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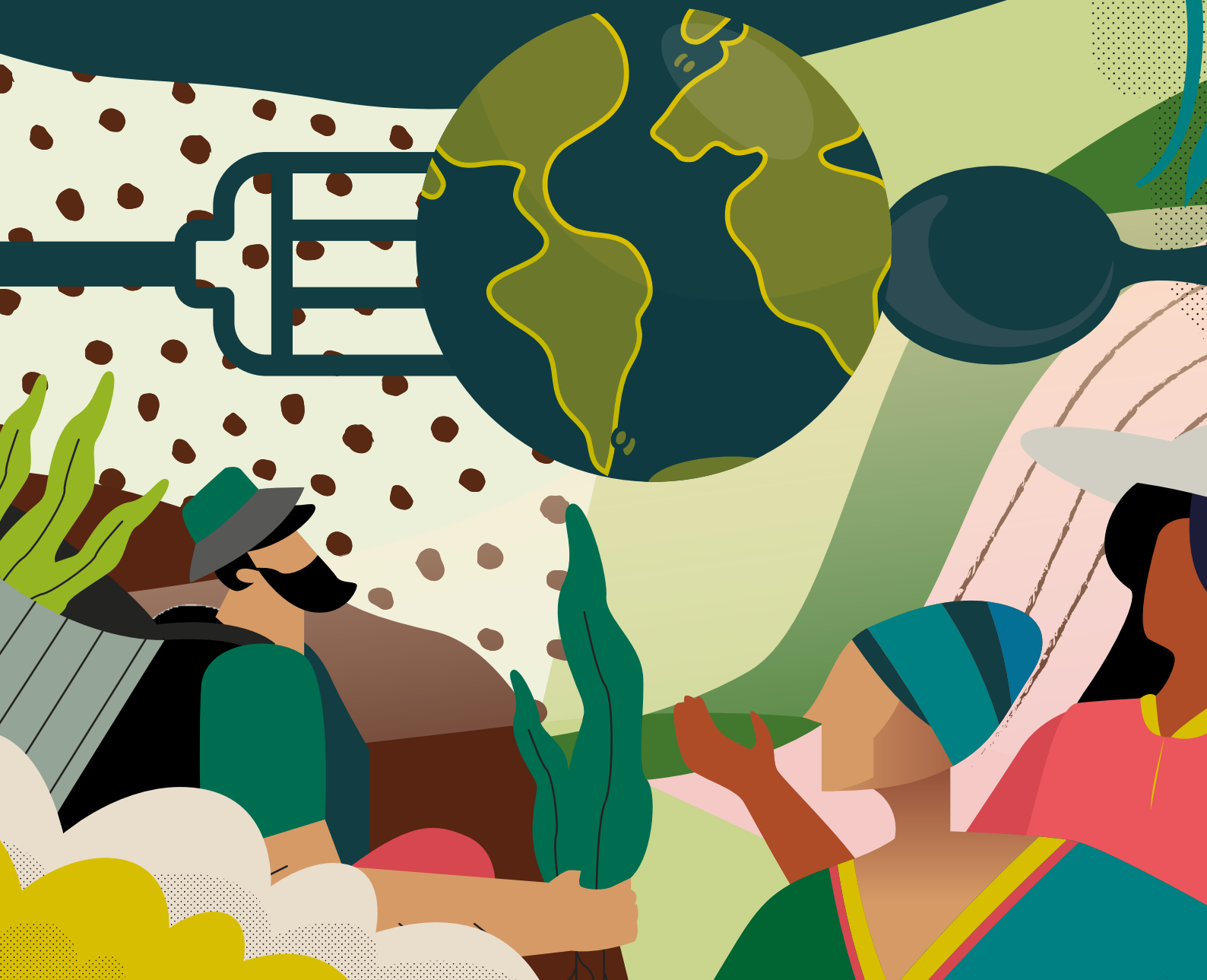
NEW TRENDS AND CHALLENGES



FOOD SYSTEMS AT RISK

NEW TRENDS AND CHALLENGES

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CONCLUSION OF SECTION 3

MUCH-NEEDED FOOD SYSTEM TRANSFORMATIONS TO RESPECT AND RESTORE ENVIRONMENTAL INTEGRITY

Étienne Hainzelin[1]

Some evolutionary paths taken by food systems, especially industrialised ones which have been spreading since the beginning of the twentieth century, have caused and are still causing serious environmental problems. These problems relate to the finiteness of natural resources used in the production process (land, water, fossil fuels, phosphorus etc.), the irreversible loss of biodiversity and erosion of ecosystems, and the contamination of different environmental compartments, especially water and soils.

The industrialisation of agriculture has affected the environment at many levels, even in LI and LMI countries. First, the status of the world's soils is alarming, with one-third of agricultural soils degraded. Soils are crucial to environmental integrity; they are a non-renewable resource with a high degradation potential and slow regeneration rates. They represent the habitat of precious - and mostly unknown - ecosystems and they are clearly a key resource to productive and healthy food systems.

Biodiversity, the real engine of above- and below-ground ecosystems, has been severely eroded virtually everywhere in the world, with differentiated kinds of pressure. In LI and LMI countries, pressure on land and natural habitats. along with water and soil contamination, have played a major role in this erosion. Although most production systems in these regions are still biodiverse (Herrero *et al.* 2017), intensification processes based on artificialisation and simplification are gaining ground, raising new and intense threats.

Finally, the non-renewable resources needed by such food systems, such as land, fossil fuels and phosphorus with different time horizons for when they will run out, will eventually collide with the finiteness of the planet. There are no substitutes for these resources and their dwindling will hamper food systems. Some essential renewable resources, such as freshwater, should not theoretically follow this finiteness, but in reality they are also badly affected by the degraded environment and are dwindling in many regions. Large-scale land and water acquisitions in various parts of the world are frequently worsening these problems.

Simultaneously, eroded biodiversity and dwindling resources are drastically affecting the capacity of food systems to meet food security objectives. These risks threaten the integrity of the environment on which all food systems depend, from production through to consumption and waste, to produce adequate food in terms of quality and quantity. In LI and LMI countries, food production capacity is already affected by these risks, such as soil degradation due to intense pesticide and synthetic fertiliser use.

Under the pressure of several imperative constraints, food systems must produce more and better food. Industrialised agriculture managed to reach incredible yields but the environmental price paid has been very high and will be felt by generations to come in the form of impoverished and contaminated environments. A transformation of food systems is much needed, allowing for the intensification of production based on healthy and biodiverse environmental matrices. Some of these transformative intensification pathways are already known; in short, they should seek to close nutrient cycles by avoiding losses, erosion and leaching, managing agriculture effluent, building new solutions against pests and competitors in place of pesticides, such as biological control, and drastically reducing contaminant sources.

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REFERENCE

Herrero, M., Thornton, P.K., Power, B., Bogard, J.R., Remans, R. Fritz, S., Gerber, J.S., *et al.* 2017. Farming and the geography of nutrient production for human use: a transdisciplinary analysis. *The Lancet Planetary Health,* 1: e33–42.