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An Aspect Of Food Safety, Envıronment Pollutıon And Agrıculture Contamınatıon Wıth Supplyıng Energy Sources

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Abstract

The civilization should have been started with exploring agriculture by applying agriculture and establishing villages by living in the same place. The most important negative factor that has given to nature comes from human. The environment pollution occurs in the air, soil and water principally. The human being is the biggest pollutant all over the world. Energy supply especially fossil fuels, some of agricultures practices like using pesticides, unprocessed kinds of wastes, and deficiency in infrastructure etc are the main factors in pollution and when examined in detail, each of pollutant factors affect and impend food safety and human health. On the other hand, developing and increasing numbers of industry investments and kinds of technologies, increasing of world population, destruction of forests and erosion events, create the environment problems. The aim of the article to explain food safety with before described due to environmental factors. It is well known that air pollution is the very big problems; especially an half burned fossil fuels led to important food safety and health problems. Polycyclic hydrocarbons (PAHs) are almost 104 compounds and important number of them cause to cancer. Renewable energy sources must be evaluated all over the world, it is known very common idea for particularly all of the development countries must be adapted international agreements and regulations about stopping or decreasing emissions and using fossil fuels.

Key words: Food, Agriculture, Energy, Environment, Food safety, Health

Enerji Sağlama Kaynakları İle Gıda Güvenliği, Çevre Kirliliği Ve Zirai Bulaşmaya Bir Bakış

Uygarlık ziraatin keşfi ile ziraat uygulamaları yaparak aynı yerlerde yaşayarak başlamış olmalıdır. Doğaya en çok negatif zarar veren factor insandır. Başlıca çevre kirliliği havada, toprakta ve de suda meydana gelmektedir. İnsanoğlu bütümn Dünyada en büyük kirleticidir. Enerji temini, özellikle fosil yakıtlar, bazı tarım uygulamaları, pestisidler, işlenmemiş atıklar, alt yapı eksikliği kirlilikte ana faktörlerdir ve her biri detaylı inclendiğinde gıda güvenliğini ve insan sağlığını olumsuz etkilemektedir. Diğer yandan endüstri yatırımları ve çeşitli teknoloji sayılarında artış ve gelişmeler, ormanların tahribi ve erozyon olayları çevre problemlerini yaratmaktadır. Bu makalenin amacı daha önce tanımlanan çevresel faktörlere bağlı gıda güvenlğini açaıklamaktır. İyi bilinmektedir ki hava kirliliği çok büyük bir problemdir; özellikle yarı yanmış fosil yakıtlar önemli gıda güvenliği ve sağlık problemlerine yol açmaktadır. Polisiklik hidrokarbonlar (PAHs) heman hemen 104 adetir ve bunların büyük bir oranı kansere neden olmaktadır. Yenilenebilen enerji kaynakları tüm Dünya'da değerlendirilmelidir, Bilinen en yaygın fikir özellikle gelişmiş ülkelerin hepsi fosil yakıtları kullanma ve emisyonları durdurma ve azaltma konusundaki uluslararası anlaşma ve yönetmeliklere uymaları yönündedir.

Anahtar kelimeler: Gıda, Ziraat, Enerji, Çevre, Gıda güvenliği, sağlık

Introductıon

Food safety does not mean that only providing food safety regulations and standards in the plats. Thus environmental factors energy supply, climate change and pollution are the main factors which affect food safety. Rapid increasing of population, using fossil fuels or any environment harmful energy sources, development of industries create environment problems and affect food safety and food and agriculture productions.

The European Regulation for Food Law [Regulation /EC) 178/2002; European Community, 2002a] requires that, in addition to protecting human life, health, and consumer interests. Environmental factors are explained by mission of the European Food Safety Agency (EFSA) in the same regulation that compromise effect of the environment on the food (Smith and Konig, 2010).

Food safety can be affected from various factors such as climate conditions. Tirado et al. (2010) reviewed climate change and food safety. There should be sorts of reasons through which climates related factors may impact food safety including; changes in temperature and precipitation patterns, increased frequency and intensity of extreme weather events, ocean warming and acidification, and changes in contaminants transport pathways among others.

