization, analysis, completion and evaluation of all project activities.

Recently Ohio’s cities have been home to a great increase in urban agriculture in the form of both community and market gardens. Josh’s research is investigating the agronomic properties of soils being used for urban agriculture, identifying specific soil-related constraints to productivity, and understanding the spatial variability of soil properties. The project has two main components: an experimental site and a field study of urban farms. At the experimental site, Josh is evaluating the effect of applying compost made from urban yard waste on soil properties and crop growth in a degraded urban soil. The research garden is located in Youngstown, Ohio, on a series of adjacent lots where vacant houses were demolished just prior to the start of the research. Vacant urban properties and land are a widespread issue in the state, and communities are increasingly looking to use these sites for gardens and green spaces. Since 2005 in Cleveland OH, a city with 1,500 ha of vacant land, more than 35 urban market gardens have been founded.

Results from the research garden suggest that yard waste compost and other low cost management strategies can be used to support crop growth and enhance ecosystem services at these types of sites, provided the site has not been subject to unsafe levels of contamination. Much of this research has been conducted in collaboration with the Youngstown Neighborhood Development Corporation who operate several programs designed to transform vacant properties into community assets.

Josh's project will be completed this spring and he plans to graduate summer.

Spring 2013 Semester Classes



ENR-5261
Environmental Soil Physics
Spring Semester 2013
Room # KH 370
(3 credit hours)

Lecture: M W 10:20-11:15 am

Lab: W 8:00-10:00 am
F 9:00-11:00 am



ENR-5268
Soils and Climate Change
Spring Semester 2013
Room # KH 460
(2 credit hours)

Lecture:
Tuesday 2:20 pm-4:10 pm

Upcoming Conferences

NATIONAL CONFERENCES

Boston, MA - AGU 2/14/13

<http://education.agu.org/news/announcing-the-1st-international-teacher-scientist-partnership-conference/>

Reno, NV - SWCS 7/21/13

www.swcs.org/13AC

Tampa, FL - SSSA/ASA 11/3/13

www.acsmeetings.org

INTERNATIONAL CONFERENCES

Reykjavík, Iceland - SCS 5/26/13

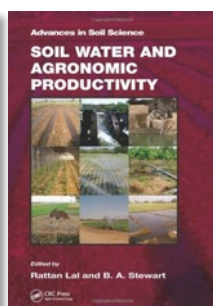
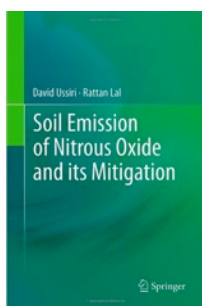
<http://scs2013.land.is/>

Madison, WI – IUSS 6/3/13

<http://iuss-c-conference.org/static/index>

Bojor, Indonesia - ESAFS 10/21/13

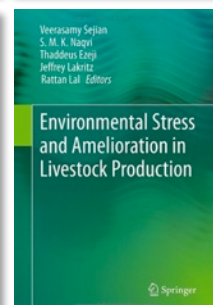
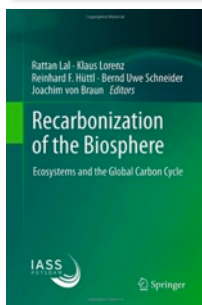
<http://www.esafs11ina.org>



Books Published by C-MASC in 2012

Ussiri, D. and R. Lal. 2012. Soil Emissions of N_2O and Its Mitigation. Springer Verlaag, Holland, 395 pp.

Lal, R. and B.A. Stewart (Eds.) 2012. Soil Water Management and Agronomic Productivity. CRC/Taylor and Francis. Boca Raton, FL, 568 pp.



Lal, R., K. Lorenz, R. Huttle, B.U. Schnieder and J. Von Braun. (Eds) 2012. Recarbonization of the Biosphere. Springer Verlaag, Holland, 545 pp.

