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**SOIL HEALTH AS THE BASIS FOR THE TRANSITION TO A MORE
SUSTAINABLE AGRICULTURE**

Agriculture in all over the world, including in the Republic of Moldova, is facing many challenges at the moment and, especially, for the future:

- limited natural resources, including non renewable sources of energy (oil, natural gasses, coal) with regularly increased prices on them
- worsening of economic conditions for farmers activities because of unfair increased prices for industrial inputs and agricultural products
- providing food security at the local, regional and global levels in the conditions of higher density of population
- biodiversity losses, including genetic losses both on the surface of the soil and, especially, in the soil
- soil degradation and danger of ground waters and food pollution on the whole food chain in the conditions of the globalization of economy
- increased negative consequences of the global warming with more frequent manifestation of droughts (heats) and other natural calamities
- rural community disintegration
- increased expences for public health (non transmissible diseases)

Industrial model of agricultural intensification based on the concept of “green revolution” didn’t address many of the above mentioned challenges and consequently didn’t provide a sustainable development (economic, ecologic and social aspects). It means agriculture is in crisis.

The main orientation of modern agriculture is on maximum yields and profit by externalizing the negative consequences on the environment and health of people.

Price for agricultural products are not real prices, because they don’t take in consideration the expences required for recovering the negative consequences on the environment and health of people. Who is paying for them? Deffinitely the society as a whole.

Soil is 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 outputs is maximized by industrial inputs and soil is simply the medium in which their roots are anchored.

Soil is a living organism. Life on the earth became possible thanks to permanent turnovers of energy and nutrients on the entire natural food chain: producers - consumers (people and animals) - decomposers (wheat of life according to Howard, 1942). The crucial role of decomposers (located in the soil) has been underestimated if not neglected until now. Meantime 95% of our food comes from the soil.

Agriculture in all over the world requires change of the paradigm of agricultural intensification - transition from industrial inputs to a better recycling of energy and nutrients in each farm.

Soil organic matter (humus) is an integral index of soil fertility (soil quality, soil health).

Soil quality (soil health) is crucial in the transition to a more sustainable agriculture, including to organic agriculture.

Soil health is determined by continuous turnover of nutrients and energy on the whole food chain: producers - consumers - reducers.

Sustainable soil management requires a higher diversity of crops with permanent supply of fresh organic residues (wastes) for continuous transformation of soil organic matter (synthesis - humification and decomposition - mineralization).

Changes in the soil structure due to compaction by heavy farm machines suppress root development, thus reducing the quantity of soil nutrients and water that can be accessed by crops.

A decline in soil organic matter following intensive tillage can reduce the water - holding capacity of the soil making the crop more susceptible to water deficits and drought during the growing season.

A soil with good physical, chemical and biological properties is able to produce higher yields, can generate more income than a poor quality soil.

The higher is the diversity of crops in the crop rotation the higher is the functionality of soil as a result of a higher biodiversity of organisms for the whole soil food chain.

The better are the predecessors of winter wheat the lower are the extra yields from fertilization. Yields reduction from sowing winter wheat after late harvested predecessors is significantly higher than extra yields from fertilization.

The share of soil fertility in yield formation of winter wheat is significantly higher after early harvested predecessors than after later harvested predecessors or permanent cropping.

Nitrogen - use efficiency from mineral fertilizers is the lowest when applied after early harvested predecessors and it increases after late harvested predecessors.

A good quality soil can provide better ecosystem and social services:

- filtering and purifying water before it goes to waterways
- buffer for climate changes by promoting the growth of plants that sequester CO₂ from the atmosphere and contributing to the humification and physical protection of carbon from plants and other organic residues

- pollination of crops
 - high quality of agricultural products beneficial for human and animal health.
- Healthy soil provides health for the whole food chain: crops - animals - people
- planet Earth.

Literature:

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INFLUENCE OF BIOGAS DIGESTATE, WOOD ASH AND THEIR MIXTURES ON THE YIELD AND QUALITY OF WINTER WHEAT

Winter wheat (*Triticum aestivum* L.) is considered to be one of the most important grain crops. Due to its high yield potential and grain quality, it is widely grown and used in food products all over the world.

Considerable areas are allocated for winter wheat crops in Ukraine. Thus, in 2020, grain crops were planted on an area of about 15,077 thousand hectares, in particular, 6,595.7 thousand hectares, or 43.7%, were devoted to winter wheat. In 2021, these indicators reached the level of 6,907.6 thousand hectares, or 44.1% in the structure of grain crops.

The geographic position of Latvia is very suitable for the production of winter wheat, which is also reflected in the country's field structure. During the last 10 years, the area under winter wheat has increased by factor 3, and it is no longer possible to use the agricultural area to increase yield output.

The data of the Central Statistical Bureau of the Republic of Latvia for the year 2020 show that the area used for grain crop farming was 750 000 ha, of which 381 000 ha were winter wheat.

The most important measures for improving the productivity and yield quality of winter wheat are soil reaction improvements and plant fertilization.

Currently, for the production of heat and energy, biogas plants and solid fuel