MX 0146 Sustainable food production - challenges and cropping system solutions 2022

Required reading

Introduction to sustainable cropping systems: why are they important?

Foley, J., Ramankutty, N., Brauman, K. et al. Solutions for a cultivated planet. Nature 478, 337–342 (2011). https://doi.org/10.1038/nature10452

Naylor R et al (2005) Losing the Links Between Livestock and Land: 310, Issue 5754, pp. 1621-1622 DOI: 10.1126/science.1117856

Major food crops and their sustainability challenges

Francis, C.A. (2005) Crop rotations. Encyclopedia of Soils in the Environment, 318-322.

Malézieux, E. et al. (2009) 'Mixing plant species in cropping systems: Concepts, tools and models: A review', in Sustainable Agriculture. doi: 10.1007/978-90-481-2666-8_22

Giller, K. E. et al. (2015) 'Beyond conservation agriculture', Frontiers in Plant Science. doi: 10.3389/fpls.2015.00870

Introduction to Life cycle assessment

Garnett, T., Röös , E., Nicholson, W., & Finch, J. 2016. Environmental impacts of food: an introduction to LCA (Foodsource: chapters). Food Climate Research. Network, University of Oxford.

Tidåker P et al 2021. Towards sustainable consumption of legumes: How origin, processing and transport affect the environmental impact of pulses. Sustainable Production and Consumption https://doi.org/10.1016/j.spc.2021.01.017

Plant-based protein production systems

Graham PH, Vance CP 2003. Legumes: Importance and Constraints to Greater Use. Plant Physiology 131: 872-877. www.plantphysiol.org/cgi/doi/10.1104/pp.017004.

Foyer CH et al. 2016 Neglecting legumes has compromised human health and sustainable food production Nature Plants 16112 | DOI:10.1038/NPLANTS.2016.112

Plant nutrient management for efficient crop production and reduced environmental impact

Goulding, K., Jarvis, S. and Whitmore, A. 2008. Optimizing nutrient management for farm systems. Philosophical Transactions of the Royal society B, 363:667-680.

Integrated pest management - insects, diseases and weeds

Barzman M et al 2015. Eight principles of integrated pest management. Agron. Sustain. Dev. 35:1199–1215 DOI 10.1007/s13593-015-0327-9

Guest DI 2003. Plant Pathology, Principles. Encyclopedia of Applied Plant Sciences, 2nd edition, Volume 3 http://dx.doi.org/10.1016/B978-0-12-394807-6.00056-3

Landis DA et al. (2000) Habitat Management to Conserve Natural Enemies of Arthropod Pests in Agriculture. Annual Review of Entomology. 45:175-201

Hoffmann C. & Thiéry D. (2010) Mating Disruption For The Control Of Grape Berry Moths-Bottlenecks and conditions for adoption in different European grapevine-growing regions. Endure Grapevine Case Study – Guide Number 3

Organic production

https://www.ifoam.bio/en/organic-landmarks/principles-organic-agriculture (Links to an external site.)

https://rodaleinstitute.org/why-organic/organic-farming-practices/ (Links to an external site.)

http://www.jordbruksverket.se/amnesomraden/odling/ekologiskodling.4.373db8e013d4008b3a18000179.html (Links to an external site.)

Reganold JP and Wachter JM (2016) Organic agriculture in the twenty-first century. Nature Plants 15221. DOI: 10.1038/NPLANTS.2015.22 Reganold and Wachter 2016.pdf

Garnett T et al. (2013) Sustainable Intensification in Agriculture: Premises and Policies. Science 341 (6141), 33-34. DOI: 10.1126/science.1234485 Garnett-2013-Sustainable-intensification-in-agri.pdf

Darnhofer et al. (2010). Conventionalisation of organic farming practices: from structural criteria towards an assessment based on organic principles. A review. Agron. Sustain. Dev. 30 67–81. DOI: 10.1051/agro/2009011 Darnhofer et al 2009.pdf

Climate change and cropping systems: the two way interactions

Zhao, C., Liu, B., Piao, S., Wang, X., Lobell, D. B., Huang, Y., . . . Asseng, S. (2017). Temperature increase reduces global yields of major crops in four independent estimates. Proceedings of the National Academy of Sciences, 114(35), 9326-9331. doi:10.1073/pnas.1701762114

Vermeulen, S.J., Campbell, B., Ingram, J.S., 2012. Climate Change and Food Systems, SSRN. https://doi.org/10.1146/annurev-environ-020411-130608

Global perspectives on challenges to agricultural sustainability

Altieri MA, Nicholls CI, Henao A, Lana MA 2015. Agroecology and the design of climate change-resilient farming systems. Agron. Sustain. Dev. DOI 10.1007/s13593-015-0285-2

Miguel A. Altieri & Clara I. Nicholls (2020) Agroecology and the reconstruction of a post-COVID-19 agriculture, The Journal of Peasant Studies, 47:5, 881-898, DOI: 10.1080/03066150.2020.1782891

Further reading (optional)

General

Pollan, Michael. The omnivore's dilemma: the search for a perfect meal in a fast-food world. Bloomsbury Publishing, 2009.

FAO 2018 The future of food and agriculture http://www.fao.org/publications/fofa/en/

WRI 2019 Creating sustainable Food Future https://wrr-food.wri.org/

UNEP (2016) Food Systems and Natural Resources Summary report. http://www.resourcepanel.org/file/395/download?token=JqcqyisH

Major food crops and their sustainability challenges

Bowden et al. (2008) Wheat growth & development. NSW Department of Primary Industries

IPM

Dara SK 2019. The New Integrated Pest Management Paradigm for the Modern Age. Journal of Integrated Pest Management. : 12 1–9 doi: 10.1093/jipm/pmz010