The water pollution is harmful the agricultural products and creates hazard to food safety and human life. Wastes of industry, house pollutants, pesticides, even air pollutants can reach the water sources river and sea vehicle wastes can create important pollution problems. Polluted water can be used for irrigation plants and can reach animals and also human from the food chain. Food chain comprises environment pollution. The food safety starts from farm and finishes with fork, it is well known principle in the food quality and food safety. Hazard Analysis Critical control Points (HACCP) is the basement all of the international food safety standards. It should be insufficient practiced food safety only in the food plants. Raw material obtaining or growing in the farm are deal with food safety beginning in the process. Main water pollutants are grouped as chemical, microbiological, biological, physical and radioactive items. Especially, underdeveloped countries can suffer from lack of hygienic and sanitary water and food supply because of environment pollution problem mostly. Soil pollution is another factor which affects food safety and food supply. Harvesting and agriculture process can be applied in a very small portion of the earth. Polluted soil loses its living beings and can not be applied agriculture; actually, air and water pollution focused on the soil and led to soil pollution. In the world, at least 19 countries suffer from starvation and famine, and lack of the food safety. It is reviewed mentioned topics by following literatures ad our before studies.

Some of factors or events can occur due to climate change like temperature increase, extreme weather events ocean warming. Climate change may create lots of risks and hazards to agriculture, crop production and plant health, animal production and animal health, fisheries, aquaculture, food trade, food and feed manufacturing, processing and handing and consumer's behavior (Tirado at al., 2010).

Renewable energy supply must be direct relation-ship food safety and energy sources. Fossil fuels cause environment pollution; air, water and soil also cause climate change. It was reviewed among the factors those affected each of them the point of food safety, environment pollution and energy sources as main highlights otherwise these mentioned topics are detailed and so large perspective.

Understanding of food safety with environment factors

What is the food safety in deep and exact meaning? When compared it with environmental factors. Food safety means that to be able to produce food without leading any risk and hazards to human health and also all of the living beings in the nature (Çağlarırmak, 2010).

A joint FAO/WHO Expert committee on food safety concluded 1983, contaminated foods cause to illness and create the wide spread health problems and also reduced economic productivity. Public health authorities and food industries to recognize weaknesses in traditional food safety assurance methods and the need to resort to amore efficient preventive method known as hazard analysis and critical control point (HACCP) Mollins, et al (2001). The HACCP system is the basement of all of the international food safety standards such as ISO 22000, BRC, etc. The HACCP system

can be apply to the entire food chain as a food safety management tool identification of measures for prevention of food born illnesses. HACCP will be essential food standard trade in commodities through the world and the application of HACCP in some countries has since then become mandatory for certain food industries (FSIS, 1996), Adams, 1994; Merican, 1996). Establishment of critical control points include also environmental pollution factors in the food chain.

Main environmental pollutants come from industry, frustrating, agriculture applications, pesticides, fertilizers, from air PAHs (Polycyclic Aromatic Hydrocarbons), microbial contaminants, even genetically modified organism (GMO), etc. All of these pollutants can create risk and hazard in food chain during food production (Çağlarırmak, 2007).

Effects of climate change to food safety were examined in detail by Miraglia et al., (2009). It is well known that the issue of climate change is increasingly receiving attention from scientists, pubic and policy makers. Climate change affects the agriculture and food safety with kinds of factors such as variations of seasons, alterations in arable land and crop yields, and changes in soil quality; an increase of losses of soil mineral, variation in soil microorganism ecosystem. On the other hand, climate changes have been identified as relevant for variation in precipitation, drought, and atmospheric carbondioxide (CO_2). Miraglia et al. ((2009), reviewed in large perspective climate change, agriculture and food safety. They reported that agricultural factors established **s**top systems, soil quality, crop yields, crop associated biological environment, livestock production. Mycotoxins are formed among the these factors, producing or metabolites by toxigenic moulds that are mycotoxins cause cancer such as aflotoxin B1, carcinogenicity for aflotoxin B1, Ochratoxin (OTA), fumonuosins, fusorium toxins, nivalenol, and zeralonone. The global warming change led to increase of plant disease, insects etc. moreover climate change may affect the pesticides. Using of agrochemicals are increasing due to climate change.

