



C-MASC NEWSLETTER

C-MASC Reaches Out to Policymakers

C-MASC Meets with Rep. Tim Ryan

Members of C-MASC’s Agricultural Soils and Forest Carbon Working Groups, including Chairs Dr. Roger Williams, Dr. Sayeed Mahmood, Dr. Scott Demyan and Dr. Steve Lyons and C-MASC Director Dr. Rattan Lal, were pleased to have the opportunity to discuss their research and the importance of soil sequestration with U.S. Representative Tim Ryan (D-OH) (pictured right) from Ohio’s 13th congressional district on February 8, 2021. C-MASC put together a 3-page purpose statement for

Congressman Ryan to assist in framing a federal appropriations request, and to provide Congressman Ryan’s office more information regarding CMASC.

Representative Tim Ryan expressed his appreciation to C-MASC and its working group members for taking the time to share their knowledge on carbon sequestration, and the importance of investing in high quality, scientific research to evaluate best agricultural practices and management approaches to maximize carbon sequestration.



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Image courtesy Maaie Willis

Spring into Action

As vaccination numbers rise, it feels like the world is slowly waking up from a year-long “winter.” This bee gathering pollen on Marsh flowers outside Kottman Hall on March 3rd seem to agree!

Rep. Ryan is enthusiastic about working with Ohio State University researchers to inform federal policies around carbon sequestration, soil health, forestry management, and other land-use issues. He believes that C-MASC and Ohio State University's College of Food, Agricultural, and Environmental Sciences

have the expertise (*cont. p. 2*) to be vital, credible contributors to current and emerging policy conversations in this area.

The Ohio State University looks forward to working with Rep. Ryan and other legislative officials to advance our scientific understanding of carbon sequestration and its role in

addressing climate change challenges and improving the health of our natural ecosystems here in Ohio and throughout the U.S.

C-MASC thanks Representative Ryan for this opportunity to make a difference.

Congresswoman Marcy Kaptur's Soil Health Conference



Agricultural Soils Working Group Lead Dr. Steve

Lyon and Associate Dean Dr. Gary Pierzynski were invited to represent The Ohio State University and C-MASC at U.S. Congresswoman Marcy Kaptur's (D-OH 9th District) (pictured left) Soil Health Conference on March 15, 2021. Moderated by Bob Jones, Jr., Co-Owner and COO of The Chef's Garden with speaker introductions from U.S. Congresswoman Sanford Bishop (D-GA 2nd District), the conference featured a roundtable discussion and presentation with 15 local farmers followed by nine speakers from several sectors,

public and private, with expertise from water quality and soil to algal blooms, composting, and food policy.

Dr. Lyon and Dr. Pierzynski gave a joint presentation entitled "Ohio State University Soil Health and Water Quality," which introduced C-MASC and promoted recent OSU efforts regarding soil health and its connections to water quality.

C-MASC appreciates this opportunity to contribute to the conversation - thank you, Representative Kaptur.

Special Event Webinar Friday May 7th 10am - 12 pm EST

Dr. Roger Williams, Co-Chair of the FCWG, will be presenting a webinar through the Ohio Woodland Stewards Program on May 7, 2021, entitled "Can My Woodlot be a Solution to Climate Change?". Drs. Sayeed Mehmood, FCWG Co-Chair, and Brent Sohngen will serve on a question and answer panel following the webinar. More info: <https://woodlandstewards.osu.edu/>

CFAES OHIO STATE UNIVERSITY EXTENSION

Ohio Woodland Stewards Program

Friday's
ESCAPE TO THE FOREST

Take a break to relax and visit the woods with us.

On Friday's we will post information on Ohio's woodlands, wildlife, invasive species, management recommendations and more!

[Woodlandstewards.osu.edu/resources](https://woodlandstewards.osu.edu/resources)

THE OHIO STATE UNIVERSITY
COLLEGE OF FOOD, AGRICULTURAL, AND ENVIRONMENTAL SCIENCES

WEBINAR

Friday May 7th @ 10 am - 12 pm

Can My Woodlot be a Solution to Climate Change?