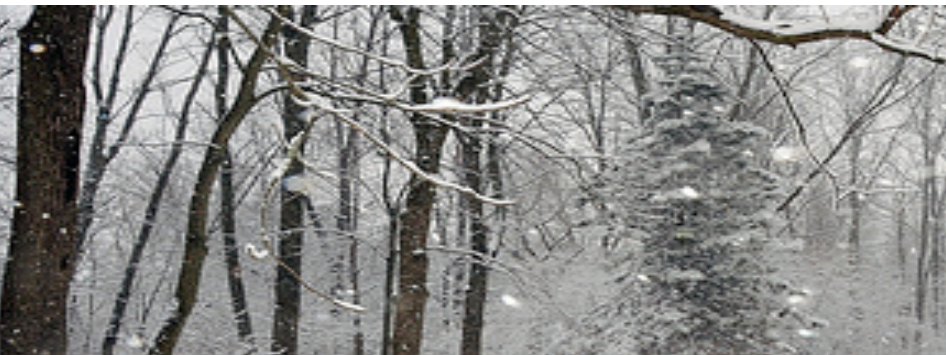
Sejian, V., J. Lakritz, T. Ezeji, and R. Lal. 2012. Environmental Stress and Amelioration in Livestock Production. Springer Verlaag, Holland, 569 pp.

Articles Published by C-MASC in 2012

1. Srinivasarao, Ch., B. Venkateswarlu, R. Lal, A.K. Singh, K.P.R. Vittal, S. Kundu, S.R. Singh, and S.P. Singh. 2012. Long-term effects of soil fertility management on carbon sequestration in a rice-lentil cropping system of the Indo-Gangetic Plains. *Soil Sci. Soc. Am. J.* 76: 168-178.
2. Srinivasarao, Ch., B. Venkateswarlu, R. Lal, A.K. Singh, S. Kundu, K.P.R. Vittal, S.R. Singh, B.K. Ramachandrarappa and G.N. Gajanan. 2012. Long-term effects of crop residues and fertility management on carbon sequestration and agronomic productivity of groundnut-finger millet rotation on an Alfisol in southern India. *Int. J. Agric. Sust.* (<http://dx.doi.org/10.1080/14735906.2012.662392>): 1-15.
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6. Demessie, A., B.R. Singh, T. Borreson, and R. Lal. 2012. Effect of eucalyptus and coniferous plantations on soil properties and quality in Gambo District, southern Ethiopia. *Acta Agric. Scandinavia (B) Soil & Plant Sci.* 62: 455-466.
7. Kumar, S., Lal, R. and D. Liu. 2012. A geographical weighted regression kriging approach for mapping soil organic carbon stock. *Geoderma* 189:627-634.
8. Stavi, I. R. Lal, S. Jones and R.C. Reeder. 2012. Implications of cover crops on soil quality and geodiversity in a moist-temperate region in the Midwestern U.S. *Land Degrad & Dev* 23:322-330 (DOI: 10.1002/ldr.2148)
9. Srinivasan, V.H.P. Mahewarappa and R. Lal. 2012. Long-term effects of topsoil depth and amendments on particulate and non-particulate carbon fractions in a Miamian soil of central Ohio. *Soil and Tillage Res.* 121:10-17.
10. Srinivasarao, Ch., B. Venkateswarlu, R. Lal, A.K. Singh, K.P.R. Vittal, S. Kundu G.N. Gajanan, and B. Ramachandrarappa. 2012. Soil carbon sequestration and agronomic yield of ground nuts-based systems on an Alfisol in southern India. *Eur. J. Agron.* 43:40-48.
11. Kong, X., B. Li, R. Lal, L. Han, H. Lei, K. Li, and Y. Bai. 2012. Soil Organic Carbon Stock And Crop Yields in Huang-Huai-Hai Plains, China. *J. Agric. Sci.* 4(12):140-154.
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13. Kumar, S., A. Kadono, R. Lal, and W. Dick. 2012. Soil hydrological properties as influenced by 50 years of tillage and cropping systems of two contrasting soils in Ohio. *Soil Sci. Soc. Am. J.* 76:1798-1809.
14. Ortas, I. and R. Lal. 2012. Long-term phosphorus application impacts on aggregate-associated carbon and nitrogen sequestration in a Vertisol in the Mediterranean Turkey. *Soil Sci.* 177(40): 241-250. (doi:10.1097/ss.ob013e318245d11c).
15. Bonin, C. and R. Lal. 2012. Bioethanol potentials and lifecycle assessments of biofuel feedstocks. *Crit. Rev. Plant Sci.* 34:271-289.
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24. Lenka, N. and R. Lal. 2012. Soil aggregation and greenhouse gas flux after 15 years of wheat straw and fertilizer managemenet in a no-till system. *Soil & Tillage Res* 126:78-89.
25. Adhikari, S., R. Lal and B.C. Sahu. 2012. Carbon sequestration in the bottom sediments of aquaculture ponds of Orissa. *Ecol. Eng.* 47:198-202.
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Ilan Stavi and family celebrate OSU from Israel!!



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