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Literature Review **Sustainable Skills**



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01

What is sustainable agriculture & sustainable skills?



| WHAT IS SUSTAINABLE AGRICULTURE AND SUSTAINABLE SKILLS?

Sustainable agriculture is an activity that reduces the environmental impact of agriculture, enabling a more efficient and environmentally friendly use of resources, i.e. soil, water, machinery, plant protection products, seeds, fertilizers and energy. However, all measures aimed at maintaining harmony in the environment must ultimately also lead to the profitability of agricultural production and its social acceptance. In the long term, this approach improves the quality of the environment and the resource base on which agriculture depends, provides basic human food and fibre needs, is economically viable, and improves the quality of life of farmers and society as a whole. [Crews, Mohler, Power 1991]



Figure 1- Triangle of sustainability

[Abubakar Attanda 2001]

To maintain this balance, skills are necessary to ensure that soil-water-plants-environment-living beings live in harmony with the balance of food chains and the energy balances associated with them. [Kambewa 2007] A modern farmer is therefore a strategist, manager, expert, entrepreneur, financial planner, producer, breeder, agronomist, machine operator, and even a meteorologist. Being a farmer is really about combining various professions and skills, as well as theory and practice.

In the context of sustainable agriculture, skills that allow you to achieve agricultural productivity while minimizing negative environmental impacts, protecting natural resources and caring for animal welfare are crucial.

The most important skills relate to the following aspects:

1. Soil management and regeneration

- **Efficient crop rotation:** The ability to select crops appropriately to increase soil fertility and reduce erosion.
- **Practice cover crops:** Use plants to protect the soil from erosion and retain water.
- **Composting:** The ability to manage organic residues to be used as organic fertiliser, thereby improving the structure of the soil and providing it with the necessary nutrients and reducing the use of artificial fertilisers.
- **Simplified tillage techniques:** Ability to select simplified tillage to reduce or eliminate tillage altogether to reduce soil erosion and improve soil structure.

2. Sustainable water management

- **Rainwater management:** Ability to manage water in order to collect it and use it for irrigation. in a way that allows for the collection and effective use of precipitation.
- **Protection of water sources:** Ability to perform agrochemical treatments in a way that does not pollute groundwater.

3. Agroecology

- **Integrated Pest Management (IPM):** The ability to select and apply natural enemies of parasites.
- **Mixed crops:** The ability to integrate different plants into one area to increase biodiversity, improve soil quality and protect against erosion.
- **Biodiversity management:** The ability to increase species diversity to balance the ecosystem and increase resilience to climate change.

5. Precision Farming

- **Application of digital technologies:** Knowledge and ability to operate drones, sensors, GPS and various types of software
- **Data management:** Ability to collect and analyse agricultural data to optimise production
- **Automation:** Use advanced machines and tools to minimize resource consumption.

6. Organic farming

- **Organic certification:** Knowledge of certification requirements and procedures
- **Production and distribution of organic food:** Ability to run an organic farm

7. Sustainable animal husbandry

- **Rotational grazing:** Conduct grazing in a way that minimizes soil degradation
- **Integrated farming systems:** The ability to combine animal husbandry with crops, e.g. by using animal manure to fertilise plants naturally.

8. Adaptation to climate change

- **Climate risk management:** Ability to adapt agricultural production to changing climatic conditions – selection of appropriate species and varieties.

9. Sustainable management

- **Long-term planning:** Ability to create farm development plans that take into account the long-term conservation of natural resources such as soil, water and biodiversity.
- **Financial management:** Planning investments and costs in such a way that they generate income and do not have a negative impact on the environment
- **Certificates and grants:** Ability to benefit from farm-specific subsidy programs aimed at sustainable production.

02

Research Analysis



| ANALYSIS

The range of skills that a farmer should have to be able to run a farm in a sustainable way is very wide. First of all, it is the ability to use knowledge in the field of cultivation and breeding.

Western European countries attach great importance to the qualifications and education of people working in agriculture. In the rest of Europe, the situation is much worse, e.g. in Italy over 10% of farmers do not have any qualifications, and over 60% have only the lowest level of education [Kobytecki 2003]. Higher skills and appropriate education foster innovative attitudes that support and shape entrepreneurship and the ability to adapt flexibly to changing conditions. [Chyłek 2004]

In the European Community, full agricultural censuses are systematically carried out, also concerning the level of education of farmers. With regard to the EU as a whole, it can be stated that 70.4% of managers had only practical experience, 22.6% had basic agricultural education and only 7.0% had full agricultural education. Countries with high rates of higher education include Belgium (26.4%), Austria (25.6%), France (21.6%) and Sweden (18.8%). On the other hand, the countries with lower levels included the countries of southern Europe, including Greece (0.4%), Spain (1.5%), Portugal (1.6%) and Italy (5.2%). Statistical surveys clearly show that the level of education of EU farmers does not correspond to the contemporary challenges faced by the food economy. The fact that more than 70% of farm managers have no education means that this sector is lagging far behind others. [Wawrzyniak 2019]

A modern farmer should use computer technology, also in the field of communication functions he performs. Using a computer with Internet access, the farmer can check the current and forecast weather, trends in the prices of agricultural products, feed prices, agricultural portals giving access to many advertisements related to agriculture. There are also software available to collect and analyze data, e.g. intended for herd management, supporting balanced feeding and identification of animals. The computer is also a tool in communication with institutions with which the modern farmer deals almost every day – banks, agricultural agencies, offices.

Despite the increased access to Internet resources, farmers still assess the usefulness of information technologies in farm management relatively low. This may be due not only to the relatively low education of the surveyed farmers, but also to the lack of access to free updated versions of specialist programs. The reason for the low use of information technologies in running a farm is the lack of specialist training, especially among farmers who graduated from primary, vocational and secondary schools in the years when IT was not included in the curricula [Kocira, Lorencowicz 2011]

In addition to basic agricultural knowledge and skills, a modern farmer must demonstrate skills in organization and management. He must know well the elements of them that he encounters on his farm. The farmer, as the owner of the farm, has the ability to make key decisions, but this involves taking full responsibility for mistakes. This is facilitated by the possibility of managing the farm using digital tools.

A farmer should also have a range of soft skills, such as the ability to build relationships, understood as effective cooperation in a team, a group of people, establishing new contacts, maintaining good relations with employees, neighbours and contractors.

Work organization is also a necessary skill, i.e. the ability to properly plan work (tasks, processes) by, among other things, choosing the right tools to achieve the goal, setting priorities, and effective use of working time. These are selected competences that should be developed by a farmer who wants to meet the challenges of the agricultural production market.

03

Conclusion



CONCLUSION:

- Farm changes, modernisation and innovation require improving the knowledge and skills of farm managers
- Appropriate advice is necessary to introduce positive changes
- The knowledge, skills and competences of a large part of farmers are insufficient in terms of management models, quality improvement, reduction of productivity growth costs
- Large gaps in expertise with low propensity to acquire it
- Lack of ability to apply theoretical knowledge in practice
- Low level of digital skills in relation to the rapid pace of change
- Widening digital divide between small, medium and large farms
- Young farmers prefer film presentations as a form of training
- Farms managed by people with knowledge and sustainable skills achieve greater efficiency
- Lifelong learning is poorly promoted among people involved in agriculture
- It is necessary to expand knowledge and skills in the following areas: the use of digital solutions, environmental protection and combating climate change, starting and running a business, sustainable management of resources (food, water, energy, etc.), consumer knowledge (reading labels, conscious shopping)

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