When we look at the measures related to plant pattern and biodiversity in the world, it is seen that large-budget research projects are carried out to find which varieties can produce and be grown economically at which latitudes and longitudes, especially for products with high economic value, according to the future climate change models of the geographies they grow.

For the continuity and sustainable production of agricultural products, or in other words, food security, it is tried to discover uncultivated varieties and to create more resistant species against climate change.

Apart from this, the correct use of soil resources is the most important adaptation tool for climate change adaptation in the agricultural sector. Soil-friendly production methods are important in the struggle against climate change. Wrong land use and cultivation techniques will not only put food security at risk, but also cause adverse conditions in terms of greenhouse gas emissions.

Evaluating industrial and small family businesses separately for the capability of agricultural sector to adapt to climate change is the appropriate approach.

Solutions to be Applied in the Short and Medium Term for Climate Change Adaptation in Small Agricultural Enterprises:

- Adjustment of sowing, harvesting and other maintenance times according to climate data and forecasts,
- Protection of gardens against frost damage or improvement of air-conditioning systems in animal shelters, such as ventilation and refrigeration (technical solutions),
- Selection of product types that are suitable for the expected growing season and existing irrigation facilities and resistant to new temperature and humidity conditions. (review of product pattern),
- Climate change adaptation with the help of biotechnology opportunities and existing genetic diversity,
- Improvement of pest and disease control through practices such as better monitoring methods, diversified product rotation or integrated pest management (proactive plant protection measures),
- Mitigation of water losses, improvement of irrigation practices and a more efficient use of water by recycling and storing water (sustainable water management),
- Increase in water holding capacity, improvement of soil management,
- Start of breeding heat-resistant farm animals in small and air-conditioned enterprises in shelters (IPCC, 2019)

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CLIMATE ADAPTATION

FOR AGRICULTURAL AND FOOD SECURITY

REPUBLIC OF TURKEY
MINISTRY OF ENVIRONMENT
AND URBANISATION

Environment and Climate Action
Sector Operational Programme

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Agriculture provides humanity with basic food products necessary for sustaining its life. The interaction of climate change and agriculture poses a risk for the continuity of these basic products.

The 13th article of Sustainable Development Goals adopted by the United Nations (UN) in 2015 has the title of "Climate Action" and it is seen that other Goals are directly or indirectly related to the issue of climate change.

According to the international organizations, in order to meet the food needs of humanity, we have to double the current agricultural production worldwide by 2050.

Well, while we can't provide enough food in some parts of the world even today, considering the yield loss that will occur even with the most optimistic climate scenarios, it becomes increasingly difficult to talk about food security for the year 2050.

We need to change our current usage habits and production approach regarding natural resources.

In line with the realization of the UN Sustainable Development Goals, in the context of climate change adaptation in agricultural systems, the first objective is to “end hunger, ensure food security and improve nutrition and promote sustainable agriculture”. The second goal is “to provide sustainable food production systems and to implement resilient agriculture practices that increase productivity and production, help protect ecosystems, strengthen the capacity to climate change adaptation.

In achieving these goals, primarily the measures that can be taken from the local to the national and from the short-term to the long-term and the solutions to be applied must be taken into consideration in sustainable agriculture and food production.

Climate change adaptation in the agricultural sector can be expressed primarily in two ways.

Based on these studies, with the help of climate and agricultural product models, planning plant patterns on a regional scale with 5-year periods will be the most accurate adaptation option.

This integrated planning approach is important in the context of associating local, regional, national and international adaptation efforts with each other.

Possible Actions to Climate Change adaptation in Industrial Agricultural Enterprises:

- **Identification of fragile areas and sectors and evaluation of the requirements and opportunities for different product types to be selected depending on climatic changes and for product change,**
- **Supporting agricultural research and experimental production for the selection and production of the most suitable product for the new conditions,**
- **Strengthening adaptation capacity by raising awareness and providing useful information on farm management (Making agricultural publication services functional),**
- **Considering the relationship between precipitation, irrigation and yield in the context of industrial agriculture, planning appropriate irrigation investments since higher yields may require more irrigation,**
- **The relationship between the expected yield and irrigation requirement as a result of climate change will affect the product pattern and this will affect the product prices as a result of the supply-demand balance. Due to this interaction, it is important that large enterprises engaged in industrial agriculture follow the economic and climate parameters in parallel.**

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