



C-MASC NEWSLETTER

Dr. Rattan Lal **World Food Prize Laureate**



We are honored to tell you that Dr. Rattan Lal is the 50th World Food Prize Laureate!

On June 11, 2020, the Laureate was announced online by Ms. Barbara Stinson, President of the World Food Prize. This online format allowed a once-in-a-lifetime opportunity to feature a Digital Dialog between Dr. Lal and Dr. Gebisa Ejeta, Chair of the World Food Prize Laureate Selection Committee and the 2009 World

Food Prize Laureate. Dr. Ejeta interviewed Dr. Lal for about a half-an-hour, exploring Dr. Lal’s academic, research, and personal history, and discussing how these great minds think that agronomic science may move forward to address the many critical issues of our time, from food security to climate change. (con’t page 3)

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Visiting Scholars Manjeet Kaur from India (left) and Mah-Noor Azad from Pakistan (right) carefully take soil samples in Waterman Field

Summer Apart!

Buckeyes continue to flatten the curve in Ohio, by carefully following social distancing rules as they resume their work.

Quarterly Viewpoint

FROM THE DESK OF RATTAN LAL

7 June 2020

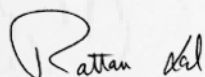
Tenets of Regenerative Agriculture in Response to the COVID-19 Pandemic

The COVID-19 pandemic has disrupted the traditional food production and supply chains and aggravated the global problem of food and nutritional insecurity. The COVID-19 pandemic necessitates a closer and an objective review of the manner in which the food is traditionally produced, stored, processed, packaged, transported, distributed, cooked, consumed, and the waste disposed of. The disruption caused by the COVID-19 pandemic is an important cause for a paradigm shift and reemphasizes the need to focus on strengthening of local food production systems and enhancing their resilience against any future disruptions caused by political or natural perturbations. The global disruption in all aspects of the food supply chain has also enhanced the importance of using the practices of regenerative agriculture (RA), or the soil-centric approach to innovative farming. Indeed, RA is focused on soil restoration, and conservation of natural resources (i.e., soil, water, biodiversity, energy). The goal of RA is to enhance health and functionality of surface soil by restoring soil organic matter (SOM) content, strengthening processes which recycle nutrients and enhancing storage of green water (i.e., the plant available water) in the root zone. The latter is critical to enhancing resilience of soil and of agroecosystems against climate-induced droughts (e.g., pedological and agronomical damage).

Therefore, basic tenets must be adhered to for enhancing the adoption and adaptation of RA under site-specific conditions (i.e., biophysical and the human dimensions) to mitigate the adverse effects of the COVID-19 pandemic. In this context, the objective of RA is “produce more from less,” meaning less land area, inputs of chemical fertilizers and pesticides, energy consumption, water use, emission of greenhouse gases (GHGs), depletion of SOM content, soil erosion, leaching and volatilization of nutrients, and the overall environmental footprint of agroecosystems. Examples of soil-centric RA practices include: conversion from traditional plow-till to no-till (NT) farming, retention of crop residue mulch on the soil surface, avoidance of in-field burning of crop residues, inclusion of a cover crop in the rotation cycle during the off-season, avoidance of excessive and uncontrolled grazing, minimization of inputs of fertilizers and pesticides, and change from flood-based irrigation to sub-surface drip-fertigation. Rather than puddled rice paddies, direct-seeded aerobic rice is a climate-cum-water smart option, albeit with some reduction in grain yield. Saving in water and energy normally used for puddled rice production would make direct-seeded aerobic rice more profitable, even with a somewhat lower yield. Furthermore, it would also reduce emissions of methane and nitrous oxide.

Ten tenets of RA practices, to be fine-tuned for site-specific conditions, include: 1) replace what is removed, 2) predict what may be altered, 3) conserve water and soil, 4) increase soil biodiversity, 5) create disease-suppressive soils, 6) improve soil resilience against extreme climate events, 7) promote nutrition-sensitive farming, 8) make agriculture a solution to climate change, 9) reconcile the need for food production with the restoration of the environment, and 10) save land and water for nature. These tenets are based on the “Law of Return.”

