

Editorial

Farm to Fork: Balancing the Needs for Sustainable Food Production and Food for Health Promotion

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Food is an essential human need underpinning health and wellbeing, while also having the potential to support environmental sustainability. In the past several decades, an emphasis on maximising yield though improved production practices has enhanced human lives in several respects, including by reducing hunger, infant and child mortality and poverty, and raising life expectancy [1,2]. Despite these advances, a downside of these practices is a shift to diets that are calorie-dense, processed and utilise animal products [3,4]. Food production is also a major contributor to environmental degradation [5,6]. Thus, food needs to be produced in a way that is not only healthy and nutritious but also environmentally sustainable. For example, during the period 2007–2016, total net greenhouse gas emissions from agriculture, forestry and other land use accounted for 23% of total net anthropogenic greenhouse gas emissions [7]. Land management and land use change also contributes to biodiversity loss [8], freshwater use [2] and soil degradation [9], which all affect land productivity and food security [10].

In this Special Issue, three interesting papers have been included.

The first paper concerns soil phytoremediation from cadmium using *Sesbania sesban* L. in association with *Bacillus anthracis* PM21. Ali et al. evaluated the plant-growth-promoting potential of the bacterial strain *B. anthracis* PM21 using *S. sesban*; they concluded that this bacterium can be an effective candidate for the phyto-remediation of Cd-polluted soil.

The paper is available online at: <https://www.mdpi.com/2071-1050/13/24/13529> (accessed on 29 November 2022).

In the second paper, Esteves et al. used life-cycle assessment (LCA) to evaluate the environmental impact of growing pigs, focusing on the production of crude protein while supplementing amino acids. They concluded that acidification, eutrophication and land occupation were reduced with the reduction of protein concentration.

The paper is available online at: <https://www.mdpi.com/2071-1050/13/9/4815> (accessed on 29 November 2022).

In the third paper, Hor et al. estimated the emissions of carbon dioxide from a traditional Cambodian diet food production system using LCA. They reported that the country's existing food production system generates CO₂ emissions of 9.7 Mt CO₂ eq/yr, with the proposed system reducing these by 28.9% to 6.9 Mt CO₂ eq/yr.

The paper is available online at: <https://www.mdpi.com/2071-1050/13/7/3660> (accessed on 29 November 2022).

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References

1. Whitmee, S.; Haines, A.; Beyrer, C.; Boltz, F.; Capon, A.G.; Dias, B.F.d.S.; Ezeh, A.; Frumkin, H.; Gong, P.; Head, P.; et al. Safeguarding human health in the Anthropocene epoch: Report of The Rockefeller Foundation-Lancet Commission on planetary health. *Lancet* **2015**, *386*, 1973–2028. [[CrossRef](#)] [[PubMed](#)]
2. Will, S.; Katherine, R.; Johan, R.; Sarah, E.C.; Ingo, F.; Elena, M.B.; ReINETTE, B.; Stephen, R.C.; Wim, d.V.; Cynthia, A.d.W.; et al. Planetary boundaries: Guiding human development on a changing planet. *Science* **2015**, *347*, 1259855.
3. International Food Policy Research Institute. *2017 Global Food Policy Report*; International Food Policy Research Institute (IFPRI): Washington, DC, USA, 2017.
4. Global Panel on Agriculture and Food Systems for Nutrition. *Food Systems and Diets: Facing the Challenges of the 21st Century*; Global Panel on Agriculture and Food Systems for Nutrition: London, UK, 2016.
5. Tilman, D.; Clark, M. Global diets link environmental sustainability and human health. *Nature* **2014**, *515*, 518–522. [[CrossRef](#)]
6. Springmann, M.; Godfray, H.C.; Rayner, M.; Scarborough, P. Analysis and valuation of the health and climate change cobenefits of dietary change. *Proc. Natl. Acad. Sci. USA* **2016**, *113*, 4146–4151. [[CrossRef](#)] [[PubMed](#)]
7. IPBES. *Summary for Policymakers of the Global Assessment Report on Biodiversity and Ecosystem Services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*; Díaz, S., Settele, J., Ngo, H.T., Guèze, M., Agard, J., Arneeth, A., Balvanera, P., Brauman, K.A., Butchart, S.H.M., Chan, K.M.A., et al., Eds.; IPBES secretariat: Bonn, Germany, 2019; 56p.
8. IPCC. *Climate Change and Land: An IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems*; Shukla, P.R., Skea, J., Calvo, B.E., Masson, D.V., Pörtner, H.O., Roberts, D.C., Zhai, P., Slade, R., Connors, S., van, D.R., et al., Eds.; Cambridge University Press: Cambridge, UK; New York, NY, USA, 2019.
9. Borrelli, P.; Robinson, D.A.; Fleischer, L.R.; Lugato, E.; Ballabio, C.; Alewell, C.; Meusburger, K.; Modugno, S.; Schütt, B.; Ferro, V.; et al. An assessment of the global impact of 21st century land use change on soil erosion. *Nat. Commun.* **2017**, *8*, 2013. [[CrossRef](#)] [[PubMed](#)]
10. Montanarella, L.; Pennock, D.J.; McKenzie, N.J.; Badraoui, M.; Chude, V.; Baptista, I.; Mamo, T.; Yemefack, M.; Singh, A.M.; Yagi, K.; et al. World's soils are under threat. *Soil* **2015**, *2*, 1263–1272. [[CrossRef](#)]

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