Trace elements; arsenic (As), in its organic form, Cadmium (Cd), lead (Pb), and mercury (Hg) are of major concern. These are elements represent actual hazards in terrestrial environment, Hg is of concern aquatic system. Pesticides and toxic trace elements threatened human health since they can contaminant food from food chain as a result of environmental pollution and climate change.

PAHs and renewable energy (RED)

Polycyclic hydrocarbons occur from an half burned fossil fuels. PAHS are contain four or more member rings, but five or six are more common. Benzo[a] pyrene which is accepted as indicator that is in the tobacco. Human exposure to PAH is 88-98% connected with food. The majority of hydrocarbons are situated on the skin of fruits and vegetables (Kluska, 2003). Food can be contaminated by the PAHs as direct way or indirect way such as smoking. Uptake of gaseous chemicals by plants is one of the major pathways of many semi-volatile contaminants including PAHs into the agricultural food chain and is a key process in determining human exposure (McLachlan, 1996). Vegetation plays an important role in the global cycling of PAHs, but therefore the various processes of accumulation, migration, and transformation of PAHs within plants have not been well understood. It is well known that fossil fuels not only cause global warming and climate change also because pollution particularly “air pollution”. These PAHs compounds contaminate soil, water and all of the plants and can reach he animal products and human from the food chain (Çağlarırmak, 2008, Çağlarırmak et al., 2009). Renewable energy supply must be target of target of searching new and sustainable energy sources for decreasing or preventing gas emissions or green house gases to atmosphere. Each of PAHs pollutants determines critical control points.

Renewable energy sources, nutrition and food safety

Balanced and sufficient nutrition in food safety chain provides surviving, quality of life and future of societies. These main topics; climate change, biofuel production, food safety and nutrition were examined by Tirado and et al., 2012. It was reported that between 1900 and 2005, there has been a 0.45 C rise in average world temperature. There are many factors that affect increasing of average world temperature. There are other factors affected world temperature, one of them some cold applications; like refrigeration, and maintaining foods in cold chain, for preserving and

preventing microbial contaminations and developing of undesired biochemical reactions. James and James (2010) reported relationship with cold food chain and climate change. They described that providing safe food products of high organoleptic quality attention must be paid to every aspect of the cold chain from initial chilling or freezing of the raw ingredients, through the storage and transport, to retail display, removing the required amount of heat from a food necessitate time and energy consumption. The reports estimated that 40% of all food requires refrigeration and that 15% electricity consumed world wide is used for refrigeration. Energy is required to maintain the cold chain and generation of this energy contributes to CO2 production and climate change (James and James, 2010).

The Food and Agriculture Organization of the United Nations (FAO) estimates more than billion people are under nourished worldwide in 2009; this about 100 million people more than in 2008, around one-sixth of all humanity (Tirado at al., 2010, FAO 2009) more than one billion people are suffering hunger in 2009. It is reported that three major challenges threaten current and future efforts to overcome food insecurity and malnutrition; climate and global environmental change and the consequent loss of food crops as a source of fuel the food and financial areas (Tirado et al., 2010).

The using nutritious crops such as maize cause to hide consumption of them as a food source both for human animal feeding that led to decrease of meat and milk production world hunger reached a historic high in 2009 (FAO, 2009). Every six seconds dies of hunger in the world.

During the early 21st century, food borne diseases can be expected to increase, especially in developing countries, in part because of environmental and demographic changes. These vary from climatic changes, changes in microbial and other ecological systems, to decreasing freshwater supplies. Toxic chemicals released into the environment by industrial processes and agricultural practices may enter the human food chain. Pesticides have been found in human tissues, notably fat, in developing as well as developed countries, but their effect on the human immune system has not been thoroughly studied (Fersten and Abdulsalam, 1999).