Sincerely,



Rattan Lal

Distinguished University Professor of Soil Science, SENR

Director, Carbon Management and Sequestration Center

Past President, International Union of Soil Sciences

IICA Chair in Soil Science & Goodwill Ambassador for Sustainable Development Issues



2020 Laureate Announcement + Digital Dialogue

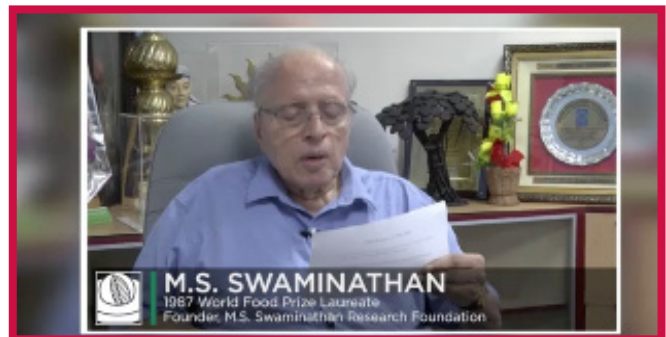


Dr. Rattan Lal (top left), Dr. Gebisa Ejeta (top right) and President of the World Food Prize Ms. Barbara Stinson present online at the 2020 Laureate Announcement and Digital Dialogue

(con't page 1) While the COVID-19 pandemic has disrupted many aspects of our lives, humanity continues to craft silver linings in the cloud of its storm, and it was an honor for Dr. Lal to be able to participate in such a unique Laureate experience.

Dr. Rattan Lal will be awarded the 2020 World Food Prize this October in Des Moines, Iowa, for his improvement of global awareness of sustainable soil management. Dr. Lal's tireless efforts to promote soil-saving techniques have extended the Green Revolution and the vision of Dr. Norman Borlaug. Dr. Rattan

Lal will be honored for his revolutionary work promoting soil health. Dr. Lal's pioneering research is now at the heart of efforts to improve agriculture systems globally. **#FoodPrize20**



Dr. Madhura Swaminathan and Dr. M.S. Swaminathan greet and congratulate Dr. Rattan Lal during the online presentation of the 2020 World Food Prize Laureate Announcement and Digital Dialogue on June 10, 2020.

Explore the World Food Prize

Learn more about the World Food Prize: <https://www.worldfoodprize.org>

Watch the 2020 World Food Prize Announcement: <https://youtu.be/JQLTluBVXSI>

Watch the 2020 Digital Dialogue with the Laureate: <https://youtu.be/GYVYvWv2S1w>

Read The Ohio State University Announcement: <https://go.osu.edu/cfaes-wfp>

Florent Tivet: CASIC



Soil pit under pastureland of *Brachiaria mullato*. Comments on soil pits were provided by Dr. Seng Vang, soil scientist and Director of DALRM. Regional training on appropriate-scale mechanization for Conservation Agriculture. Siem Reap & Bos Khnor, Cambodia, 6th to 9th May 2019

Cambodia Conservation Agriculture Sustainable Intensification Consortium

On 21 May, 2020, HE Minister Veng Sakhon, Ministry of Agriculture, Forestry and Fisheries (MAFF), through a decision letter, has formally approved the formation of the Cambodia Conservation Agriculture Sustainable Intensification Consortium (CASIC). This decision is a turning point to foster the dissemination of CA/SI practices to restore and preserve agricultural soils in Cambodia, advancing in farm sustainability and contributing to climate change mitigation and adaptation.

Conservation Agriculture (CA) initiatives in Cambodia have been focused primarily on cropping system design, soil fertility assessment, agricultural engineering, rather than commercial practices. In recent years, commercial practices have been

promoted in this area. The formation of CASIC will further augment the current work by bringing together other stakeholders and to make CA more accessible to farmers through the market actors offering the services.

