

O 24. WHERE TO START THE PREVENTION OF FOOD WASTE

Eda Güneş^{1*}, Haticetül Kübra Erçeti², Büşra Madenci³, Ümit Sormaz⁴

¹ *Necmettin Erbakan University, Faculty of Tourism, Gastronomy and Culinary Arts Department,
Konya, Turkey*

² *Necmettin Erbakan University, Institute of Social Sciences, Department of Gastronomy and Culinary
Arts, Konya, Turkey*

³ *Necmettin Erbakan University, Faculty of Tourism, Gastronomy and Culinary Arts Department,
Konya, Turkey*

⁴ *Necmettin Erbakan University, Faculty of Tourism, Gastronomy and Culinary Arts Department,
Konya, Turkey*

*E-mail: egunes@konya.edu.tr, htk.kubra@gmail.com, abmadenci@gmail.com,
usormaz@konya.edu.tr*

ABSTRACT: Food waste have been stated food spoilage or turning to waste, food used for consumption. Food wastes are usually directly proportional with nutrition and purchasing habits. This work have been conducted primary school children studying that foundation and public school the purpose of creating awareness against food waste. Investigative have been made 5-8 age group students who foundation school (FS) and public school (PS) studying situated in Konya that random sampling method selected and with total 46 student to survey development (11 question). Applied survey have been found as 0,718 validity and credibility. 36 % of the FS students participating in the survey stated that the most money was wasted, PS have been stated 71.4 % in proportion as of factors money, food, time and energy. While at FS have been found that plate waste was not PS have been detected the same. Food waste have been found students who studying FS 40 % wasting cereals while PS 33.3 % has been identified all nutrients. However, general knowledge is inadequate about food waste though has been detected waste can be prevented known by the majority. Accordingly, there are requirements intended for applications food waste to reduce, awareness have been determined should be started at early age.

Keywords: Food waste, education, waste

1. INTRODUCTION

A regulation has been issued in order to contribute to nature and recycling giving priority to reuse by minimizing waste by giving sustainability the idea of “Zero Waste” in Turkey 2018 According to the regulation, it is aimed food waste in biodegradable wastes and to prevent food waste (Sıfır atık yönetmelik taslağı, 2018). In accordance with, “food and kitchen waste” has considered as the perfect source with high organic content existing in every corner of the (World (Sindhu et al., 2019). If food loss; has occurred after consumption of suitable materials for human consumption with extinction, degradation or disposal (Parfitt et al., 2010). The resulting losses has covered the entire process from field to table (Parfitt et al., 2010; Lipinski et al., 2013; Demirbaş et al., 2017). Generally, half of all foods in the world has wasted or destroyed before or after consumption (Parfitt et al., 2010). “Food waste” has evaluated as animal feed and fertilizer in the industry with renewed legislation, regulations, standards and rules. Recently has seen substantial increases in food alternative waste management system in Turkey (Demirbaş and Evren 2018). Food loss has composed the important part of the food expenditures of the population (Buzby and Hyman, (2012). According to the data estimates of Food Agriculture Organization (2013), production of food for individuals to consume almost 1/3 has disappeared or discarded every year.

According to zero waste regulation: food waste; means any substance or materials that are disposed to or discontinued by the natural or legal person holding the producer (Sıfır atık yönetmelik taslağı, 2018). If food loss, food to be consumed has expressed as a decrease in the amount of during the supply chain (Artık et al., 2011). In both definitions, it refers to the unused parts of foods and the parts left to nature. The terms has differentiated the amounts of food thrown. In developed countries, the amount waste or

loss of food has not considered “throw is cheaper than reusing” with principle (Sıfır atık yönetmelik taslağı taslağı, 2018).

Arrangements including student-family-school management and teachers should be given children who constitute the future of the society. In order to establish nutritional awareness among the students in early childhood (Şanlıer et al., 2019). The aim of this study is to raise awareness of waste in early childhood by teaching what food waste is. In addition, it was planned to develop a questionnaire by measuring the readiness levels of children by means of the survey method. The importance of food waste on questions and how to reduce the practical information is seen as a sub-goal.

2. MATERIAL AND METOD

The research was conducted with descriptive research model. The universe has comprised of students at the primary education level of the 5-8 age group who are studying in Konya private(PS) and state schools(SS) depend on the Ministry of National Education. Among these schools, a list of (PS) and (SS) in Konya was made; The students who were randomly selected from a state and a private school (46 students) was composed sample of research. The questionnaires were applied to the classes of the teachers who accepted to participate in research in the 2018/2019 academic year by obtaining permission for the survey. The questionnaire used as data collection tool was developed by the researchers and has enriched with visuals for students to understand. The validity reliability of the developed questionnaire was tested and factor analysis was performed. The obtained datas were determined with statistical program by comparing the readiness levels of SS and PS students.

2.1. Research Findings

The data collection tool used in the research has consisted except demographic features from 11 questions. Factor analysis of the questions was found as 5.

As for the demographic characteristics, because of the fact that was small the age scale of the group information was taken from their teachers. According to this, there are students participating in the study 21 in SS and 24 in PS. It is seen that 80% of the students are 7 years old and there are more men in PS (n:12) than women in SS (n:13). Validity reliability of the questionnaire while was found in the preliminary assessment 0.718 (in 25 randomly selected students) sampling applied was found as 0.572 (α). According to (George and Mallery 2003) the survey was continued to be questionnaire acceptable.