Climate change is the important factor upon agricultural harvesting and water supply. Research and information on the links between climate change related food and water insecurity and malnutrition are necessary. Climate change the social role and work especially underdeveloped Some of African countries (Lambrou and Piana, 2006). Many of the world's poorest people are rural woman and children in developing countries who depend on subsistence agriculture (family farms) to feed their families. Climate change also cause to food and water in security and woman increasing working and child and reduce opportunities of education (Von Braun and Braun, 2003).

Greenhouse-gas emissions from the agriculture sector account for about 22% of global total emissions; this contribution is similar to that of industry and greater than that of transport. Livestock production (including transport of livestock and feed) accounts for nearly 80% of the sector's emissions. National and international climate change policies all accept a target that greenhouse-gas emissions from agriculture in 2050 should be limited to no more than their 2005 levels. and positive factors upon food safety (McMichael, 2007).

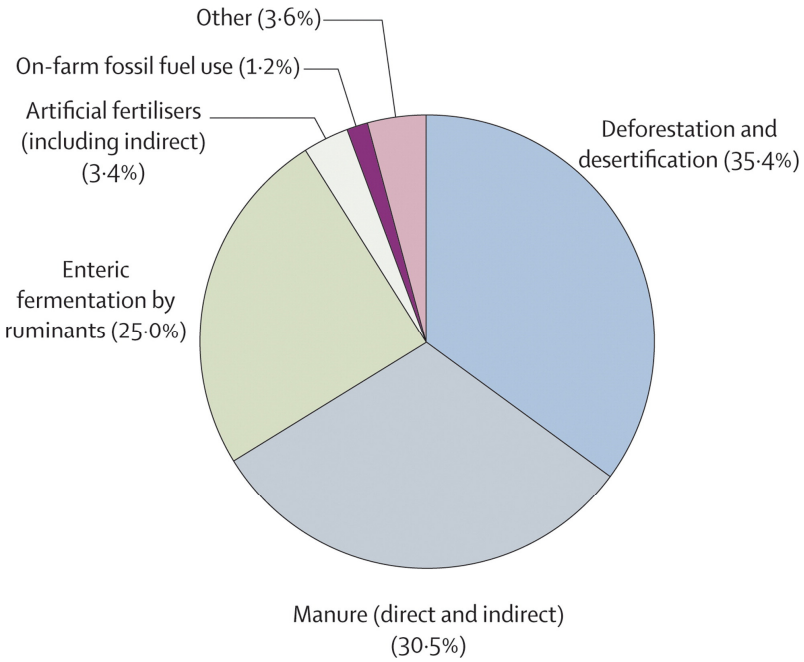

Figure 2. Proportion of greenhouse-gas emissions from different parts of livestock production (McMichael, 2007).

