**International Polytechnical Journal in Science and Engineering**

- International Academic Journal -
Vol. 2, No. 1, 2021, GISB Special Issue

# Efficiency and Careful Use of Food and Other Consumer Goods

**Özlem Çolapkulu[1], Ceren Nur Özdemir[2] , Ravza Doğrul[3]**

[1*] *Kandilli Kız Lisesi, Turkey*
[2] *Kandilli Kız Lisesi, Turkey*
[3] *Kandilli Kız Lisesi, Turkey*

[*] *Corresponding Author: e-mail: colapkuluozlem@gmail.com*

**Abstract**

The increasing demands, with the economic progress cause deficiency in energy resources. This increases the importance of productivity and careful use of resources issue day by day. This study points out food waste, which is one of the biggest problems of our time, and in this respect saving and using efficiently other consuming goods. It includes studies; showing the degree of waste in food and other consumer goods concerning Turkey and other countries in the World and researches about how we could save from these materials and maintain productivity.

***Keywords****: Saving, Productivity, Waste, Food, Maintainability, Recycling*

## 1. Savings and Efficiency in Food Products

The increasing pressure on population disrupts the balance on consumption of food and access to food. Keeping this balance stands out as one of the biggest and most difficult goals that we have to face with. Food industry is an energy dependent production process in its each step. In all the stages, like production, logistics, storage, protection and consumption of food, energy is needed. The activities like cooking, warming up, freezing and transport also mean dependence to energy. In other words, the waste of food products is a two-way problem which we have to face with meaning the waste of both the food and the energy that is used to produce the food.

### 1.1. Bread

Bread which is in the staple consumption food of most houses in the world and especially in Turkey, isn't valued equally when it comes to consumption and preservation. The food waste in our country is considered to range from 10-18% varying to the region. According to the data given from the Chamber of Bakers' from the 18 million bread, which is produced in İstanbul, 2 million goes to waste. (TZD, 2010) According to the data of Turkish Grain Board (TGB) 101 million bread is produced a day in Turkey and 95million of it is consumed, and 6 million remained bread is wasted. (TGB, 2013)

It is known that in Turkey, the left over bread is warmed up, toasted or used in other dishes and turned into good account. However, these limited reusing of the bread equals to only a small amount of percentage in the waste.

By working through teaching consumers to store bread in proper conditions, activating the operation of collecting the stale bread and reassessing the bread weight in grams, this waste can be prevented.

### 1.2. Fruits and Vegetables

It is known that 26 million tons of food is being wasted every year in Turkey. Fruits and vegetables constitute a considerable percentage o this waste. Bendevi Palandöken, the Head of the Turkish Chamber of Commerce and Industry expressed that 25% of the produced fruits and vegetables go to waste in the filed or during transportation or on the market stalls by not being sold because of the price. Turkey has 3% of the world's fruit production and is the sixth in the ranking. Consumers should take into consideration not only the agricultural value of these fruits and vegetables but also the consumption of water and buy the amount of fruits and vegetables as needed. They should also be careful about the storage of these products. Furthermore, the wastes of fruits and vegetables are organic and should be used as compost fertilizer and saved on.

### 1.3. Oil

The waste vegetable oil is being collected in Turkey with the Waste Vegetable Oil Regulations started by the Ministry of Environment and Urbanisation. The data given by both the Ministry of Agriculture and Forestry and the Ministry of Environment and Urbanisation shows that 1.7 million tons of vegetable oil is consumed and 350 thousand tons of waste oil is formed every year in Turkey. According to the records of Ministry of Environment and Urbanisation in the year 2010 the registered amount of waste vegetable oil is approximately 111 thousand tons, 8 thousand tons of which is frying oil. Waste frying oil can be utilized as a good potential for the production of biodiesel. For this reason waste oil must never be poured into the kitchen sink but must be delivered to an oil recycling centre.

### 1.4. Household Food and Restaurant Waste

Household waste includes food and meals prepared to be consumed at home and theirs wastes. One of the most efficient ways of putting them into good use is the compost technic. Bokashi technic, also known as 'garbage pickle' is way of recycling all household food wastes including cooked food and transforming them into productive soil and liquid fertilizer which is a kind of compost. Offering the guests more than they can eat and thus not being able to finish the food on their plates lead waste in the restaurants. Moreover, open buffet service is one of the main factors that cause food waste.

