



Research Article

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# SUSTAINABLE AGRICULTURE IN TURKEY: POTENTIAL, OBSTACLES AND RECOMMENDATIONS

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## Abstract


Natural resources are threatened to meet need of increased population. Sustainable agricultural production practices are required to provide activities against global warming, energy use and water scarcity etc. This study is aim to put current situation and potential of Turkish Agriculture for sustainability, reveal obstacles and present recommendations. The information collected is presented by strengths, weaknesses, opportunities, threats (SWOT) analysis approach and some recommendations are made. In terms of sustainability Turkey has some strengths (wide agricultural and ecological zones, biological diversity, high numbers and quality research institutes, increased levels of education and awareness of producers) and opportunities (supports for organic agriculture and biological control, New trends towards consuming natural products etc.) for sustainable agriculture. At the same time, there are some weaknesses (low competitiveness, large numbers of small farmers and wide chemical input use) and threats (lack of knowledge about sustainability in the society, agricultural subsidies and inexpensive food demand etc.). Government supports, education and some additional projects can be useful to expand sustainable production systems.


**Keywords:** Sustainable agriculture, SWOT analysis, Turkey

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## 1. Introduction

The world's population is forecasted to rise dramatically over the next 30 years, from 7.5 billion in 2017 to 9.2 billion by 2050 (UN, 2017). At the same time, economic development will lead to an increase in demand for meat, dairy, vegetables and fruit. Global food production will need to double by 2050 to feed the world well. The

problem is that half of the habitable land on Earth is already used for farming. As resources are limited, the challenge is to achieve global food security while having a positive impact on the environment and society (Saipatform, 2018). Sustainable agricultural practices are considered importantly to provide efficient solution for these concerns.

Sustainable agriculture has environmental, social and economic dimensions. Protecting and improving of the natural environment are fundamental, and issues like global warming, energy use, water scarcity, saving of biodiversity and soil degradation need to be addressed.

The social dimension covers labor rights and the health of communities, food quality and animal welfare. On the economic side, sustainable agriculture is productive, efficient and competitive (Table 1).

**Table 1.** Environmental, social and economic dimensions in sustainable agriculture\*

Environmental Impacts	Social Impacts	Economic Impacts
<ul style="list-style-type: none"> <li>• Biodiversity</li> <li>• Climate change/ Energy</li> <li>• Soil degradation</li> <li>• Water scarcity</li> </ul>	<ul style="list-style-type: none"> <li>• Labor Rights</li> <li>• Community Health</li> <li>• Food Quality &amp; Safety</li> <li>• Animal Welfare</li> </ul>	<ul style="list-style-type: none"> <li>• Farm Profitability</li> <li>• Livelihoods</li> <li>• Value Chain</li> </ul>

\*Saipatform, 2009

Sustainable agricultural development plays a major role in improving food security and nutrition, increasing the quantity and diversity of food and providing economic transformation. From this point, sustainable agricultural development was defined as “Sustainable agricultural development is agricultural development that contributes to improving resource efficiency, strengthening resilience and securing social equity/responsibility of agriculture and food systems in order to ensure food security and nutrition for all, now and in the future” (HLPE, 2016). Main tools of sustainable agriculture are multi-cropping, minimal or no pesticide use, focusing soil health, choosing sustainable seeds and plant varieties, practicing water conservation and sustainable irrigation. Other methods of sustainable crop production are aquaponics, agroforestry, permaculture, rooftop farms and other methods of urban agriculture.

Sustainable agriculture is satisfied with the features at below;

- It sustains the economic viability of farm operations
- It satisfies human food, fiber and energy needs
- It maintains or enhances the resource base upon which it depends by emphasizing soil conservation, nutrient recycling, biologically based-pest management and biodiversity
- It takes advantage of the knowledge and skills of farmers
- It is durable and resilient to disturbance, pest outbreaks and market variability
- It makes the most efficient use of non-renewable resources and on-farm resources
- It integrates, where appropriate, natural biological cycles and pest control tools with production practices (Menalled et al., 2008).

Turkey has great agricultural potential because of climate, wide agricultural area, biological diversity and productive soil. However, it is known that economic and environmental sustainability are under great pressure by inappropriate and excessive use of chemical input, conventional production techniques, and excessive use

of natural resources. In this case, defining current situation and problems have significant importance to present recommendation to provide sustainability in the sector overall. This study aimed to put current situation and potential of Turkish Agriculture for sustainability, reveal obstacles and present recommendations.

## 2. Material and Method

The main material of the study is secondary data which are obtained from literature review (books, reports, journals and statistics). The data is presented by strengths, weaknesses, opportunities, threats (SWOT) analysis approach and some recommendations are made. SWOT analysis is a strategic planning framework used in evaluation of an organization, a plan, a project or a business activity. This analysis is therefore a significant tool for situation analysis that helps the managers to identify organizational and environmental factors. It has two dimensions as internal and external. Internal dimension includes organizational factors, also strengths and weaknesses, external dimension includes opportunities and threats (Gurel and Tat, 2017). SWOT analysis is defined as “a simple but powerful tool for sizing up an organization’s resource capabilities and deficiencies, its market opportunities, and the external threats to its future” (Thompson et al., 2007; Table 2).

