A sustainable agriculture starts from optimum fertilizer use

Dursun Yıldız

Civil Engineer

Head of Hydropolitics Academy

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SUMMARY

The goal of sustainable agriculture is to meet society's food and textile needs in the present without compromising the ability of future generations to meet their own needs. Practitioners of sustainable agriculture seek to integrate three main objectives into their work: a healty environment, economic profitability, and social and economic equity.

There are many practices commonly used by people working in sustainable agriculture and sustainable food systems. Growers may use methods to promote soil health, minimize water use, and lower pollution levels on the farm.

Consumer society, in order to meet the growing need for food, agricultural land per unit area required to achieve maximum efficiency and highest quality product. It is known that the nutrition of the plant is the one of the most important factors to control agricultural productivity and quality. Rates of nutrients in the soil affects the quality of yield. In the permanent agricultural land, the soil will be very poor in nutrients, as a result, inefficient. Therefore, producers, fertilize the soil, combat pests, irrigation and process of agricultural activities to make more efficient to soil. Fertilization among these activities remains a priority at all times.

Recent studies, however, excessive use of fertilizers is the need for additional land outside the public and environmental health of the reported adverse affects. Excessive fertilization and mindless, but there were soil salinity, heavy metal accumulation, water eutrophication and accumulation of nitrate, to consider in terms of air pollution in the air of gases containing nitrogen and sulfur, giving and can lead to problems such as the greenhouse effect.

We aim to rise awarenes among farmers and reveal environmental and health problems caused by improper fertilization.We also provide recommendation toward solving these problems.

Keywords: Fertilizer use, sustainable agriculture, public healt,

The Fertilizer Use in Turkey and Problems Experienced About Fertilizing

One of the first technics thought about intensive agriculture applications is fertilizing. Fertilization is in the second row following mechanisation in agricultural inputs in Turkiye, similar to the state in worldwide. Chemical fertilizations that have been used since 1950's in Turkish agricultural fields have been widely used since 1970's. In the beginning the consumption ratio was under one million tonnes while it has a minimum value of five million tonnes in recent years. Moreover, chemical fertilization production and consumption in Turkiye includes many problems within itself. This is the reason why products and decrement ratio in rendement to be handled via fertilization could not reach the grades that were expected. In addition to that, fertilization application the harms caused by the problems mentioned above have pretty high levels.

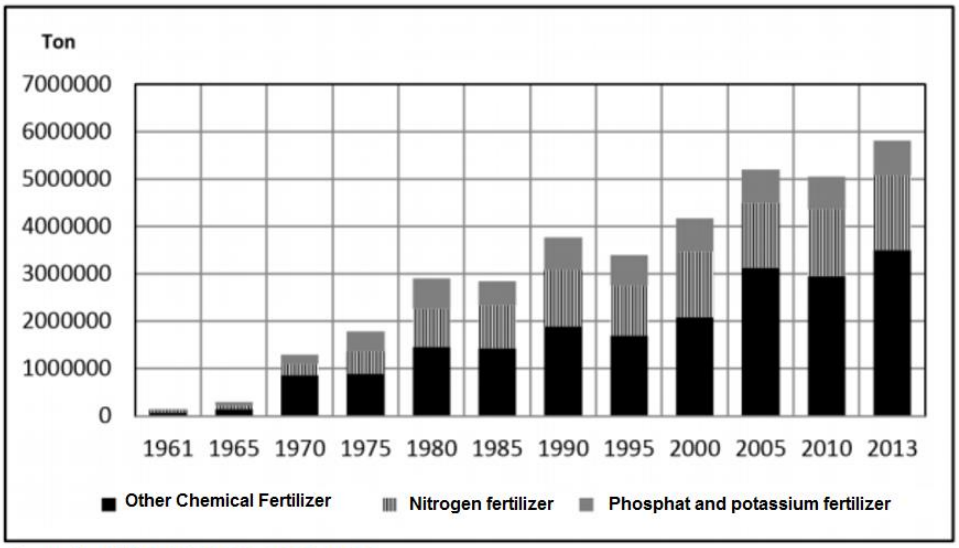
Although this issue- which has been studied by agriculture experts- will be examined in a collaborative apporoach to convince farmers, Water Users Organisations and (WUO) and groundwater irrigation cooperatives' managers. Identifing the present situation we will create applicable ,suitable solutions and suggestions for problems are stated.

Figure 1. Chemical Fertilizer Consumption in the cities in 2013

Fertilization increases efficiency and obtains better quality of product recovery in agricultural activities. It is one of the most important ways. Non-organic fertilizers mainly contain phosphate, nitrate, ammonium and potassium salts. Fertilizer industry is considered to be source of natural radionuclides and heavy metals as a potential source. It contains a large majority of the heavy metals [1-2] . However, in recent years, fertilizer consumption increased through Turkey in contrary to decresing agricultural land .