### 1.5. Water

The demand of water increases because of the population growth, global warming, industrialization and agricultural use. To avoid the risk of reaching water, both the resources should be used efficiently and usage should be managed well. Water management means using the resources effectively and developing effective policies about it. According to the 2010 year data of Food and Agriculture Organization of the United Nations (FAO) water resources are mostly used in the fields of irrigation (69%), industry (19%) and urban consumption (12%). In the houses water is used for personal hygiene (40%), laundry cleaning (13%), bathroom (25%), general cleaning (5%), cooking (12%). International Union for Conservation of Nature and Natural Resources (IUCN) conducts studies on conservation of biodiversity, rehabilitation of stream beds, equitable and fair use of water and managing water resources effectively.

### Virtual Water

Water, though it is a consumable item of its own, is also needed in production. The concept of virtual water is described as the clean water required for the production of a product. Meaning, besides from drinking and domestical use of water is also a notion of the production process Water is used in many fields from coffee production to textile, from industry to paper. In other words, virtual water indicates a high amount of water that is not seen in every product.

### 1.6. Meat

According to the researches almost 5% of greenhouse gas emissions come from animal husbandry processes. Considering that the greenhouse gas emissions caused by land and air traffic are lower than this rate, it will be easier to predict how much meat consumption harms the environment. In addition, considering the agricultural lands allocated for animal breeding, deforestation and the amount of virtual water, the damage to nature in order to consume meat becomes even more important.

## 2. Savings and Efficiency on Other Consumable Items

### 2.1. Energy

#### 2.1.1. Rain and Irrigation

Global climate change in Turkey and in the world poses a drought threat every 100 years. Due to low seasonal precipitation, dams in Turkey have started to have low occupancy rates. The occupancy rate of the dams in Istanbul fell below 20% on January 8, 2021, which is the lowest level in the last 15 years. Afterwards, rain and snowfall increased the water level in the dams, reaching this rate to 30.77% as of January 20. As a result of the current danger of drought, measures such as turning to new sources, rainwater harvesting, and alternative water sources such as gray water treatment come to the fore. In addition, in order to get more efficiency from the rain, the material used on the roof, the slope of the roof mass, the use of rain water in various areas (toilet flush tank, cleaning, irrigation...) are also important.
In addition, it is possible to use water better with efficient irrigation methods in agriculture. Water can be used better in agriculture by methods such as better control, use of wastewater in irrigation, giving importance to drainage water, and measuring water.

#### 2.1.2. Lighting

Lighting accounts for 20 percent of all electricity consumption. Better lighting means better energy efficiency. The energy used for lighting can be used more efficiently in ways such as reducing the lighting sources used in homes and workplaces, turning off unnecessary lights, preferring natural lighting and making more use of the sun with light cubes.

#### 2.1.3. Air-conditioning

Heating or cooling of buildings is also an energy item and It is important that these activities are carried out efficiently. Efficient consumption in the air-conditioning area should be made possible with measures such as solarwall implementation, use of photovoltaic panels, trombe wall, insulated wall, the use of heat-insulated window systems and glass.

#### 2.1.4. Renewable Energy

It is important to turn to renewable, unlimited resources instead of fossil-based limited resources when meeting energy needs. The use of resources such as the sun, wind and waves in energy production both prevents the damage to nature and causes less environmental pollution.

##### 2.1.4.1. Biomass

Renewable green energy production can be increased by burning biomass assets (forest waste, scrap wood, olive pomace, fruit peels...) in biomass power plants for electricity and heat generation**.**

For example, the General Directorate of Forestry in Turkey uses materials that are not suitable for direct use in production, such as bark, branches, and logs, which come out as by-products in forests, both in energy production and can provide additional income.

Biofuels obtained from biomass asset also stand out as an important energy alternative that reduces dependence on fossils.

#### 2.1.4.2. Wind

Thanks to the rapid development of the technology required to obtain energy from the wind, The costs of producing electricity have decreased and it has become a type of energy that can replace fossil fuels. A high investment cost at first, but low operating cost afterwards makes wind energy attractive.

According to the Turkish Wind Energy Statistics Report published by TÜREB, the Turkish Wind Energy Association, at the beginning of 2018; Turkey ranks 4th in Europe and 8th in the world. In this ranking, the share of Turkey's high wind potential power is very important.

#### 2.1.4.3. Wave

Wave motion occurs when the seas and oceans covering approximately ¾ of the World encounter a constant wind from any direction. Apart from this, seismic events such as earthquakes also create waves. Hundreds of earthquakes that we do not feel and winds that continue uninterrupted provide the continuity of the waves. These waves also contain an energy. Scientists have been carrying out various studies for many years to convert this energy into electrical energy.

The thrust power of waves occurring in areas such as lakes, seas or oceans are converted into mechanical energy and then into electrical energy by various methods in wave power plants. For this, the energy generated by the wave hitting the determined part of the plant is generally used. Wave energy generation studies are quite new in Turkey and electricity is produced from wave energy at the power plant established in Zonguldak, which was selected as the pilot region.

