

Borlaug Dialogue Side Panel: A Food Systems Approach to Transforming Africa's Soil Health: Policy, Science, Implementation, and Impact

October 22, 2021

The Panelists

- Dr. Richard Mkandawire
 - [Bio](#)
 - [Alliance for African Partnership](#)
- Julie Borlaug
 - [Bio](#)
 - [Invaio Sciences](#)
 - [Borlaug Foundation](#)
- Dr. Rattan Lal
 - [Bio](#)
 - [2020 World Food Prize](#)
 - [Padma Shri Award](#)
- Dr. Prem Bindraban
 - [Bio](#)
 - [FERARI Program](#)
- Dr. Oumou Camara
 - [Bio](#)
 - [IFDC North and West Africa Projects](#)
- Sign up for more information about the second Africa Fertilizer Summit in 2022: [Africa Fertilizer Summit II - IFDC](#)

Question 1

The current global discourse on sustainable agriculture and food systems is dominated by developed nations and focuses on organic, regenerative, and agro-ecological practices. These dialogues meet the needs of the US and of European nations, but do they serve **African nations'** diverse agricultural and food systems?

Resources

- Pray, C., J. Anderson, S. Ledermann, and L. Nagarajan (2021). [“The Agricultural Innovation System in the Context of the 2020 Pandemic”](#)
- Bindraban, P.S., Rob Groot, and Upendra Singh. [“Soil Nutrients: The Key to Meeting the Triple Global Challenge of Food and Nutrition Security, Climate, and Biodiversity”](#)

- Bindraban, P.S., H. van Keulen, and F.P. de Vries. Sustainable World Food Production and Environment Options for Alternative Developments. Wageningen. Delft AB-DLO/WL. Cited in Sustained Risks: A Lasting Phenomenon. Netherlands Scientific Council for Government Policy. Reports to the Government 44. <https://english.wrr.nl/publications/reports/1994/06/07/sustained-risks-a-lasting-phenomenon>
- [The Future of Farming to Meet Sustainable Development Goals in Africa](#) (video)

Question 2

Given the over-exploitation of soils on the African continent, which leads to soil nutrient mining, declining crop yields, and poverty, what comprehensive or integrated approaches must be pursued to reverse these trends?

Resources

- **2SCALE: [Gender Mainstreaming in Agribusiness](#)**
- **AAP Public Dialogue Series: Innovating financing for gender equity and implementing SDG5 in Africa**, October 27, 2021 9:00AM-10:30AM EDT [Alliance for African Partnership :: Fall 2021 Public Dialogue Series \(msu.edu\)](#)
- Bado, Vincent and **André Bationo**. (2018). Integrated Management of Soil Fertility and Land Resources in Sub-Saharan Africa: Involving Local Communities. <https://doi.org/10.1016/bs.agron.2018.02.001>
- **Bationo, A., U. Singh, E. Dossa, J. Wendt, S. Agyin-Birikorang, F. Lompo, and P. Bindraban**. 2020. "Improving Soil Fertility through Fertilizer Management in Sub-Saharan Africa," IN *Soil and Fertilizers: Managing the Environmental Footprint*, Rattan Lal (Ed.), pp. 67-102, CRC Press. <https://www.routledge.com/Soil-and-Fertilizers-Managing-the-Environmental-Footprint/Lal/p/book/9781138600072>
- Das, S., M. Jahiruddin, **M.R. Islam**, A. Al Mahmud, **A. Hossain**, and A.M. Laing. 2020. "Zinc Biofortification in the Grains of Two Wheat (*Triticum aestivum* L.) Varieties Through Fertilization," *Acta Agrobotanica*, 73(1):7312. <https://doi.org/10.5586/aa.7312>
- Dimkpa, C.O., **J. Fugice**, **U. Singh**, and T.D. Lewis. 2020. "Development of Fertilizers for Enhanced Nitrogen Use Efficiency—Trends and Perspectives." *Science of the Total Environment*, 731:139113. <https://doi.org/10.1016/j.scitotenv.2020.139113>
- **Gaihre, Y., U. Singh, W. Bible, J. Fugice, and J. Sanabria**. 2020. "Mitigating N₂O and NO Emissions from Direct-Seeded Rice with Nitrification Inhibitor and Urea Deep Placement," *Rice Science*, 27(5):434-444. <https://doi.org/10.1016/j.rsci.2020.03.005>
- [IFDC Research](#)
- IFDC: Integrated Household Improvement Plans ([YouTube](#))
- **Nagarajan, L., A. Naseem, and C.E. Pray**. 2020. "Seed Policy Reforms in Zambia," *AgriLinks*, March 9, 2020. <https://www.agrilinks.org/post/seed-policy-reforms-zambia>
- Ouattara, B., Taonda, S. J. B., Traore, A., Serme, I., Lompo, F., Peak, D., Sedogo, M. P., & Bationo, A. (2018). Use of a warrantage system to face rural poverty and hunger in the semi-arid area of Burkina Faso. *Journal of Development and Agricultural Economics*. <https://doi.org/10.5897/JDAE2017.0841>

