

**Opinion Article**

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Transformation of Agriculture in the Republic of Moldova

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Introduction

The dominating industrial approach to agricultural intensification, known under the concept of the "Green Revolution," expanded all over the world after the Second World War. However, this approach does not work anymore.

The stabilization of yields, accompanied by soil degradation, losses of biodiversity both above and under the soil surface, and aridization of the territory as a result of global warming, with frequent manifestations of drought, has become a reality, especially during the last decades. We are living in a world of limited resources.

The discrepancy between the prices of non-renewable sources of energy and their derivatives, such as mineral fertilizers, fuel, pesticides, etc., on the one hand, and the prices of agricultural products, on the other hand, has become more acute because of military conflicts. This situation is increasing economic pressure on farmers. They have to look for alternative ways of agricultural intensification.

How to reduce dependence on non-renewable sources of energy and their derivatives is a very important issue at present and, especially, for the future. The industrial model of agricultural intensification has not addressed many of the challenges faced by modern agriculture and, consequently, could not provide sustainable development from economic, ecological, and social points of view. This means that agriculture is in crisis.

The main orientation of modern agriculture is toward maximum yields and profit, while externalizing the negative consequences on the environment and human health.

Prices for agricultural products are not real prices because they do not take into consideration the negative consequences for the environment and human health. Who is paying for them? Definitely, all of us—the whole society. The ecosystem and social services provided by soils are not evaluated and valued.

Soils are treated as a substrate where water and nutrients are applied for obtaining yields. Food production is treated like an industrial process, where plants assume the role of miniature factories: their output is maximized by industrial inputs, and soil is simply the medium in which roots are anchored.

In reality, soil is a living organism. Life on Earth became possible thanks to permanent turnovers of energy and nutrients throughout the entire natural food chain: producers-consumers-decomposers (the will of life according to Howard in *An Agricultural Testament*, 1943). The crucial role of decomposers, located in the soil, has been underestimated, if not neglected, until now. Meanwhile, 95% of our food comes from the soil.

The key issue in modern intensive agriculture is the insufficient quantity of organic matter returned back to the soil and the domination of the processes of decomposition (mineralization) of soil organic matter over synthesis (humification).

This is a result of:

- Excessive amounts of row crops in the structure of sowing areas and excessive moldboard plowing;
- Replacement of perennial herbaceous crops by annual crops with a smaller root system;

- Lack of organic fertilizers and excessive application of mineral fertilizers, especially nitrogen fertilizers, which contribute to more intensive mineralization of soil organic matter.

Agriculture all over the world requires changes in the paradigm (concept) of agricultural intensification-a transition from industrial inputs to better recycling of energy and nutrients within each farm. Respecting the principles of more sustainable agriculture is crucial for the transition to a more sustainable and climate-resilient agriculture. They also allow improvement of soil health (soil quality):

- Higher diversity of the main and cover crops within the framework of crop rotation;
- Minimum mechanical disturbance of the soil;
- Keeping the soil surface covered with crop residues or living mulch;
- Integration of crops and animals.

A good-quality soil can provide better ecosystem and social services, such as:

- Filtering and purifying water before it is released into waterways;

- Buffering climate changes by promoting the growth of plants that sequester CO₂ from the atmosphere, contributing to the humification and physical protection of carbon from plants and other organic residues;

- Pollination of crops;

- Production of high-quality agricultural products beneficial for human and animal health.

Healthy soil provides health for the whole food chain: soils-crops-animals-people-environment-Planet.

By improving soil health (the agrophysical, agrochemical and biological properties of the soil), farmers can significantly reduce their dependence on non-renewable sources of energy and their derivatives (fuel, mineral fertilizers, pesticides, etc). This was proven by the results obtained in the long-term field experiments conducted at the Selectia Research Institute of Field Crops, Bălți, Republic of Moldova.

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Conflict of Interest

No conflict of interest.