### 2.2. Textile

Fashion is the second largest industry in terms of environmental damage and in consuming water in the use of virtual water. More than 60% of the clothes produced in the world are made of synthetic fiber, acrylic, nylon or polyester. Every time polyester clothes are washed, plastic fibers are mixed in the running water. These tiny pieces of plastic, which are too small to be seen with the naked eye, pass through the washing machines and mix in the rivers, seas and oceans.

Fast fashion production, rapid change in trends, low-quality, high-volume production with "disposable" type production, and the difficulty of recycling the synthetic materials used stand out as the most important inefficiency reasons caused by the textile industry.

### 2.3. Paper

Paper is one of the most harmful substances to nature in terms of both production and consumption. The material used in its production, the awareness of recycling is not widespread in our country, the waste of paper even if it is usable, paper derivatives such as packaging and cardboard wastes harm the environment.

### 2.4. Battery

Batteries are a major source of environmental problems after use. Batteries considered as “hazardous waste” pose a threat to both the environment and human health. The chemicals in the batteries that are thrown unconsciously harm the soil. With the 2004 "Regulation on Control of Waste Batteries and Accumulators", which came into force within the scope of the legislation on waste batteries in Turkey, it brought regulatory principles. All of the batteries produced in Turkey are imported and there is no facility in our country where these batteries can be recycled. These batteries are sent to Europe for recycling.

### 2.5. Glass

The recycling cost of glass, whose main material is sand, soda and lime, is lower than the cost of production. For this reason, glass recycling is very important in terms of both resource management and the environment. The total electricity consumption of the glass industry in 2012 is 830,397,797 kWh (Republic of Turkey Ministry of Science, Industry and Technology,2014).

### 2.6. Electronic Waste (E-Waste)

Since technology is developing rapidly, a device that is technically working becomes garbage before it reaches the end of its useful life. Today, the decrease in the prices of technological products facilitates access to these products and as a result causes a significant increase in the number of electronic waste.

E-waste definition has been made in Turkey with the Waste Electrical and Electronic Equipment Control Regulation (Date: 22.05.2012, R.G. No: 28300) (WEEE Control Regulation, 2012) and some ways have been suggested for recycling. The disposal and recycling of e-waste requires a different process from other wastes. Because these products contain different types of materials. For this reason, e-waste must be collected and recycled correctly. Consumers should also collect e-waste differently from household waste and deliver these wastes to appropriate centers.

## 3. Some Saving and Efficiency Practises in the Context of Waste Management and Recycling from Turkey and The World

### Japan

Waste disposal in Japan is more complex than in many other countries. In public places, there are a limited number of bins on the streets of the country, and most of them are for recycling. At home, it is no less elaborate as each neighborhood is governed by its own garbage disposal rules. The country's garbage sorting system leaves many with the impression that the country is one of the best recycling countries in the world. The country's garbage sorting system leaves the impression that the country is one of the best recycling countries in the world. In reality, according to Waste Atlas, that's not exactly the case, the country's recycling rate is 20.8%. However, one item that Japan recycles well is PET (plastic) bottles, which are the bottles you see in most vending machines. The country developed a system that melts the plastic of the bottle and turns it into pure resin. This resin can be made into new PET bottles and other items such as clothes and carpets. The success of this recycling innovation is why PET litter boxes are the most common litter boxes you'll see on the streets of Japan. It's also a great reason not to throw other trash in these PET bottle cans, as it is blocked by the aerodynamic system. When you move to or from Japan, one of the first things you should do is to visit your local municipal office to register as a resident. During this registration system, people are given a brochure detailing the garbage collection protocols for that particular municipality. Many wards have color-coded signs on poles outside residential areas to remind people on which day certain types of garbage will be collected.

Hotels and hostels also require guests to comply with local waste disposal regulations. Most places have guides or posters that show exactly how and where to dispose of recyclables and garbage. The Japanese town of Kamikatsu produces almost no garbage. The concept of “Zero Waste” started in 2003 with its release. The concept of Zero Waste here is about not throwing anything away. Everything should be recycled and there are 45 categories of recycling.

### Sweden

Converting its waste into energy, Sweden has reduced its carbon dioxide emissions by 2.2 million tons per year. Between 1990 and 2006, carbon dioxide emissions decreased by 34% and greenhouse gas emissions are projected to decrease by 76% by 2020 compared to 1990 levels. Only 1% of Swedish garbage is sent to landfills. By burning garbage, another 52% is converted into energy, and the remaining 47% is recycled. The amount of energy produced from waste alone provides heating for one million homes and electricity for up to 250,000.