- Parihar, C.M., A. Singh, S. Jat, A. Dey, H. Nayak, B. Mandal, **Y. Saharawat**, M. Jat, and O.P. Yadav. 2020. “Soil Quality and Carbon Sequestration Under Conservation Agriculture with Balanced Nutrition in Intensive Cereal-Based System,” *Soil and Tillage Research*, 202:104653. <https://doi.org/10.1016/j.still.2020.104653>
- [Soil-SMaRT – Helping Smallholder Farmers Deliver Balanced Crop Nutrition- IFDC](#)
- Vanlauwe, B., Descheemaeker, K., Giller, K. E., Huising, J., Merckx, R., Nziguheba, G., **Wendt, J.**, and Zingore, S.: Integrated soil fertility management in sub-Saharan Africa: unravelling local adaptation, *SOIL*, 1, 491–508, <https://doi.org/10.5194/soil-1-491-2015>, 2015.

Question 3

The burden to sustainably manage soils is placed entirely on smallholder farmers. Yet the benefits from soil use are reaped by everyone. Despite private land ownership, soils are a common good. Who should bear the responsibility for improving and maintaining soil health, and how does this become sustainable?

Resources

- Anderson, J., Birner, R., **Nagarajan, L.**, Naseem, A. & Pray, C. (2021). Private Agricultural R&D: Do the Poor Benefit? *Journal of Agricultural & Food Industrial Organization*, 19(1), 3-14. <https://doi.org/10.1515/jafio-2021-0007>
- Aremu, T., Freeman, C.Y., Laamari, A., Iddrisu, Y., Atakora, W.K., **Bindraban, P.S.**, 2020. [Towards establishing a Ghana multi-stakeholder fertiliser platform: Insights from stakeholder and network analyses. IFDC FERARI Research Report No. 1.](#)
- Iddrisu, Y., **P.S. Bindraban**, W.K. Atakora, B.T. Aremu, P. Annequin, K. Kouassi, A. Fernando, R. Wheeler, and F. Gyasi. 2021. [The Ghana Fertilizer Platform Study. IFDC FERARI Research Report No. 3.](#)
- Pray, C.E., **L. Nagarajan**, A. Naseem, and J.R. Anderson. 2020. “Chapter 3: Investing in Innovation,” IN *Harvesting Prosperity: Technology and Productivity Growth in Agriculture*, pp. 95-146, K. Fuglie, M. Gautam, A. Goyal, and W. Maloney (Eds.), World Bank. <https://openknowledge.worldbank.org/bitstream/handle/10986/32350/978146481393.pdf?sequence=6&isAllowed=y>

Question 4

What policy decisions should African and other governments make to build resilient soil health programs that enhance sustainable agriculture productivity and food security?

Resources

- University World News: [Scholars should engage policy-makers on agriculture.](#)
- UNFSS Website: [Coalition of Action 4 Soil Health \(CA4SH\)](#)
 - [Video on the Coalition of Action for Soil Health](#)
- CIFOR.org: [“The U.N. Food System Summit is laying the groundwork for change – from the soil up”](#)
- Devex: [How soil can save us all](#) by Dr. Rattan Lal

- TheBrokerOnline.eu: [“Embrace the Earth”](#)
- Medium: [Unleashing the Potential of Nature-Positive Food Systems](#)

Related Scientific Papers

- **Bindraban, P.S.**, Dimkpa, C.O., White, J.C., Franklin, F.A., Melse-Boonstra, A., Koele, N., Pandey, R., Rodenburg, J., Senthilkumar, K. Demokritou, P., Schmidt, S. (2020) Safeguarding human and planetary health demands a fertilizer sector transformation. *Plants, People, Planet* 2 (4): 302-309. DOI:10.1002/ppp3.10098 <https://nph.onlinelibrary.wiley.com/doi/pdfdirect/10.1002/ppp3.10098>
- **Prem S. Bindraban**, Christian Dimkpa, Scott Angle, Rudy Rabbinge, 2018. Unlocking the multiple public good services from balanced fertilizers. *Food Security* 10: 273–285. <https://fertiliser-society.org/store/role-of-fertilisers-for-climate-resilient-agriculture/>
- Ros, G. H., A. M. D. van Rotterdam, D. W. Bussink & **P. S. Bindraban**, 2016. Selenium fertilization strategies for bio-fortification of food: an agro-ecosystem approach. *Plant Soil* 404 (1-2): 99-112. <https://doi.org/10.1007/s11104-016-2830-4>
- **Prem S. Bindraban**, Christian O. Dimkpa, Renu Pandey, 2020. Exploring phosphorus fertilizers and fertilization strategies for improved human and environmental health. *Biology and Fertility of Soils* 56: 299–317 <https://doi.org/10.1007/s00374-019-01430-2>