

FACTSHEET: ORGANIC AGRICULTURE AND SOIL HEALTH



Why is soil health important?

Soil is the basis of production for our fuel, fibre, animal feed and about 95% of our food.¹ Healthy soils provide the nutrients that plants need to grow and to ward off pests and diseases. Beyond this, they also retain water, regulating its flow, and store carbon, which mitigates climate change.² But the health of soils is declining rapidly around the world – and an estimated 40% of degradation is caused by agricultural activities, most notably through excessive use of chemical fertilisers, pesticides and plant treatment products. Organic agriculture focuses on maintaining and enhancing soil health and fertility.

What makes soils healthy and fertile?

Soil health is defined as “the continued capacity of soil to function as a vital living system” and degradation as a process that “lowers the current and/or future capacity of soil to produce goods or services”.³ Healthy and fertile soils have high levels of organic matter and beneficial organisms.

Organic matter binds the soil together, enabling it to retain water and slowly release it for use by plants.⁴ Organic matter can absorb and retain 90% of its weight in water. It also holds reservoirs of nutrients that are slowly released and used by plants. The plants draw on the phosphates, potassium and calcium, and, in turn, pass on nutrients to the people and animals that consume them.

Soil organic matter comprises particles of:⁵

- Fresh and decomposed plant residues, and animal dung.
- Micro-organisms, such as bacteria, fungi, nematodes, arthropods and protozoa, that consume and transfer nutrients, transforming the organic matter over time into humus.
- Cells and tissues of microbes and the substances that they synthesise.
- Stable organic matter known as colloidal humus, which does not decompose easily.

There is scientific evidence that shows that organically managed soils often have higher percentages of organic matter (8.33%) than those under industrial farming models (7.37%).¹

Organic agriculture production techniques and soil health

The organic agriculture production techniques mentioned below, among others, contribute to maintaining and enhancing soil health and fertility:^{6/7}

- **Crop rotation:** Rotating crops throughout the farm helps to increase the nutrients available in the soil and it lowers the risk of soil-borne pathogens by increasing the soil's microbial biomass.
- **Intercropping:** Growing different crops together in the same field helps plants to share resources, such as the nitrogen supplied by nitrogen-fixing plants. It also helps to reduce the risk of pests and diseases and reduces the need for synthetic inputs.
- **Minimum tillage:** Breaking the soil up as little as possible means that soil organic matter is kept intact and able to provide its vital functions. >>

- **Mulching:** Covering bare soil with biomass makes it softer and humid, which boosts soil fertility, and it helps to reduce evaporation and retain water, and slows down erosion. The mulch itself then decomposes adding to the soil organic matter.
- **Nitrogen-fixing plants:** Legume crops are used to fix nitrogen in the soil thus reducing the need for fertilisers. The Rodale Institute finds that soybean plants grown organically have a more extensive root system and therefore have more and more widely spread nitrogen-fixing nodules than those grown conventionally.⁸
- **Beneficial insects:** Crops are planted to draw beneficial insects that control pest populations.
- **Organic fertilisers:** Organic farmers add crop residues, vegetable peelings and animal manure to make compost for the soil.
- **Bio-fertilisers:** Fertiliser made by using live microorganisms is used to enrich and improve soil's biological, physical and biochemical condition.

Healthy soils and climate change mitigation

There is increasing focus on building soil health as a climate mitigation tool. Organic matter is rich in carbon and can retain it in the soil. In addition, healthy soils can retain and produce nitrogen, which reduces the need for application of chemical fertilisers. The application and excessive use of synthetic nitrogen-based fertilisers contributes significantly to greenhouse gas emissions.

Studies show that organic/ agroecological practices can yield carbon sequestration of up to 2 245 kilograms/hectare/year while soils farmed conventionally lose 227 kilograms/ hectare/year.¹

¹ Soil Association. 2015. *Living soils: A call to action*. [Online] Available: <https://www.soilassociation.org/media/6263/living-soils-a-call-to-action-2015.pdf>.

² Ibid.

³ Biswas, S. Ali, N. Goswami, R. & Charabarty, S. 2014. Soil health sustainability and organic farming: A review. *Journal of Food, Agriculture & Environment*, 12(3&4):237-243.

⁴ United States Department of Agriculture. n.d. *Soil organic matter*. [Online] Available: https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_053264.pdf.

⁵ Ibid.

⁶ Biswas, S. Ali, N. Goswami, R. & Charabarty, S. 2014. Soil health sustainability and organic farming: A review. *Journal of Food, Agriculture & Environment*, 12(3&4):237-243.

⁷ International Federation of Organic Agriculture Movements. n.d. *Organic basics*. [Online] Available: <https://www.ifoam.bio/en/our-library/organic-basics>.

⁸ Rhodes, C.J. 2012. Feed and healing the world: through regenerative agriculture and permaculture. *Science Progress* 95(4):345-446.

The Knowledge Hub for Organic Agriculture and Agroecology in Southern Africa (KHSA) is part of the Knowledge Centre for Organic Agriculture and Agroecology in Africa (KCOA), a collaborative country-led partnership funded by the German Federal Ministry of Economic Cooperation and Development (BMZ) and implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and non-governmental organisations across Africa. The KCOA aims to scale up adoption of organic farming practices through five knowledge hubs in Africa over a four-year period.

The South African-based Sustainability Institute supports project implementation in southern Africa. Activities are focused in Zambia, led by Participatory Ecological Land Use Management (PELUM) Zambia; in Namibia led by the Namibia Nature Foundation (NNF) in collaboration with the Namibian Organic Association (NOA); and in South Africa led by the South African Organic Sector Organisation (SAOSO). The project will extend to Malawi in 2021. The other hubs are implemented by GIZ in North, West and Eastern and Central Africa. For more information about KHSA, contact the Project Director Angela Coetzee on angela@sustainabilityinstitute.net.

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