From a very young age, children are taught to recycle, which becomes a way of life. Teachers receive special training to involve children in practical activities such as making their own paper or enforcing waste policies in schools. In the end, everyone gets involved. Sweden has made recycling easy, accessible and convenient. There are many recycling stations in the country. Swedish citizens receive discount coupons as a reward for using nearby recycling machines. In new urban developments such as those in Stockholm, waste chutes are designed to divert garbage directly to waste-to-energy converters.

In Sweden, you pay a deposit for returned plastic bottles and boxes when you bring your waste to the recycling station. It's a common sight to have people running to the supermarket with their plastic bags full of cans and bottles. There's even a word for it: panta (Swedish for deposit). On average, when Swedes recycle 183 cans and PET bottles per capita in this way, a total of around 17,000 tons of aluminum and more than 20,000 tons of PET bottles are converted into new cans and bottles. About 85 percent of all cans and PET bottles sold in Sweden are recycled through the official programme.

**Turkey**

Cif, a cleaning brand, has placed garbage catchers in the Bosphorus with the project called "Beautiful When Clean".

It has been determined that there is a 78.4% decrease in the use of plastic bags with the application of charging plastic bags, which started on January 1, 2019.

Üsküdar Municipality also launched the "Üsküdar Model in Transformation with Zero Waste Project" in 2019. Recycling days were determined with the trainings given to the residents of the district. With this model, it is aimed to earn 1 million TL per month, cleaner streets and streets, and a recycling activity of more than 500 tons per day.

**4. Conclusions**

It is possible to examine what needs to be done in order to achieve savings and efficiency in food and other consumer goods under two headings as individual measures and administrative practices.

In individual measures, practices such as avoiding waste, not purchasing more than can be consumed, choosing products with an environmentally friendly production process, sensitivity and active participation in recycling processes come to the fore.

In administrative practices, it is possible to list items such as strict controls, provision of renewable energy infrastructure and incentive opportunities, investments for recycling and awareness-raising campaigns, an effective reward and penalty system, and saving and efficiency.

At this point, the application of the principles of savings and efficiency, both individually and in the administrative context, should be adopted as the main point in a circle ranging from the production stages of each product to its delivery to the consumer, from storage conditions to efficient use and recycling in accordance with re-production.

As a result of the "Don't Waste Your Bread" campaign carried out by the Ministry of Agriculture and Forestry, 1 million breads thrown in the trash are saved every day. Bread that is not sold in bakeries as surplus production in Ankara is turned into chips. (Ankara Metropolitan Municipality, 2014).

**REFERENCES**

Alpat, F. (2011). Yavaş Moda Nedir? Akdeniz Sanat, 4 (8), 0-0.
Deniz, E., Yeşilören, G., & İşçi, N. Ö. (2015). Türkiye'de Gıda Endüstrisi Kaynaklı Biyokütle ve Biyoyakıt Potansiyeli. *Gıda*, *40*(1), 47-54.
Çukurçayır, M. A., & Sağır, H. (2008). Enerji sorunu, çevre ve alternatif enerji kaynaklari. *Selçuk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, (20), 257-278.
Demir, H, Çıracı, G, Kaya, R, Ünver, Ü. (2020). Aydınlatmada Enerji Verimliliği: Yalova Üniversitesi Mühendislik Fakültesi Durum Değerlendirmesi. Uludağ University Journal of The Faculty of Engineering, 25 (3), 1637-1652.
Doğan, H., Dengiz, C. C., & Tarhan, s. Otel Restoranlarında Gıda İsrafı Algısına Yönelik Bir Araştıma. In International Marmara Social Sciences Congress (Autumn 2020) (p. 525).
Dölekoğlu, C. Ö., Ggiray, F. H., & Şahin, A. (2014). Mutfaktan Çöpe Ekmek: Tüketim ve değerlendirme. *Akademik Bakış Uluslararası Hakemli Sosyal Bilimler Dergisi*, (44).