Following the decision letter from HE Minister, a 2-day CASIC internal kick-off launch was held in Bos Khnor, Kampong Cham, and Siem Reap from 3 to 4 June 2020 in order to: 1) introduce CASIC and the delivery mechanisms to the steering committee and executive board members; 2) provide information on conservation agriculture in Cambodia and CASIC structure and management to all participants; 3) provide recommendations and suggestions; and, 4) to identify collaboration opportunities with development partners to enhance conservation agriculture in Cambodia.

In the meeting, HE Om Kim

of CA at national level and among private sectors. He also noted that the presence of CASIC steering committee and executive board members was significant in strengthening solidarity and cooperation, in prioritizing action plans towards the realization of CASIC. He expected that, through CASIC and other agencies, Cambodia can contribute significantly to climate change adaptation and mitigation, a common concern of the world today and in the future. HE Dr. Chan Saruth, MAFF Undersecretary of State and Chair of the Executive Board of CASIC, spoke about the role of CASIC to pool together relevant stakeholders including market actors to address soil restoration issues, to enhance adaptation and mitigation to climate change while ensuring the alignment with the national policies. He further elaborated on the delivery mechanism including CASIC structure and



Field day in Cambodia with Dr. Seng Vang and colleagues, May 25th, 2020.

Sir, MAFF Secretary of State and Chair of the Steering Committee of CASIC mentioned that CASIC is a key arena to raise awareness of the importance

management. He stressed that CASIC is a coordinating body. All participants agreed that CASIC is a movement rather than an institution promoting CA

CASIC (con't)

in Cambodia.

CASIC is a multi-stakeholder consortium that will consist of organizations who have the incentives to come together and meet on a regular basis to discuss the promotion of CA/SI practices in Cambodia via the four committees, namely a) Knowledge Management led by the Royal University of Agriculture (RUA), b) Networking and Collaboration led by Swisscontact, c) Research led by the Department of Agricultural Land Resources Management (DALRM) in close collaboration with the Center for International Cooperation in Agricultural Research for Development (CIRAD); and, d) Promotion led by Swisscontact. CASIC has the vision to be a well-established platform with a vast

network of organizations that are working on the CA issues in Cambodia, e.g. markets, research, policies, service provision. The mission of CASIC is to establish knowledge management of CA related resources for easy access by smallholder farmers, semi-commercial farmers, and agricultural cooperatives; create an enabling environment to boost investment in CA/SI; promote and enhance CA/SI practices and enhance collaboration between stakeholders.

Five ministries, namely the Ministry of Agriculture Forestry and Fisheries (MAFF), Ministry of Water Resources and Meteorology (MOWRAM), Ministry of Women's Affairs (MoWA), Ministry of Interior (MoI), Ministry of Environment (MOE), and the Cambodia Chamber of

Commerce are involved at the CASIC Steering Committee.

CASIC is a result of the untiring efforts of the various organizations who are also represented on the executive board, namely, Department of Agricultural Land Resources Management/GDA, Department of Agricultural Engineering/GDA, CIRAD, Centre of Excellence on Sustainable Agricultural Intensification and Nutrition (CE SAIN) of the Royal University of Agriculture, Swisscontact, and Kansas State University. CASIC will be embarking upon its strategic plan in the coming months and will be launching the initiatives in the midst of the stakeholders.



C-MASC Snapshot: Research in the Time of COVID-19

(Left to right) C-MASC's Visiting Scholars Mah-Noor Azad, Gurmeet Singh Dheri, and Manjeet Kaur practice careful social distancing as they restart fieldwork taking soil samples with Lab Manager Kyle Sklenka and Graduate Student Nall Moonilall (not pictured).