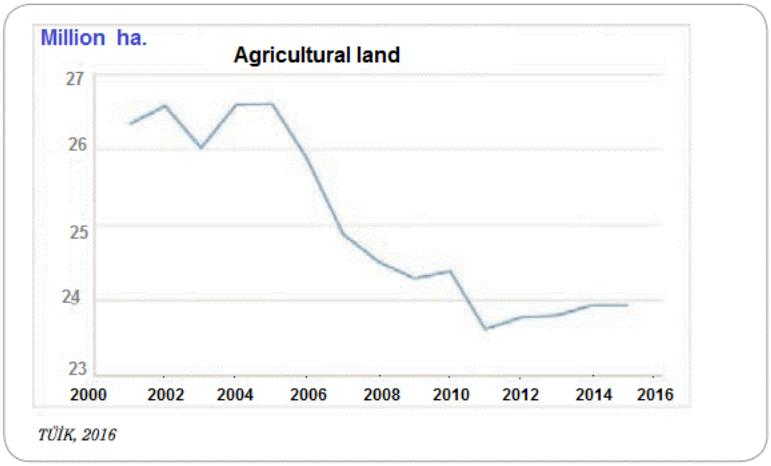
İn 2001, Turkey had 26,3 million hektar agricultural land .This agricultural land figure has decreased to 23,9 million ha in 2015. During this period of time, on the contrary to this decreasing trend total consumption use of fertilizer has increases as 20% . (Fig 2. Fig 3) . Dr..Ağaçayak explained this situation as "excesive use of fertilizer has decreased in agricultural

land productivity and farmers have used more fertilizer than before. Therfore there is an urgent need to rise an awareness and protect water,soil,environment ,society in all levels.



Kaynak: *BÜGEM, 2015; FAO, 2016.*

Figure 2. Total Fertilizer ,Nitrogen Fertilizer,Phosphat -potassium fertilizer consumption by years in Turkey (1).



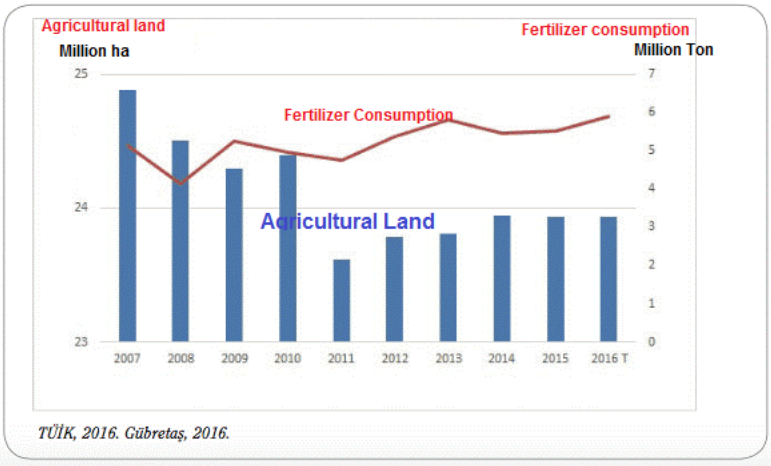


Figure 3 .Trends in fertilizer consumption and agricultural land in Turkey (5).

The Figure 3 clearly shows that excesive use of fertilizer has increased as the years go by. Some researhers have indicated that Although excesive use of fertilizer and increased consumption there is no increse in productivity in agricultural production. Comparision in terms of productivity between Turkey and some Foreign Countries show that lower fertilizer consumption countries have higher productivity than that of Turkey in the agricultural sector.

This result itself shows us there is an urgent need to optimize chemical fertilizer use to protect agricultural land as well as humanbeings, water and all ecosystem and natural environment.

The Government has decided to stop chemical fertilizing in some regions of Turkey

Investigation showed that in 830 000 decar agricultural land in the Eastern Part of Turkey, more than 130 kg/ decar chemical fertilizer has been used since last 50 years.

Research in the province of Rize in the territory of Turkey, one-way ammonium sulfate fertilization of tea, actually led to an increase in acidity of soils with low pH. Today 85% of the territory has dropped below pH 4 which is considered as the critical level (6).In 2016 Turkish government has decided to stop chemical fertilizing in the Eastern Black Sea region in Tea Leaf production.In 2017 Turkish government has also decided gradually stop producing chemical fertilizers to prevent terrorist organizations from accessing the substance commonly used in producing explosives and instead increase the use of biological fertilizers in agricultural lands,

Excesive chemical fertilizer use

Excesive fertilizer use can cause serious environmental problems. Fertilization may affect the accumulation of heavy metals in soil and plant system. Plants absorb the fertilizers through the soil, they can enter the food chain. Thus, fertilization leads to water, soil and air pollution.

The Hydropolitics Association made a surveying study and prepared a report in 2016 (4) . The survey has been carried out among the members and managers of the Groundwater Irrigation Cooperatives belonging to The Central Union of Turkish Irrigation Cooperatives

Obtained results showed that there is a general tendency among farmers to use more fertilizer for more product .