Join SENR's Roger Williams, Associate Professor Forest Management, in this presentation where we explore the role of forests in the carbon cycle, how they sequester carbon, how forest management affects sequestration and the types of forest-related activities that may qualify for carbon credit projects

Registration: go.osu.edu/syrup

Forest Carbon Working Group

Chair: Roger Williams **Co-Chair:** Sayeed Mahmood

Members: Matt Davies, Rachel S. Gabor, Matthew Hamilton, Jeff Hattey, Stephen Matthews, Brian Slater, Kathy Smith, Brent Sohngen, Eric Toman, Kaigung Zhao; (ex-officio: Rattan Lal, Klaus Lorenz)

By Roger Williams

The Forest Carbon Working Group (FCWG) has developed five research objectives for the group to accomplish in the foreseeable future. The five research objectives that have been developed include:

Objective 1: Mapping of above and below ground carbon stocks as affected by agricultural and forest management practices

Objective 2: Assess land use practices to maximize sequestration of atmospheric carbon.

Objective 3: Identify programs, including government-led programs and carbon market programs, that can affect and contribute to carbon sequestration on privately and publicly owned land.

Objective 4: Identify policies that will enhance the ability of landowners to participate in programs and activities that contribute to increasing carbon stocks.

Objective 5: Develop

outreach and extension programs to enhance the recognition and adoption of carbon sequestration practices in land management activities.

To that end the FCWG has started to draft working preproposals as templates to be used for future funding requests. The FCWG has begun to explore international cooperation on forest carbon projects with Northeast Forestry University, Harbin, China, and Tomsk State University, Tomsk, Russia.

Agricultural Soils Working Group

Chair: Scott Demyan **Co-Chair:** Steve Lyon

Members: Mark Sulc, Steven Culman, Ajay Shah, Jeff Hattey, Dennis Heldman, Marilia Chiavegato, Matt Davies, Vinayak Shedekar, Christine Sprunger, Rachel Gabor, David Barker, and Laura Lindsey; (ex-officio: Rattan Lal, Klaus Lorenz)

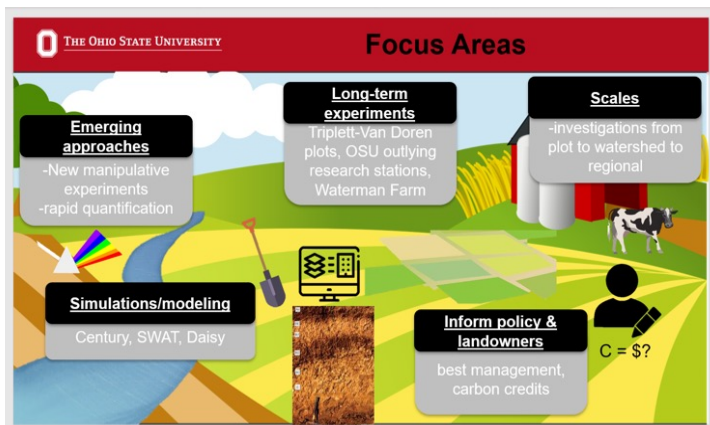
By Steve Lyon

Within CMASC, the Agricultural Soils Working Group

(“Ag-Soil”) has been established to (1) determine the maximum potential for carbon sequestration

along a continuum of agricultural management regions, (2) improve ecosystem carbon models using new primary carbon stock data, (3) synthesize existing data on permanence of carbon stocks (e.g. quality, composition), (4) investigate the economics around carbon in agricultural systems, and (5) establish how all these different factors influence landowners/producer decision making. Ag-Soils plans to utilize new and existing field experiments to gain insight on carbon processes from seasonal to decadal temporal scales and from plot to watershed spatial scales (Fig. 1, right).