Centre for Climate Resilient Animal Adaptation Studies

ICAR-National Institute of Animal Nutrition and Physiology (ICAR-NIANP) has started a new



Dr. Seijan (in centre) along with DG-ICAR, DDG (AS), Director-NIANP along with Prof. Frank Dunshea from the University of Melbourne

“Centre for Climate Resilient Animal Adaptation Studies” with Dr Veerasamy Seijan as the In-Charge

of the centre. The facility is the first of its kind in Asia. The centre has two climate chambers (i) Thermo-neutral Zone Chambers and (ii) Heating/cooling chambers. The chambers are predominantly for small ruminants and extendable for pig and poultry. Each chamber has the holding capacity of twelve animals each with individual,

feeding, watering, urine and feces collection facilities. The centre was inaugurated by Hon’ble Dr Trilochan Mohapatra, Secretary DARE & Director General ICAR on 5th Feb 2020. Hon’ble DDG (AS) and DDG (Fys) and collaborators from the University of Melbourne were also present during the inauguration of the facilities.

Unique Features of ICAR-NIANP Climate Chamber Facility

1. Budget: Building Cost: 120 Lakhs; Equipments Cost: 80 Lakhs and Annual Maintenance Cost approximately: 3 Lakhs
2. Twenty four micro climate controlled chambers
3. Weather variables that could be altered
4. Provision to induce accurate thermo-neutral zone for small ruminants
5. Provision of conducting both heat stress and cold stress studies
6. Provision to simulate any weather condition across the world
7. No socialization stress as it is possible for the animals to see and communicate with each other
8. No restraining stress as the animals can be maintained in individual cabins ensuring free movements
9. Data logger to record weather variables of micro environment within the climate chambers as well as both within and outside the climate chamber building
10. Provision to conduct experiments throughout the year
11. Individual feeding facility
12. Individual watering facility
13. Individual urine collection facility
14. Individual fecal collection facility



The Climate Chamber facility at ICAR-NIANP and experimental animals inside the climate chamber



C-MASC Scholar Viewpoint

FROM THE DESK OF GURMEET SINGH DHERI

The rice-wheat sequence is an important cropping system of Asia which feeds millions of people and supports the livelihoods of most of the farmers of the region. This system has impacted the natural energy exchange between the soil-plant-animal-environment continuum. Adoption of intensive tillage, inefficient irrigation methods, excessive use of synthetic fertilizer, and removal of crop residue has exacerbated the risk of accelerated soil erosion, loss of biodiversity and soil C reserves, depletion of water resources, pollution of the environment, and global warming. If appropriately managed, the soil can play a central role in the decarbonization of atmosphere, and the solution to climate change is underfoot—i.e. soil—as said by Dr. Rattan Lal, World Food Prize Laureate. The adoption of minimum soil disturbance, retention of crop residue and cover crops is necessary for the existence of life in the soil and on the soil. Conservation agriculture has the potential to achieve the aspirational value of “4 per mille” in the tropics.

In-situ retention of crop residues is one of the critical components of conservation agriculture which is advocated to enhance soil ecosystem services and avoid environmental pollution from straw burning. The mode of straw management affects its decomposition rate, C exchange, thus GHG emissions and global warming. Thus, the assessment of straw management induced GHG emissions is pertinent to identify low C emissions technologies for mitigating C footprints of agriculture. Besides a rich source of C, soil application of crop residues also supplements synthetic fertilizer and reduce indirect emissions of fertilizer, environmental pollution, and economic loss of the farmers on a long-term basis.

The encouraging effects of residue retention on soil C stock and soil health have been reported in field crops. As agriculture makes a significant contribution to the world’s greenhouse gas emissions, crop residue management is expected to influence C flux and global warming. Therefore, it is essential to study the effects of on-farm residue management technologies on C exchange through the soil-plant-environment continuum for a tradeoff between soil C and GHG emissions.