Table 2. SWOT analysis

INTERNAL	
Strengths	Weaknesses
Opportunities	Threats
EXTERNAL	

## 3. Results and Discussion

### 3.1 Strengths

Wide agricultural and ecological zones: Turkey is characterized by extreme geo-climatic diversity, which permits the production of a wide range of livestock and

crops. As per the classification developed by TURKSTAT, there are nine agricultural zones in Turkey. These agricultural zones allow producing almost all of the products. This situation allows using sustainable agriculture practices easily. Thus, it is provided to minimized factors that prevent sustainable agriculture.

**Biological diversity:** Turkey displays the character of a small continent in terms of biological diversity. Among the reasons for this situation, one may count the fact that the country has three different types of bioclimatic and three Biogeographical Zones, namely Euro-Siberian, Mediterranean and Irano-Turanian. In other words, the country is at the point where three continents intersect. This results quite rich ecological and floristic differences throughout the country (MEF, 2007). Biodiversity is the origin of all crops and domesticated livestock and the variety within them. Biodiversity in agricultural and associated landscapes provides and maintains ecosystem services essential to agriculture. By this way, Sustainable agriculture is enhanced by biodiversity. Sustainable agriculture uses water, land and nutrients efficiently, while producing lasting economic and social benefits (WTC, 2008).

**Numerous and high quality of research institutes:** Turkey presents a good research environment with research institutes and faculties for agricultural and natural sciences to improve and expand sustainable agricultural practices. Agricultural Research is one of the duties of Ministry of Agriculture and Forestry in Turkey. In this concept, there are 50 research institutes to conduct agricultural researches (MAF, 2018). In tasks of these institutes, it especially emphasized that the sustainable use of natural resources must be taken as a basis. In addition, there are 39 faculties of agricultural and natural sciences, 24 faculties of veterinary, 10 faculties of forestry and 11 faculties of fishery (YOK, 2018).

**Increased levels of education and awareness of producers:** It is known that agricultural extension activities about conservation of natural resources expand recently. Also numbers of educated farmers have increased rapidly. As a tool of sustainable agriculture, organic agriculture is quite important in Turkey, like all over the world. Numbers of organic production producers were 14,798 in 2003, it reached 67,878 in 2016 (MAF, 2018). This indicator shows that the producers have tendency to provide sustainable agriculture if they are motivated as needed.

### **3.2. Weaknesses**

**Low competitiveness:** It can be said that sustainable agriculture practices have been newly recognized by producers and some of producers may have negative behaviors of farmers towards adoption of new farm technologies. This situation brings low competitiveness for products produced in sustainable practices comparing conventional products.

**Large numbers of small scale farms (low skilled):** Most of producers are small scale farmers which prefers

conventional production techniques in Turkey. This applications result inefficient using of natural resources and effect sustainability of agricultural development negatively.

**Wide chemical input use:** Unfortunately, most of agricultural production is grown with chemical inputs like synthetic fertilizers and chemical pesticides as conventionally. Although chemical input intensive agriculture produces great quantities of products at low prices, this production system threatens the environment, human health, rural communities and animal welfare. In some farms, meat, eggs, and dairy products are now produced on enormous industrial livestock facilities. These facilities confine hundreds of animals in cramped conditions. In addition to compromising animal welfare, factory farms generate a huge amount of waste, which pollutes air, water, and soil, degrading the natural environment and threatening public health.

**Inappropriate water use:** In Turkey, agriculture is the greatest water consuming sector (with about 73%). Turkey is geographically located within the focus of the world and Middle Eastern countries. Water is the most critical issue of the world agenda in 2010s. Significance of water was pointed out and water was placed among strategic resources. The basic target of agricultural water management is to prevent water wastages and losses. Sensitivity of surface and ground waters resources to environmental impacts, ever-complexing agricultural, domestic and industrial demands are significant issues of sustainable agricultural water management (Gokalp and Cakmak, 2016).

**Higher prices of environmentally friendly inputs:** Prices of environmentally friendly inputs are higher than chemical inputs. Using chemical inputs farmers are able to produce agricultural products at lower cost. It gives opportunity to the producers to get higher profit. Even some producers have awareness of environmental issues and pressure on natural resources, most of them prefer to use chemical inputs because of economic concern.

### **3.3. Opportunities**

**Supports for organic agriculture:** In Turkey, producers are supported by Ministry of Agriculture and Forestry to increase crop production, improve quality, and provide sustainability and environmentally sensitive farming techniques since 2005. The amount of support was defined between 10 TL/da and 100 TL/da for different categories of products in 2017 (MAF, 2018).