(cont. p. 5)



existing data



C-MASC Assistant Director Viewpoint

FROM THE DESK OF KLAUS LORENZ

More good news – at the end of 2020 the College of Food, Agricultural, and Environmental Sciences (CFAES) reaffirmed C-MASC as the CFAES Dr. Rattan Lal Carbon Management and Sequestration Center. The process started in the middle of 2019 when Dr. Jeff Sharp, Director School of Environment and Natural Resources, invited me to help drafting the C-MASC proposal, and meet regularly to discuss the progress. We organized two workshops with a broad range of natural and social scientists from faculties across campus to ask for their opinion on how C-MASC should be organized, what kind of research should be undertaken, and how it could serve them, stakeholders and the broader public. The valuable inputs and outcomes of the discussions fed into developing and strengthening the proposal text.

Then, the proposal was submitted to CFAES right at the beginning of the COVID-19 pandemic in February 2020. We are all thankful that CFAES supports the proposal, and we immediately began implementing some proposed activities at the end of 2020 during the ongoing pandemic. For example, two working groups – one on agricultural soils, and one on forestry carbon – were established and tentative members invited for active collaborations. Each working group consists of natural and social scientists, and meet on-line regularly monthly since December 2020. Major task initially was to compile research hypotheses and objectives for each group.

Outcomes so far are a policy document and a small grant proposal. It is anticipated that the working groups will respond with inter- and transdisciplinary proposals to proposal calls. One topic that is emerging is the need to assist forest land owners and farm managers in their response to the emerging carbon markets which would generate an additional revenue stream to make their operations more viable.

Sincerely,

A handwritten signature in black ink that reads "Klaus Lorenz". The signature is written in a cursive, slightly slanted style.

Dr. Klaus Lorenz
Assistant Director, CFAES Dr. Rattan Lal Carbon Management and Sequestration Center
Post-Doctoral Scholar
School of Environment and Natural Resources

(cont. from p. 3) As part of our initial kickoff, the Ag-Soils group has started to map out potential areas for research and continued collaboration. Connected with that effort, working group members Lorenz and Demyan visited the former USDA-ARS North Appalachian Experimental Watershed (NAEW) near Coshocton, Ohio on January 28th to explore opportunities for continuing the 80-year legacy of experiments. This site is

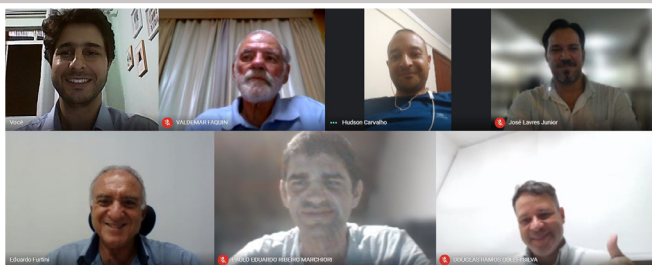
representative of the larger non-glaciated Allegheny Plateau of SE Ohio. Currently, the site is partially owned by Coshocton County and private landowners. While some basic infrastructure is still in place (e.g. lysimeter runoff and percolate catch



Fig 2. No-till fields in the former USDA-ARS North Appalachian Experimental Watershed

basins, watershed runoff chutes) and several watersheds are still under historic land use, there is need for a coordinated investment to continue research. The NAEW is a unique opportunity for the Ag-Soil working group as it has fields continuously in no-till since 1964 (Fig. 2, right) and in meadow since 1936.

Con“grad”ulations to André Baldansi Andrade



I was a visiting scholar at C-MASC from 29 May 2012 to 30 April 2013, sponsored by the National Council for Scientific and Technological Development (CNPq) through the Ciência sem Fronteiras program. On that time, I was an undergraduate in Agronomy at Universidade Federal de Lavras (UFLA), Brazil. During the period, I was supervised by Dr. Rattan Lal and Dr. Yuri Zinn (alumnus at C-MASC and professor at UFLA), when we investigated the effects of soil texture and altitude on SOC retention under native forests soils in Brazil (<https://doi.org/10.1071/SR17205>). Beyond that, I helped post-docs students in field and lab and attended Dr. Lal's classes. I graduated in Agronomy in 2014 and started my M.Sc study, which I concluded in 2016

André Baldansi Andrade (Top left) at his thesis examination with Profs. Valdemar Faquin (UFLA), Hudson Carvalho (CENA/USP) and José Lavres Junior (CENA/USP). Bottom row: Antônio Eduardo Furtini (Comigo), Paulo Marchiori (UFLA) and Douglas Guelfi (UFLA)

and, in the same year, started my Ph. D, both in the Graduate Program in Soil Science at UFLA, with focus in Soil Fertility and Plant Nutrition.