V. Renewable energy remedy for preventing global warming and climate change

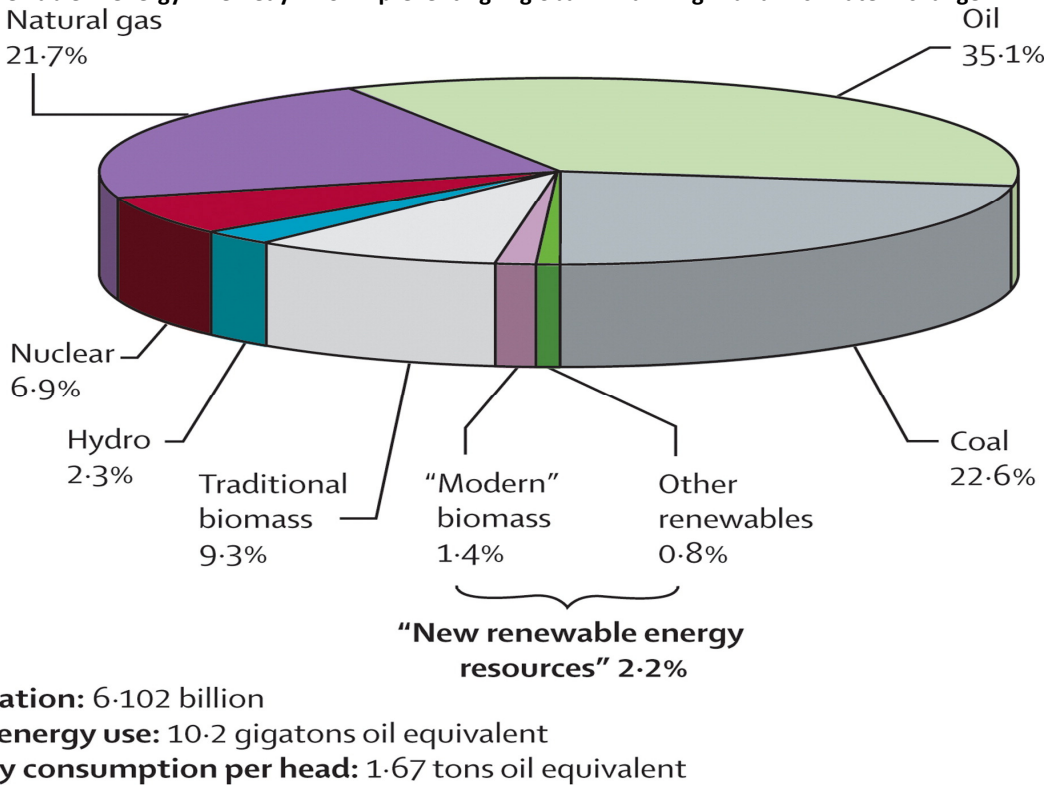

Figure 3. World energy use in 2001 (Wilkonson et al., 2007).

Nearly 80% of human energy use is in the form of oil, gas, and coal, the fossil fuels that together have grown in use exponentially since the industrial revolution, and exert substantial

health risks at various points in their fuel cycles (Wilkonson, et al., 2007

Much of the estimated 35% of global greenhouse-gas emissions deriving from agriculture and land use comes from livestock production. Livestock production—including deforestation for grazing land and soy-feed production, soil carbon loss in grazing lands, the energy used in growing feed-grains and in processing and transporting grains and meat, nitrous oxide releases from the use of nitrogenous fertilizers, and gases from animal manure (especially methane) and enteric fermentation accounts for about 18% of global greenhouse-gas emissions This estimate consists of around 9% of global emissions of carbon dioxide, plus 35–40% of methane emissions and 65% of nitrous oxide.(McMichael, 2007).

There are lots of researches and studies about renewable energy sources al over the world and also in Turkey. Turkey's renewable energy potentials are rich (Çapik et al., 2012). (Table 1).

Tablo 1. Renewable energy sources in Turkey 2010.

Sources	Potantial (MW)	Under Construction (MW)	In operation (MW)
Sources			
hydropower	40.000	13.766	14.802
Wind	48.000	2.251	1002
Geothermal	600	70	94

When examined table 1, it is seen that Turkey should have well renewable energy sources. Turkey is rich in hydropower, wind and geothermal resources. The distributions of these energy sources hydropower, wind and geothermal 14.80 MW, 1002 MW, and 94 MW, respectively. Turkey has very high quantity of hydroelectric resource; total hydropower potential of Turkey is 433 TWh/yr, it is equal to 13.8 % of total potential of Europe (2012). Çapik et al. (2012) reviewed main renewable sources of Turkey. They evaluated renewable energy policy must be developed both can obtain sufficient energy quantity and can protect environment in the economical subject. Turkey's population is growing at annual rate of 1.04%, will reach to 83.4 million in 2020. Turkey's renewable energy sources have the potential to make a large contribution to country's sustainable and independent energy future.

Erdem (2010) examined renewable energy resources of Turkey too. Turkey's energy consumption has risen dramatically, at present fossil fuels account for more than 90 % total energy consumption in the country. Total energy mix of country is not likely to support development of sustainable energy. The energy mix shows a relatively small contribution from renewable energy sources. Fossil fuels cause pollution of air, water and soil in a circle. Environment pollution must be direct or indirect effects of food safety. Heavy metals, PAHs, SO2, or any hazardous substances can reach food chain easily. Renewable energy policies are effective

Preventing or reducing environment food safety also save and maintain effect of health. Renewable energy sources are vital for the countries.

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