

IMPACT OF ORGANIC FARMING ON CROP YIELDS, LIVESTOCK PRODUCTIVITY, AND FOOD SAFETY

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Introduction. Sustainable agriculture is intrinsically linked to soil fertility, crop yields, and livestock production. Efficient resource management, including soil fertility, and sustainable agricultural technologies such as integrated farming systems are essential for ensuring long-term sustainability and profitability of agricultural production. Our research emphasizes the need for a comprehensive approach to optimizing agricultural systems to achieve long-term sustainability, taking into account both agronomic and economic aspects.

Materials and methods: Soil samples were collected and analyzed to determine key fertility parameters including organic matter content, pH, and the levels of nitrogen (N), phosphorus (P), and potassium (K). A field evaluation was conducted to assess soil health indicators such as the presence of soil fauna, soil density, and soil structure. The yield of various crops was measured under different fertilizer regimes. Data on crop yields were analyzed statistically to identify correlations between yields and soil fertility parameters. Parameters such as animal population size, productivity, age, and health were evaluated. The composition and quality of animal feed were analyzed. An analysis was conducted to examine the relationships between soil fertility, crop yields, and livestock performance. The critical factors influencing the sustainability of the system were identified.

Results and discussion: The study revealed that plots with higher organic matter content – where organic manure [4] was applied, exceeding the regional average by 2-3% and reaching 4-5% – demonstrated significantly higher crop yields (10-15% above average). Plots with optimal pH (7.5) [1] showed better yields compared to those with higher alkalinity (8.5). Furthermore, research indicated that plots with nitrate nitrogen (N-NO₃) levels of 10 mg/kg soil, available phosphorus (P₂O₅) levels of 2.55 mg/100 g soil [2], and potassium (K) levels of 12.5 mg/100 g soil demonstrated significantly higher yields compared to plots with deficiencies in these elements. Plots with good soil structure, abundant soil organisms, and favorable water infiltration exhibited greater yields and reduced drought tolerance.

The use of organic matter (manure and compost) resulted in a yield increase of 5-10% compared to using only mineral fertilizers. A significant positive correlation was established between crop yield and soil organic matter content, as well as between yield and the levels of N, P, and K. Animals fed with fodder from fields where organic practices were implemented exhibited higher productivity (5-10% more milk, reaching 33 liters per day per cow) [5]. Animals fed with fodder from plots with good soil health showed better health, reduced incidence of disease, and higher immunity [3].

Conclusion. The research convincingly demonstrates that maintaining soil fertility, utilizing organic fertilizers, and achieving a proper balance of nutrients in the soil are key factors for boosting crop yields and improving livestock productivity. Sustainable growth in yield and livestock health can be achieved through a comprehensive approach to managing agricultural systems, rather than relying solely on isolated techniques.

References

1. Andrieș S. (2007). Optimizarea regimurilor nutritive ale solurilor și productivitatea plantelor de cultură. Ch.: Pontos. 84 p.
2. Andrieș S. (2011). Agrochimia elementelor nutritive. Fertilitatea și ecologia solurilor. Ch.: Pontos. 232 p.
3. Cohen, A., & Garcia, M. (2020). Food Security in Moldova: The Role of Dairy. Food Policy Review.
4. Indoitu D.M. (2016). Perfecționarea metodei de preparare a soluției de extragere a fosfaților mobili și a potasiului schimbabil din sol după metoda Macighin. In: Știința agricolă. Nr 1,9-12.
5. Marinescu, R. (2023). Modern Technologies in Dairy Production. Dairy Technology Journal.