I defended my doctoral thesis on January 29th, 2021, addressing the physiological and biochemical mechanisms involved in nitrogen-use efficiency in tobacco genotypes, under supervision of Dr. Douglas Guelfi and Dr. Valdemar Faquin. I'd like to highlight that my stay at C-MASC was essential to reach the M. Sc and Ph. D degrees, where I learned and improved many skills related to researches on Soil Science. So I'm very grateful to Dr. Lal for the unique opportunity to had worked with all the C-MASC team. I wish to all C-MASC team strong health, keeping up relevance in soil researches and encouraging students going further in Soil Science like happened with me.



Measuring chlorophyll, flavonols and anthocyanins in tobacco leaves with the optical sensor Dualex

C-MASC Expands Herbert W. Hoover Grant with Kent State



C-MASC is excited to join with Kent State to expand on the generous grant given by the H. W. Hoover Foundation to enrich the

soil and lives of farmers in Stark County, Ohio through the Stark Sustainable Soil Initiative. This new joint project with Dr. Joseph Ortiz and Nathan Rohrbau of Kent State and Dr. Remiegio Confesor

soil and lives of farmers in Stark County, Ohio through the Stark Sustainable Soil Initiative.

of The Norwegian Institute of Bioeconomy Research will explore the way that soil carbon might be monitored through satellite and other remote sensing devices. We look forward to ground-truthing the validity of the remote measurements made with drones and satellites and other technological developments with those on the the Kent State and NIBIO teams!

Dr. Lal Honored with Padma Award and Top 2% of Scientists

Dr. Lal was honored to receive recognition from two important sources in the last few months.

Padma Shri Award

In January, Dr. Rattan Lal was announced as a recipient of the 2021 Padma Shri Award in Science and Engineering on the 72nd Republic Day from the Government of India. The Padma Awards, instituted in 1954,

recognize citizens of India for distinguished contributions in their sphere of activity, from arts to education, industry to literature, sports to science, and more. In Sanskrit, the word “Padma” means “lotus,” and “Shri” is an honorific, equivalent to “Mr.” or “Mrs.” It is

an honor that can be considered similar to the Presidential Citizens Medal, the second-highest civilian award in the United States. The other awards given by the Government include the Bharat Ratna, Padma Vibhushan, and Padma Bhushan, which might be considered similar to the Presidential Medal of Freedom. Dr. Lal is honored to be one of the few Overseas Citizens of India to be considered and bestowed this award.



Top 2% of Scientists

Dr. Rattan Lal is honored to be ranked #1 in his field, Agronomy & Agriculture and #110 overall globally among more than 100,000 world scientists.

Dr. John P. A. Ioannidis of Stanford University published a peer-reviewed analysis of a ranked list of the top 2% of scientists in the world in PLOS Biology in 2019. This peer-reviewed article ranks more than 100,000 scientists, out of ~7 million in the world. They are ranked based on publication indicators with standardized information on citations, h-index, coauthorship-adjusted hm-index, citations to papers in different authorship positions, and a composite indicator. At #110, this places Dr. Lal not only in the top 2% of scientists in the world, but among the top 0.002%. In this ranking, he is first among his esteemed colleagues at The Ohio State University, and first in his field of Agronomy & Agriculture in the world. He is greatly pleased to see that the top scientists in Agronomy & Agriculture are composed primarily of fellow soil scientists and environmentalists, a testament to the impact that soil has on the field, literally and figuratively.

SiaOnSoil.Net: We Must Have A Clean Soil Act

By Sia Chitnis

We have a Clean Water Act and a Clean Air Act, but we do not have a Clean Soil Act.