My aim at C-MASC is to study the effects of fertilizer and crop residue management on soil C and greenhouse gas emissions. Under restricted permissions in response to COVID-19 pandemic, I have a contingency plan for the assessment of biofuel crops on soil C and greenhouse gas emissions.

My training at C-MASC is sponsored by National Agricultural Higher Education Project, Indian Council of Agricultural Research, Government of India operating at Punjab Agricultural University (PAU). I express my sincere gratitude to Dr. Lal for his guidance, motivation, support and providing me with the opportunity to be part of C-MASC. My thanks are due to my parent institution (PAU) for permitting me to acquire the training at C-MASC.

Sincerely,

Dr. Gurmeet Singh Dheri
Assistant Soil Chemist
Department of Soil Science
Punjab Agricultural University, Ludhiana (PB), India

RC: Living Soils Symposium

Montreal, Canada May 22

Regeneration Canada had to move its Living Soils Symposium online due to COVID-19. The online event was an early success as the world moved to interact remotely. The lecture that Dr. Lal had recorded for them in early March for the in-person event is now available online here:

<https://youtu.be/jCCZ2f2WG0Y>



FAO: REC SOIL

Rome, Italy

June 17

Dr. Lal gave a presentation entitled “Status and Challenges of Global Soil Carbon Sequestration” to REC SOIL, an online webinar hosted by FAO in observance of the World Day to Combat Desertification and Drought. Over 1400 people attended the conference dedicated to “moving the SOC agenda into action.” Available here:

<https://youtu.be/k4P634TQ9kA>

SCSI: Brain Storming

Kolkata and New Dheli, India

June 18

Thanks to the magic of the internet, Dr. Lal was able to give three presentations in 24 hours! The second was a recording released at midnight to inaugurate a “Brain Storming” session for the Soil Conservation Society of India (SCSI) with the Indian Society of Agricultural Engineers (ISAE). He gave a talk on “Brain Storming Session on Combating Desertification and Drought for Food, Feed and Fiber.” The recording can be found here:

<https://go.osu.edu/scsi-isae>



Where in the Zoom is

Dr. Lal?

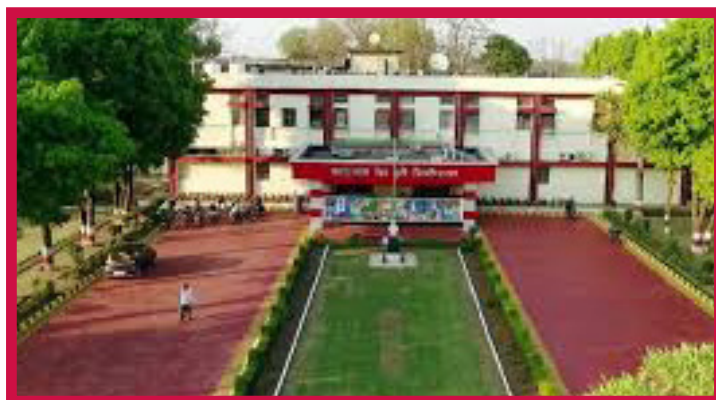
JNKVV: Online Guest Lecture Series

Jalalpur, India

June 18

Dr. Anil Dwivedi, Principle Scientist with a specialization in Soil Fertility at the university Jawaharlal Nehru Krishi Vishwa Vidyalaya (JNKVV) invited Dr. Lal to speak to his colleagues and students for in their online guest lecture series. Dr. Lal gave a talk on “Scientific Discussions: Soil Science and Agricultural Chemistry.” More than 500 participants attended this online lecture by Dr. Lal. The recording may be found here:

<https://go.osu.edu/jnkvv>



Primary building of JNKVV, Jalalpur, India



IICA

Costa Rica

July 7

Dr. Lal recorded a dialog with Dr. Manuel Otero, General Director of the Inter-American Institute for Cooperation on Agriculture (IICA) to be included in their webinar series. The episode is entitled *Soil health: the welfare of all humanity*. It can be seen here: <https://youtu.be/4UQxTRp8wLE>

Notable Events

Soil and Water Conservation Society (SWCS)

Ankey, IA

June 24

“The Soil and Water Conservation Society (SWCS) would like to congratulate the winners of the 2020 SWCS awards.