**Supports for biological control:** In Turkey, producers who prefer biological control in agricultural production are supported Ministry of Agriculture and Forestry to reduce chemical input use to preserve human health and natural resources since 2010. The amount of support was defined as 350 TL/da for greenhouses and 35 TL/da for open-field areas in 2017 (MAF, 2018).

**New trends towards consuming natural products:** Many consumers have tendency to consume natural or organic products because of some reasons such as health

concern, increasing education level, effects of media. These products are required sustainable agricultural techniques for production. It means that consumers have positive effect on sustainability indirectly.

Supports are given by organizations: In Turkey, as the world, many non-profit organizations give effort to increase public (all sides of public) conscious on importance to preserve natural resource use, support traditional agricultural production techniques, expand sustainable agricultural practices, increase consumers' knowledge level of sustainability.

Public education to inform consumers: Education is one of the most powerful tools for providing individuals with the appropriate skills and competencies to become sustainable consumers. UNESCO has designated 2005-2014 as the Decade of Education for Sustainable Development. Many, official (such as Ministry of Agriculture and Forestry, Ministry of Health, universities and research institutes) or unofficial organizations (such as non-profit organizations, firms and extension services) gives importance to the topic by means of all media tools (such as TV, social media, printed documents). It provides to increase demand for sustainable production practices.

**3.4. Threats**

Lack of knowledge about sustainability in society: It is known that there is a gap among relevant actors (consumers, business, government, and non-profit organizations). Also, there is a gap between the available knowledge about sustainable consumption and real action towards it, at all levels of society (Thogersen and Schrader, 2012). Understanding the reason for this gap and developing strategies and instruments for producers and others to close this gap is quite important for policymakers as whole the society.

Agricultural subsidies: Agricultural subsidies that favor excessive production of a single commodity may have harmful results. The subsidies force farmers to produce

same products every year. Crop diversification is an environmentally alternative to the maintenance of soil fertility in agriculture. It is often presented as a method to enhance the sustainability of agricultural production systems (Truscott et al., 2009).

Inexpensive food demand: Consumers demand reasonable or somehow cheaper prices for food products. This prevents new or sustainable production techniques.

Rapid population growth: In Turkey, total population was 80.1 million person and 28.0% of the population was in rural areas. Also, fertility rate was 2.10% and density was 105 person/km<sup>2</sup> (Worldometers, 2018). These indicators show that there is a high pressure on natural resources to meet food demand and provide income for rural population.

Climate change: Agriculture remains an important source of income and employment in Turkey. Agricultural production is heavily dependent on water availability for increasing productivity and decreasing volatility in production. Half of the crop production in Turkey relies on irrigation. Irrigated agriculture currently consumes about 75 percent of total water consumption, which is about 30 percent of renewable water availability. However, climate change is expected to increase the sectoral competition for water resources and raise the need for major changes in water policies in the medium and the long-run (Cakmak et al., 2009).

Soil Erosion: Land use management requires controlling natural resources for sustainability. Soil erosion related to improper land use is a major issue around the world. Land degradation may harm the health of ecosystem. Defining the soil loss in a basin the starting point in the restoration of soil quality for crop production. Reducing soil losses to a tolerable rate is one of the primary objectives for sustainability and soil conservation (Karas and Oguz, 2017).

**Table 2:** SWOT analysis of Turkish agriculture from the point of sustainability

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>• Wide agricultural and ecological zones</li> <li>• Biological diversity</li> <li>• High numbers and quality research institutes</li> <li>• Increased levels of education and awareness of producers</li> </ul>	<ul style="list-style-type: none"> <li>• Low competitiveness</li> <li>• Large numbers of small farmers (low skilled)</li> <li>• Wide chemical input use</li> <li>• Inappropriate water use</li> <li>• Higher prices of environmentally friendly inputs</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>• Supports for organic agriculture</li> <li>• Supports for biological control</li> <li>• New trends towards consuming natural products</li> <li>• Supports are given by organizations</li> <li>• Public education to inform consumers</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of knowledge about sustainability in the society</li> <li>• Agricultural subsidies</li> <li>• Inexpensive food demand</li> <li>• Rapid population growth</li> <li>• Climate change</li> <li>• Soil Erosion</li> </ul>

**4. Conclusions**

Sustainable agricultural development is very controversial and crucial issue for all dimensions of society. In the study, current situation and potential of

Turkish Agriculture is defined and obstacles are revealed. Some recommendations are given at the below. Importance of sustainable production systems should be introduced to farmers and given information about supports, which are given by Ministry of Agriculture and

Forestry.

Some supports are given by different organizations for people who want to use sustainable production systems. Farmers should be given information about these information and encouraged. The education, publishing and consulting system must be actively organized by the Ministry of Agriculture and Forestry.

Practices to develop organic farming should be enhanced and an organized production plan by increasing knowledge level of farmers should be done. Additional projects should be developed to increase the quality of life and income of farmers in areas where sustainable agriculture practices are being implemented. Also, infrastructure investments to be made in these regions are applications that can increase the prosperity of the farmers in the long period.

#### Conflict of interest

The authors declare that there is no conflict of interest.

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