Without a Clean Soil Act in place, the rate at which more soils are being contaminated with microplastics and other contaminants will continue to increase. We need to give our soil the chance to live pristinely again, for we are intimately dependent on what we walk upon. Soil feeds us and nurtures the very plants that eat the pollution we fill the sky with. Without soil there can be no life. This Act will serve to build a legal bridge between those who care for the Earth and those who care for the economy by requiring all those who profit from the soil to care for the soil.

We must care for soil as much as we care for our water and air, as the contamination issues are just as pressing and important.

Degradation of soil organic matter is so crucial to soil microbial communities: it is their necessary food and water. Microplastic levels, due to anthropogenic waste and pollution, are increasing in the soil and destroying soil's abilities to degrade organic matter. Microplastics are moving us backwards; they are undoing all permaculturist work put into increasing soil organic matter content. It is happening right in front of our eyes, and enough isn't being done to stop this. Pesticides are making the soil sterile, and harming the plant soil interaction so the soil cannot give the plant certain nutrients. The plants are then rendered helpless and cannot perform certain functions.

We must address the microplastic issue before we increase soil organic matter. Otherwise, we are plunging ourselves into a never ending cycle that will eventually lead to drought and mass starvation.

Some surfaces of these microplastics can transmit diseases and interact with soil fauna. As 79% of the plastic waste in our world is in landfills and even more is in garden soils, soil becomes one of the largest microplastic sinks. Microplastic pollution has led to accidental ingestion by organisms in the oceans, and we paid attention to our oceans. Soil, plants, and land organisms are experiencing the same horrors, and we have to address this legally.

We must advocate for legislation in the EPA that allows for the testing of microplastic pollution in the soil, and put an end to this contamination. A Clean Soil Act will establish tough, stringent laws to give warnings to businesses that are polluting the soils. Bringing together the major players that affect the soil (huge industrial farming corporations, the government), we must create strict dialogue and hold them accountable for inconsiderately devastating our Earth.

The Clean Soil Act will hold businesses accountable for what they release into the soil, and the whole world is dependent on this act. If these major corporations want to make money, we must understand that it is okay, but not at the expense of our Earth and everybody else. Scientists that are able to detect and analyze what's

happening in the soil can prove the health hazards scientifically, and bring this information to a company to demand a stop.

Currently, we have a disconnected economy, one that values short term profit at any expense. Economic forces must shift to a circular economy that takes into consideration the nature around it. It is very possible to please industrial companies and nature at the same time, but action must be taken soon to do so: laws must be placed in effect so that we can bring our Earth back to the pristine state in which it once was.

It is truly shocking that something as important as that which gives us food, clean air, and the beauty of trees, flowers and so much more is not being cared for. Soil is the most important thing on this Earth; it is the Earth.

As someone who is investigating genetics to heal the soil for water retention, I know it is time to heal our soil from microplastics before we continue any further into improving soil moisture content--my research focus. Genetic engineering of soil microbial communities, to me, is a must. It is what the soil has been craving for centuries. But all we will do, and must do, will be of no use unless we put an end to the microplastic issue and hold industrial farming corporations and the government accountable. And that is what the Clean Soil Act will do.

Sia Chitnis is a C-MASC Colleague working with Dr. Lal. Her blog may be seen at: <https://siaonsoil.net>

Quarterly Viewpoint

FROM THE DESK OF RATTAN LAL

26 March 2021

Sparing Land for Nature

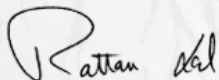
The term “land” encompasses all natural resources between the bedrock and the stratosphere, including the atmosphere, vegetation, water bodies, mineral deposits, and all biodiversity. Furthermore, stock of these resources is fixed (finite), non-renewable on a human time scale, and prone to depletion and degradation by natural and anthropogenic factors. In conjunction with capital and labor, land is an important factor of production for goods and services or ecosystem services. With the rapid increase in population and its affluence, humanity has already appropriated 40% of Earth’s land resources and converted natural to managed ecosystems. Humanity’s insatiable demand for land has dire consequences to other inhabitants of the planet (biodiversity) and to environmental quality. Examples of environmental degradation caused by anthropogenic land use include global warming, eutrophication, and scarcity of water resources, accelerated soil erosion and sedimentation, degradation of coastal ecosystems, loss of biodiversity, and, of course, growing interaction between human and wildlife with adverse impacts on humanity (e.g., the COVID-19 Pandemic).

