

An evaluation of water footprint of bread wastes in Turkey

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All living creatures on Earth need adequate nutrition to survive. However, it is not possible for the entire world population to access sufficient quantity and quality of food. Millions of people around the world suffer from malnutrition. On the other hand, a study conducted by FAO estimated that about one-third of food produced is lost or wasted globally which is about 1.3 billion tons per year (FAO, 2011). In accordance to the UN Sustainable Development Goal #2: Zero Hunger, it is an important topic to combat world hunger until 2030.

Food production requires a lot of raw materials, water and energy, as well as labor, time and money. However, food waste also means the waste of all these inputs. Along with its negative impacts on food security, food waste also contributes to some environmental problems, water and carbon footprint. The total carbon footprint of food wastage is around 4.4 GtCO₂ eq per year (FAO, 2011). When the negative impacts of climate change on water resources is considered, draught constitute an important risk for crop production and food security. Therefore, considering the water footprint of wasted food, it is essential to minimize wasted food for saving water.

Food waste is an important issue that needs to be focused on in Turkey as well as all over the world. It is estimated that 7.7 million tons of food get wasted in Turkey each year. This means 93 kg of food is wasted per capita/year (UNEP Food Waste Index Report, 2021). Wheat and wheat products are some of the most consumed agricultural products in Turkey and especially bread plays an important role in Turkish people's diet. Bread is the most common food item in Turkish cuisine, with a daily purchasing rate of 78.9%.

According to the "Wastage Report of Turkey" prepared by the Turkish Ministry of Trade, the highest reason for household food waste are spoilage (74.2%) and excess food preparation (29.8%) (Ministry of Trade, 2018). The average bread consumption in Western countries is between 112-830 grams per day per capita. The average consumption has Turkey decreased from 319 grams in 2013 to 195 grams in 2018. Only 47.5% of the total purchased bread is consumed, while 52.5% is partially consumed (Ministry of Trade, 2018). The remaining bread is either disposed as solid waste or used as an ingredient for other food. A report formed by the Republic of Turkey Ministry of Trade calculated that 542.000 tons of bread were wasted, and the economic loss of this waste was 1.5 million TL in 2012 (Ministry of Trade, 2018). On the other hand, recent studies show that the annual disposal of bread in Turkey was estimated as 71.4 grams per day per capita, which is equal to 6,000 tons daily or 2.2 million tons annually. Another research reports that approximately 6 million breads are disposed of before purchasing, which makes another 1,800 tons per year (Ministry of Trade, 2018). Such waste will inevitably harm both the environment and the country's economy.

The average water footprint of a bread is approximately 1,300 L (Water Footprint Network, 2008). and this makes a total wastage of 2,860 hm³ fresh water, which corresponds to annual domestic water consumption of approximately 52 million people. Wheat production in Turkey is commonly practiced in most basins, especially in Central Anatolia (Fig. 1). The annual wheat production in Turkey is 20.9 million tons on average, which has a water footprint of approximately 47,600 hm³. The bread wastage corresponds to 6% of the water footprint of wheat in Turkey. As a water stressed country in the Mediterranean region, Turkey needs to adopt to the climate vulnerabilities by increasing water use efficiency in agricultural sector.

This study is part of ERA-NET (FOSC) funded project Cross-Border Climate Vulnerabilities and Remote Impacts of Food Systems of the EU, Turkey and Africa: Trade, Climate Risk and Adaptation (CREATE). The outcomes of CREATE will be used to increase awareness of the risks that climate change poses to the agro-food trade and the economy. They can contribute to efforts by the governments (macro-scale), the communities (meso-scale), agricultural producers (micro scale), by providing essential information for promoting actions towards mitigating the consequences of climate change on agro-food trade. The project aims to develop strategies and policies for reducing food-wastes, which in turn would help achieve water savings.

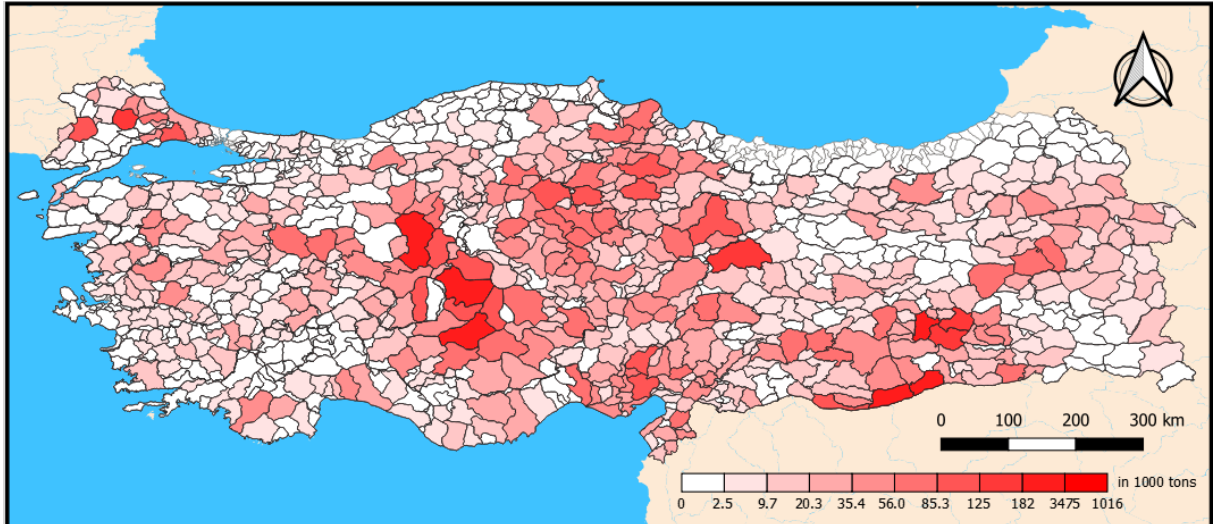


Figure 1. Annual wheat production in Turkey

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