Best Research Paper for Impact and Quality Honorable Mention

In recognition of the impact and quality of the following research paper: Lal, R. 2015. Soil carbon sequestration and aggregation by cover cropping. *Journal of Soil and Water Conservation* 70(6):329-339, doi:10.2489/jswc.70.6.329.”



United Nations

New York, NY, USA

July 1

Dr. Rattan Lal and Dr. Uma Lele have been named by UN Chief Antonio Guterres as members of the UN group designed to provide evidence for sustainable food systems for a global food summit scheduled for next year.

Quarterly Publications

Referred Journal Articles

- Fan, M., A. J. Margenot, H. Zhang, R. Lal, J. Wu, P. Wu, F. Chen, and C. Gao. 2020. Distribution and source identification of potentially toxic elements in agricultural soils through high-resolution sampling. *Environmental Pollution* 263 (2020):114527
- dos Santos, A., da Silva Matos, E., da Silva Freddi, O., Galbieri, R., Lal, R., 2020. Cotton production systems in the Brazilian Cerrado: The impact of soil attributes on field-scale yield. *Eur. J. Agron.* 118, 126090. <https://doi.org/10.1016/j.eja.2020.126090>
- Lal, R. 2020. Carbon-Centric Integrated Nutrient Management: A Solution for Enhancing Farm Productivity and Carbon Sequestration in India. *Indian Journal of Fertilizers* 16 (4): 300-312
- Lal, R. 2020. Food Security Impacts of the “4 per Thousand” Initiative. *Geoderma* 374 (2020): 114427 <https://doi.org/10.1016/j.geoderma.2020.114427>
- Lal, R. 2020. Home gardening and urban agriculture for advancing food and nutritional security in response to the COVID-19 pandemic. *Food Security*. <https://doi.org/10.1007/s12571-020-01058-3>
- Lal, R. 2020. Managing soil quality for humanity and the planet. *Front. Agr. Sci. Eng.* <https://doi.org/10.15302/J-FASE-2020329>
- Lal, R. 2020. Soil Erosion and Gaseous Emissions. *Appl. Sci.* 10, 2784. <https://doi.org/10.3390/app10082784>
- Lal, R. 2020. Soil Organic Matter and Water Retention. *Agronomy Journal*. 1-13. <https://doi.org/10.1002/agj2.20282>
- Lal, R., 2020. Soil Science Beyond COVID-19. *J. Soil Water Conserv.* 75 (4):1–3. <https://doi.org/10.2489/jswc.2020.0408A>
- Yadav, G.S., R. Lal et al. 2020. Vehicular Traffic Effects on Hydraulic Properties of a Crosby Silt Loam under a Long-Term No-till Farming in Central Ohio, USA. *Soil and Tillage Research* 202 (2020): 104654.