Rather than appropriating more land by conversion of natural to managed ecosystems, humanity must enhance use efficiency, reduce wastage, rethink its values and demands, restore degraded land, protect natural ecosystems, and return some land back to nature. Returning agriculturally marginal lands (e.g., land which is steep, with shallow soil, too dry or too wet, and land withing ecologically sensitive ecoregions) back to nature is a win-win option.

Of the 5 billion hectares of agricultural land (1.5 Bha under cropland and 3.5 Bha under grazing/rangeland), it is important to return between one to two Bha of land back to nature. In addition to sequestration of C in the soil and biomass, sparing land for nature would also strengthen biodiversity, improve quality and renewability of water, reduce soil erosion and sedimentation, and restore coastal ecosystems.

Homo sapiens (in Latin: wise man) must be wise and prudent in sharing natural resources with the other 8.7 million co-inhabitants of the Planet Earth. Returning some land back to nature would be a strong indication of the “wisdom of Homo sapiens.”

Sincerely,



Rattan Lal
Distinguished University Professor of Soil Science, SENR
Director, CFAES Dr. Rattan Lal Carbon Management and Sequestration Center (C-MASC)
IICA Chair in Soil Science & Goodwill Ambassador for Sustainable Development Issues
Adjunct Professor at the University of Iceland and the Indian Agricultural Research Institute (IARI)



TEDxOhioStateUniversity

14 March Columbus, OH USA

Dr. Lal was honored to be chosen to present a TEDxOhioStateUniversity Talk on March 14th, 2021. He would especially like to thank Ms. Abha Naik for her guidance and support throughout the rigorous development and rehearsal process to create all of the high-quality presentations for TEDxOhioStateUniversity this year, under the unusual pressures of COVID-19. All the TEDxOSU talks can be currently viewed here: <https://tedxohiostate.wixsite.com/tedxohiostateu>
Dr. Lal's talk begins on Day Two at 28:00.



RTRS: Republika Srpska Television

Banja Luka, Bosnia and Herzegovina
2 February



C-MASC was so excited to the most recently published volume of the Advances in Soil Science series, *The Soil Human-Health Nexus* on the news! Dr. Marijana Kapović-Solomun, who co-authored the chapter entitled “Healthy Soils – Healthy People Soil and Human Health – The Reality of the Balkan Region” with Dr. Ratko Ristić and colleagues. Dr. Kapović-Solomun was interviewed and discussed the important work of the team to discuss the ways that the health of soil, plants, animals, humans, the environment, and the planet are one and indivisible. More information on *The Soil and Human Health Nexus* here: <https://www.routledge.com/The-Soil-Human-Health-Nexus/Lal/p/book/9780367422134>. The interview (in Serbian) is here: <https://www.rtrs.tv/av/pusti.php?id=96184>

GBH: An Amazing Agroforestry Story

22 February Boston, MA

Dr. Lal greatly enjoyed discussing soil quality and health with Dr. Mike Hands at An Amazing Agroforestry Story: The Inga Model In Central America as part of Biodiversity for a Livable Climate and WGBH Forum Network's Life Saves the Planet Lecture Series. He would like to thank <https://forum-network.org/lectures/amazing-agroforestry-story-inga-model-central-america/>