Results obtained from this survey about excesive use of Fertilizer per decare that is given in Figure 4. Many sources said the diazot monoxide N_2O comes from excessive chemicaal fertilizer use is a major atmospheric pollutant that is much higher effect than carbon dioxide

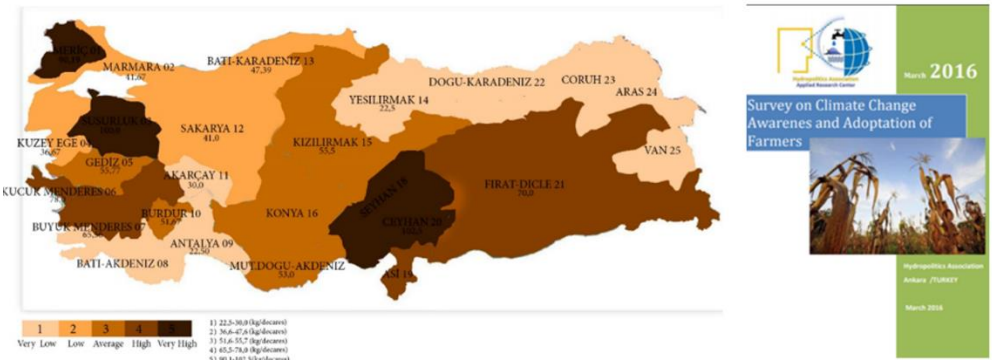


Figure 4. Total fertilizer use per decare among farmers belongs to Groundwater Irrıgation Cooperatives .(4).

Excessive use of chemical fertilizers in agriculture, resulting in a large number of environmental problems because some fertilizers contain heavy metals (eg. cadmium and chromium) and high concentrations of radionuclides. Later these fertilizers agro-ecosystem constitutes the main source of heavy metals and radionuclides in plants and some results in the accumulation of inorganic pollutants [3].

Greenhouses, aquaculture especially large amounts of chemical fertilizers used during the peak season, so dangerously polluted well water, especially water resources, crop production quantity and quality of product deteriorates. Problems caused by too much fertilizer: The amount of nitrate may increase in drinking water and rivers as a result of high levels of nitrogen fertilizer use. The amount of phosphate may increase in drinking water and rivers as a result of the transport of phosphorous fertilizer with the flow of surface. High level of Nitrogen fertilizer used plants grown in soils. There are harmful accumulation of NO3 and NO2 [2, 3]

In different part of the World as well as in Turkey ,rapidly growing population leads growing food demand , fast agricultural industrial production This make agricultural lands unprodactive and force to farmers to use excessive fertilizer and chemicals as already has been faced in many cases.

Therefore rising awarenes on the paradigm of "Safe Soil, Safe Water For Safe Environment is a vital need. In order to reach safer environment a paradigm shift is necessery to optimum use of chemical fertilizers and sustainable use of water and soil.

Therefore an intensive informative action plan should be implemented to rise awarenes among farmers about following subjects

- Optimum water and fertilizer use
- Protection of agricultural land productivity
- Agricultural production economy

Today, use of fertilizers is seen as a necessary agricultural technology. Because soil restores nutrients. However, firstly soil analysis should be performed carefully. After then, fertilizer should be given to soil. The structure and chemical content of the soil should be identified and the most appropriate type of fertilizers should be selected. The most suitable method should be processed. Otherwise, the fertilizer should be noted that errors will result in the loss of both energy and finance.

Fertilizing should be done in time, should not be inappropriate times. For example a heavy rainfall to the seasons, fertilization, fertilizers water will mix with the surrounding soil by leaching. For this reason, fertilizer will be lost from soil, as well as pollution of surrounding water and therefore it will result in eutrophication [1]

Conclusion

" Safe Water, Safe Soil For A Safe Environment " chain needs a paradigm shift starting from using optimum amount of organic fertilizer instead of excessive chemical one .Farmers in Turkey should be aware of optimum fertilizer use in terms of safe food production as well as to protect environment. There are irrigation cooperatives and water users organizations in Turkey. However, the vast majority of these water users organisations have difficulties in accessing up-to-date information because of their weak organisational structure and economic difficulities . Therefore, they cannot have adequate knowledge on upcoming legal responsibilities and requirements as well as new technologies,new products to achieve food safety and environmental protection.

The other effective group is the consumers. Consumers are the most important link in the safe water ,safe soil and safe environment chain. Increasing consumer's knowledge and raising their awareness could be an effective step towards ensuring food safety and protection environment. Therefore consumers can become an important part of this safety chain asking " growing situation and used materials for their consuming agricultiral products"

Irigation cooperatives,water user organizations ,consumers and related agricultural associations need to be aware of that the vital action starts from being aware of optimum chemical fertilizer use to protect environment as well as society healt.

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