Dursun, I. (2019). Türkiye'de Plastik Poşetlerin Ücretlendirilmesi Uygulamasına Yönelik Tüketici Tepkilerinin Belirlenmesi. *İşletme Araştırmaları Dergisi*, *11*(1), 427-446.
Güneş, E., Keskin, B., & Kıymaz, T. (2014). Gıda Sanayiinde Yeşil Ekonomi ve Uygulamaları. XI. Tarım Ekonomisi Kongre Kitabı, 1528-1532.
İkikat Tümer, E, Aytop, Y, Yavuz, K. (2019). Ekmek İsraf Etme Durumunun ve İsrafta Etkili Olan Faktörlerin Belirlenmesi: Kahramanmaraş Kent Merkezi Örneği. *Türk Tarım ve Doğa Bilimleri Dergisi*, 6 (3), 432-439. DOI: 10.30910/turkjans.595223
İlker, A. Y., & Khanlari, A. T. A. O. L. L. A. H. (2015). Güneş Duvarı Sistemlerinin Çalışma Prensibi ve Türkiye Deki Uygulanabilirliği. *Gazi Üniversitesi Fen Bilimleri Dergisi Part C: Tasarım ve Teknoloji*, *3*(3), 525-533.
Karayılmazlar, S, Saraçoğlu, N, Çabuk, Y, Kurt, R. (2011). Biyokütlenin Türkiye'de Enerji Üretiminde Değerlendirilmesi. *Bartın Orman Fakültesi Dergisi*, 13 (19), 63-75.
Kırtorun, E, Karaer, F. (2018). Su Yönetimi ve Suyun Sürdürülebilirliği. *Sürdürülebilir Mühendislik Uygulamaları ve Teknolojik Gelişmeler Dergisi*, 1 (2), 151-159.
Mangır, A. (2016). Sürdürülebilir Kalkınma İçin Yavaş ve Hızlı Moda. Selçuk Üniversitesi Sosyal Bilimler Meslek Yüksekokulu Dergisi, *Selçuk Üniversitesi Sosyal Bilimler Meslek Yüksekokulu Dergisi*, 143-154.
Örgev, C., & Gümüş, İ. (2017). Katı Atıkların Geri Dönüşümü ve Alternatif Enerji Algısı. Umteb-ı, 147.
Şahin, B. (2016). Küresel bir sorun: Su kıtlığı ve sanal su ticareti (Master's thesis, Hitit Üniversitesi Sosyal Bilimler Enstitüsü).
Yavuz, C. I., Acar Vaizoğlu, S., & Güler, Ç. (2012). Hayatımızdaki piller. Sted, 21(6), 319-25.
Yıldız, Ş, Ayvaz, K. (2018). Yavaş Moda Akımına Üniversite Öğrencilerinin Yaklaşımları: Selçuk Üniversitesi Örneği. Akdeniz Sanat, 11 (21), 29-43.
http://apelasyon.com/Yazi/382-surdurulebilir-yasam-icin-surdurulebilir-sulama?bul=%C3%BCz%C3%BCm
http://www.kasad.org.tr/dunyada-ve-ulkemizde-kagit-sektorunun-gelisimi-i-14-05-2019/
http://www2.tesk.org.tr/view/haber/goster.php?Guid=164b8ad2-b9dd-11ea-9eaf-000c29b32a85
https://cevreselgostergeler.csb.gov.tr/su-kullanimi-i-85738
https://ekolojist.net/ruzgar-enerjisi-ve-turkiye/
https://gaiadergi.com/japonyadaki-copsuz-kent-video/
https://medium.com/zorlu-enerji/yenilenebilir-enerji-kaynaklar%C4%B1nda-yeni-bir-soluk-dalga-enerjisi-446a01f3f25c
https://pazarlamasyon.com/hm-gida-atiklarindan-urettigi-surdurulebilir-moda-urunlerini-tanitti/
https://tr.euronews.com/2020/01/31/fransa-dan-dunyada-ilk-cevreci-yasa-satilmayan-urunlerin-imhasi-yasaklaniyor-iklim-krizi
https://www.aa.com.tr/tr/temiz-cevre-temiz-su/turkiyede-her-4-kisiden-1i-su-israfina-duyarsiz/1502952
https://www.aa.com.tr/tr/turkiye/yagmur-hasadi-ve-gri-su-kullanimiyla-sebeke-suyundan-yuzde-40-tasarruf-saglanabilir/2116208
https://www.blueoceanstrategy.com/blog/trash-treasure-sweden-recycling-revolution/
https://www.hurriyet.com.tr/ekonomi/gida-surdurulebilirliginde-lider-fransa-oldu-41040404
https://www.thelocal.se/20180504/swedes-are-recycling-more-than-ever-via-their-bottle-deposit-scheme
https://www.tsunagujapan.com/everything-you-need-to-know-about-garbage-in-japan/
https://www.unilever.com.tr/news/news-and-features/2020/ciften-temizken-guzel-projesi-ile-sehirlerin-mutluluguna-destek.html
https://www.uskudar.bel.tr/tr/main/news/uskudar-belediyesi-turkiyenin-en-buyuk-geri-d/1694
https://www.yesilist.com/plastigin-gizlendigi-3-urun/