C-MASC Recent Publications

Refereed Journal Articles

- Jayaraman, S., Naorem, A. K., Lal, R., Dalal, R. C., Sinha, N. K., Patra, A. K., et al. (2021). Disease-Suppressive Soils—Beyond Food Production: a Critical Review. *J. Soil Sci. Plant Nutr.* doi:10.1007/s42729-021-00451-x.
- Kurmi, B., Nath, A. J., Lal, R., and Das, A. K. (2020). Water stable aggregates and the associated active and recalcitrant carbon in soil under rubber plantation. *Sci. Total Environ.* 703, 135498. doi:<https://doi.org/10.1016/j.scitotenv.2019.135498>.
- Livsey, J., E. Alavaisha, M. Tumbo, S.W. Lyon, A. Canale, M. Cecotti, R. Lindborg, S. Manzoni (2020) Soil carbon, nitrogen and phosphorus contents along a gradient of agricultural intensity in the Kilombero Valley, Tanzania, *Land*, 9, 121; doi:10.3390/land9040121.
- Masum, M.F.H., S.R. Mehmood, M. Pelkki, and H. Liechty. 2020. Estimating Carbon Efficiency of Bioenergy Systems in the Mississippi Alluvial Valley. *Forests* 2020, 11, 899; doi:10.3390/f11090899.
- Qian, F, Wang, W, Wang, Q, Lal, R. Implementing land evaluation and site assessment (LESA system) in farmland protection: A case-study in northeastern China. *Land Degrad Dev.* 2021.1– 16. <https://doi.org/10.1002/ldr.3922>
- Romaniw J, de Moraes Sá JC, Lal R, de Oliveira Ferreira A, Inagaki TM, Briedis C, Gonçalves DRP, Canalli LB, Padilha A, Bressan PT. C-offset and crop energy efficiency increase due industrial poultry waste use in long-term no-till soil minimizing environmental pollution. *Environ Pollut.* 2021 Apr 15;275:116565. doi: 10.1016/j.envpol.2021.116565. Epub 2021 Feb 1. PMID: 33582636.

Book Chapters

- Lal, R. 2021. Soil Erosion and Gaseous Emissions. In Katra, Itzhak (Ed). *Soil Erosion: Dust Control and Sand Stabilization.* Applied Sciences and MDPI: Basel, Switzerland. <https://doi.org/10.3390/books978-3-03943-890-7>. ISBN 978-3-03943-889-1. (Reprint of 2020 #30)
- Yadav, G.S., A. Das, S. Babu, K.P. Mohapatra, R. Lal, and D. Rajkhowa. 2021. Potential of Conservation Tillage and Altered Land Configuration to Improve Soil Properties, Carbon Sequestration and Productivity of Maize Based Cropping System in Eastern Himalayas, India. *International Soil and Water Conservation Research.* <http://www.sciencedirect.com/science/article/pii/S2095633921000010>.

Keynote and Panel Presentations

- Lal, R. 2021. Managing Soil for Producing Nutritional Food and Mitigating Climate Change. Keynote Lecture and Panelist Discussion. 1 January 2021. National Institute of Food Technology Entrepreneurship and Management. Sonapat, Haryana, India. Online.
- Lal, R. 2021. Carbon... the Heart of Soil Health. 2021 Soil Health Conference. 6-7 January 2021. South Dakota Soil Health Coalition. Pierre, South Dakota, USA. Online.
- Lal, R. 2021. The Rights of a Living Soil. University Course Lecture at Earth University. 13 January 2021. Bija Vidyapeeth at Navdanya International. Florence, Italy. Online.
- Lal, R. 2021. Reorienting Agricultural Research and Education. 15 January 2021. Punjab Agricultural University and Punjab State Farmers' & Farm Workers' Commission. Ludhiana, India. Panelist. Online.
- Lal, R. 2021. Bringing Green Revolution to Small Landholder Farmers of Africa. Webinar for