Book Chapters

- Lal, R. 2020. Effects of Fertilizers on Soil Quality and Functionality. In *Soil and Fertilizers: Managing the Environmental Footprint*. Lal, R. (Ed). Boca Raton: CRC Press, 372 pp. <https://doi.org/10.1201/9780429471049>
- Lal, R. 2020. Managing Soils for Reducing Dependence on Chemicals and Import of Resources into Agroecosystems. In *Soil and Fertilizers: Managing the Environmental Footprint*. Lal, R. (Ed). Boca Raton: CRC Press, 372 pp. <https://doi.org/10.1201/9780429471049>
- Singh, Br. A. Safalaoh, N.A. Amuri, L.O Eik, B.K. Situla, and R. Lal. 2020. Agricultural and natural resources sustainability under changing climate in Africa. In B.R. Singh et al. (Eds). *Climate Impacts on Agricultural land Natural Resource Sustainability in Africa*. Springer Nature, Switzerland: 3-21.
- Singh, Br. A. Safalaoh, N.A. Amuri, E.L. Olav, B.K. Situla, and R. Lal. 2020. Knowledge gaps and research priorities. In B.R. Singh et al. (Eds). *Climate Impacts on Agricultural land Natural Resource Sustainability in Africa*. Springer Nature, Switzerland: 607-623.
- Sitaula, B.K., O. Zurovec, B.C. Luitel, A. Parker, and R. Lal. 2020. Need for personal transformations in climate change: Reflections on an environment change and climate smart agriculture in Africa. In B.R. Singh et al. (Eds). *Climate Impacts on Agricultural land Natural Resource Sustainability in Africa*. Springer Nature, Switzerland: 347-371.

Invited Keynote Speeches

- Lal, R. 2020. Managing the Global Carbon Cycle by Regenerative Agriculture. Living Soils Symposium, 2020. 12th May, 2020. Montreal, Canada. Released online: <https://youtu.be/jCCZ2f2WG0Y>
- Lal, R. 2020. Digital Dialogue with the 2020 World Food Prize Laureate. World Food Prize Laureate Announcement. 11th June 2020. Des Moines, IA, USA. Online via Zoom.
- Lal, R. 2020. Brainstorming Session on Combating Desertification and Drought for Food, Feed, and Fiber (ISCO, SCSI). 17th June 2020. Kolkata, India. Recorded.
- Lal, R. 2020. FAO. 17th June 2020. Rome, Italy. Online via Zoom.
- Lal, R. 2020. Scientific Discussions: Soil Science and Agricultural Chemistry. Jawaharlal Nehru Agricultural University. 18th June 2020. Jalalpur, India. Online via Zoom

Miscellaneous

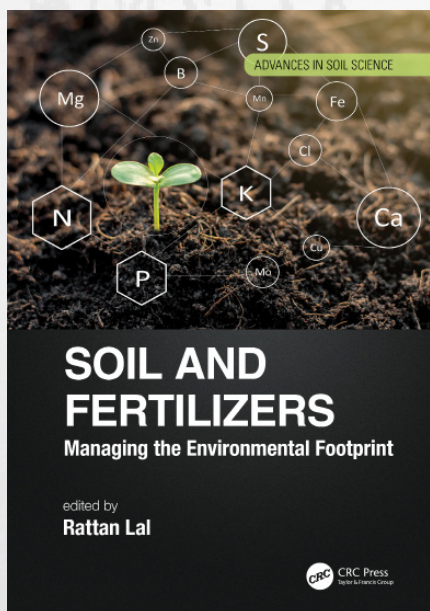
- Paustian, K., Chenu, C., Conant, R., Cotrufo, F., Lal, R., Smith, P., Soussana, J-F. 2020. Climate Mitigation Potential of Regenerative Agriculture is significant! Response to WRI.

Selected Interviews

Out of almost 200 articles published about Dr. Lal's WFP Announcement, here are a select few:

- Danielle Nierenberg of Food Tank: <https://go.osu.edu/food-tank>
- The Telegraph: <https://go.osu.edu/telegraph-wfp>
- National Public Radio: <https://go.osu.edu/npr-goats-and-soda>
- Forbes: <https://go.osu.edu/forbes>
- The Africa Times: <https://go.osu.edu/africa-times>
- The Associated Press: <https://go.osu.edu/ap-news-wfp>
- Indian Express: <https://go.osu.edu/indian-express-1> | <https://go.osu.edu/indian-express-2>
- Des Moines Register: <https://go.osu.edu/des-moines-register>
- Agri-Pulse: <https://go.osu.edu/agri-pulse-wfp>

Books Edited





This eerily empty Oval reflects Summer 2020 as everyone remains home to protect each other from COVID-19
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