Keynote and Panel Presentations

- AZURA Group Director's Meeting. 27 January 2021. AZURA Group, France-Morocco. Online.
- Lal, R. 2021. Leveraging Agricultural Best Tools for Climate Mitigation. 2021 Virtual Sustainable Agriculture Conference. 1 February 2021. Pasa Sustainable Agriculture. Online.
- Lal, R. 2021. Soil Organic Carbon for Resilience and Sustainable Food Systems and Achieving Food and Nutrition Security. International Symposium on Spices and Aromatic Crops X. Spices as Flavors, Fragrances, & Functional Foods. 9 February 2021. SYMSAC X - 2021. Kerala, India. Online. Recorded.
- Lal, R. 2021. Honorary Degree Acceptance Speech. Indian Agricultural Research Institution Convocation. 12 February 2021. Indian Agricultural Research Institute. Pusa, New Delhi, India. Online.
- Lal, R. 2021. Soil Quality Management. Northeast Nebraska Bazile Groundwater Management Area Annual Public Winter Meeting. 19. February 2021. Lower Elkhorn Natural Resources District. Bazile, Nebraska, USA. Online.
- Lal, R. 2021. An Amazing Agroforestry Story: The Inga Model In Central America (Virtual). Life Saves the Planet Lecture Series. 22 February 2021. Biodiversity for a Livable Climate and WGBH Forum Network. Boston, Massachusetts, USA. Panelist. Online. <https://forum-network.org/lectures/amazing-agroforestry-story-inga-model-central-america/>
- Lal, R. 2021. Adopting a holistic approach to soil health and agricultural productivity in Africa. Argus Fertilizer Live – Virtual Conference. 24 February 2021. Argus Fertilizer. London, United Kingdom. Online. Panelist.
- Lal, R. 2021. Food, Cities and Climate. Panel Discussion. 24 February 2021. New York City Food Policy Center at Hunter College. New York, New York, USA. Online. Panelist.
- Lal, R. 2021. Potential & Challenges of Regenerative Agriculture. IICA-Pepsico Webinar. 4 March 2021. IICA and Pepsico. San Jose, Costa Rica. Online.
- Lal, R. 2021. Managing Organic Matter: The Heart of Soil Health. Virtual World Agri-Tech Innovation Summit 2021: Harnessing Agriculture as a Source of Nature-Based Solutions for Climate. 9 March 2021. World Agri-Tech USA. Rethink Events. Brighton, United Kingdom. Online. Recorded.
- Lal, R. 2021. Soil and Humanity. Day 2. TEDxOhioStateUniversity. 14 March 2021. The Ohio State University and TEDx. Columbus, Ohio, USA. Online. Starts at 28:00: <https://youtu.be/mKvs24s8jW8?t=1680>
- Lal, R. 2021. Translating Science into Action by Building Bridges Across Societal Divides. International Summit on Agri-Innovations on 21st Century and the Ways Ahead. 9-10 March 2021. G.B. Pant University of Agriculture and Technology, Pantnager, Uttar Khant, India. Online. Recorded.
- Lal, R. 2021. Soil Quality and Health. Global Agriculture Innovation Forum: Sustainable and Climate-Smart. 19 March 2021. USDA's Foreign Agricultural Service and Purdue University's Office of International Programs in Agriculture. West Lafayette, Indiana, USA. Online. <https://youtu.be/htENinZ7t6Y?t=1730>
- Lal, R. 2021. Impact of Soil Carbon Dynamics on the Environment and Management of Improved Soil Health in the Coastal Ecosystems. International Symposium on Coastal Agriculture Webinar: Transforming Coastal Zone for Sustainable Food and Income Security. 17 March 2021. Indian Society of Coastal Agricultural Research. Canning Town, West Bengal, India. Online. Recorded.
- Lal, R. 2021. One Planet. Universities Fighting World Hunger (UFWH): One Planet - Hunger Solutions. 25 March 2021. University of California Davis. Davis, California, USA. Online.

Lal, R. 2021. Managing the Health of Soil in Semi-Arid Tropics for Food, Climate, and Other Ecosystem Services. ANGRAU Institutional Development Plan International Seminar Series. 26 March 2021. Acharya N. G. Ranga Agricultural University. Hyderabad, India. Online. Recorded.



Expanded vaccination offers hope for campus to reopen completely in 2021
Image courtesy The Ohio State University Signature Image Gallery

CONTACT INFORMATION

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

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THE OHIO STATE UNIVERSITY