Table 1. Waste food survey results in Private (PS) and State (SS) schools (n:46) percentage and averages

Questions	Private School		State School	
	Percent%	Mean±SS	Percent%	Mean±SS
1: What do you think of when it comes to waste?				
Money	36		4.80	
Energy	16		4.80	
Time	4	2.72±1.59	0.00	4.09 ± 1.6
Food	28		19.00	
Entire	16		71.40	
2: What is waste food?				
Waste	36	1.6±0.48	14.30	1.85±0.35
Plate residue	64		85.70	
3: How do you leave your plate after eating?				
Clean	100	1.00±0	85.70	1.14±0.35

Proceeding Book of ISESER 2019

Dirty	0		14.30	
4: Increased meals garbage?				
Yes	4	1.96±0.2	19.00	1.8±0.40
No	96		81.00	
5: What foods would be wasted?				
Vegetable Fruit	12		0.00	
Sea foos and meat	20		33.30	
Grains	40		4.80	
Milk and dairy product	4	3.2±1.57	26.80	3.61±1.28
Entire	4		33.30	
Unknown	20		0.00	
6: Which would waste more?				
Vegetable Fruit	4		9.50	
Sea foos and meat	8		47.60	
Grains	20	4.16±1.24	4.80	3.04±1.53
Milk and dairy product	4		4.80	
Unknown	64		33.30	
7: In your opinion, which food can you waste?				
Market-place	0		19.00	
Distribute	4.0		14.30	
Store	0		0.00	
Storege	0		0.00	
Cooking	4.0	7.5±1.32	0.00	6.52±2.76
Service	0		0.00	
Plate	12.8		0.00	
Entire	80.0		66.70	
8: Are food wastes harmful to the environment?				
Yes	68		23.80	
No	28	1.36±0.56	66.70	1.85±0.57
Unknown	4		9.50	
9: Can food waste be used in different areas?				
Fuel	8		19.90	
Kompos	4		14.30	
Animal nutrition	16	4.16±1.31	19.00	3.42±1.66
Food	8		0.00	
Entire	64		47.60	
10: Can food be produced from food waste again?				
Yes	88		76.20	
No	8	1.16±0.47	9.50	1.38±0.74
Unknown	4		14.30	

11: Can food waste be avoided?				
Yes	100		71.40	
No	0	1.00±0	14.30	1.42±0.74
Unknown	0		14.30	

When Table 1 data were analyzed, significant differences has observed of PS and SS students in between answers of some questions (question 5 and 6). Students participating in research “what do you think of when you say food waste” of question; while there was no significant difference between the answers of the students in the PS money, time food waste and energy all of the factors has stated what wasting (71.40 %). PS students said that they did not leave any food residue in their plates if 14.30% of the SS said that left of dirty their plates.

To being different in education in private and public schools with eating at school it is thought that affects the way students leave their plates. In the question of the different uses of food waste (question 9), the level of knowledge of students in private 80% and public schools 66.7% was found to be similar.

Table 2. Comparative ANOVA analysis intended for food waste of private (PS) and state (SS) of schools (n:46)

Questions	Means	±SS	F	Sig.
Ides	3.37	1.73	8.42	0.006
Waste	1.74	0.44	2.84	0.99
Plate	1.06	0.25	3.98	0.52
Increased food	1.90	0.31	2.70	0.107
Waste food	3.43	1.50	0.58	0.447
Mare waste food	3.65	1.50	7.37	0.009
Food waste	7.06	2.14	2.54	0.117
Nature effect	1.58	0.61	8.66	0.005
Uses fields	3.82	1.51	2.78	0.102
Food production	1.26	0.61	1.50	0.227
Prevent	1.20	0.54	8.30	0.006

SS and PS (Table 2) compared to ANOVA, it was found that they did not know of food was more wasted despite they know of waste food (question 6) ($F=7.37$; $p<0,005$).

“What is your mind about wasting?” and “Can food waste be avoided?” the answers to the question of student between there has not difference as statistically. In the application of the questionnaire, it is considered that the students are given answers by conscious in the last questions.

3. DISCUSSION

Nutrition is one of the most important factors affecting growth and development in childhood (Çelikoyar, 1988). Early childhood is a period in which children started putting signs and definite stand against food. This period which children choose food too much is a difficult but temporary period for their parents and teachers (Kutluay Merdol, 1999). It should be the target of teachers and families to plan meals, improve eating behavior and gain positive eating habits in early childhood (Ada, 1998). Therefore, in our study, students are dealt with primary school first grade 6-8 age group. It is thought that the wastes, which are one of the cases where parents and teachers complain the most, are caused by the food selection of the students. Therefore, awareness is needed against waste. Because early childhood period before the transition to school is known as the period of eating habits (Ünüşan, 2001; Terzi, 2005; Kobak and Pek, 2015). During the time spent at the school, students consume an average of 15% of their daily nutrition. A legal basis of the students' nutrition application has not been established

in our country. In our research, there is generally eating time application in this student age group (Güneyli, 1986). 50% of the sample of our research is female and 50% is male. When the effects of nutrition on gender are examined, it is thought that it may affect the responses. According to Demirezen, male students often eat more fatty and sugary foods than female students and eat more fast-food type foods. In addition, there are differences between the genders in the direction of adding salt to foods, consumption of veal, mutton, salami, sausage and eating fruits, vegetable food, dried legumes (Demirezen and Gülhan, 2005). According to the 2014 report of the World Health Organization (WHO), around 1 billion people in the world suffer from hunger shortage; 1.4 billion people suffer from overweight and about 2.8 million people die each year due to their excess weight. In addition, it is estimated that at least 2 billion people become ill as a result of food poisoning due to contamination during the food supply phase (World Bank [WB], 2015). In 2008, according to the total consumer and retail food loss analysis in the United States, at the first three, meat, poultry and fish (41%); vegetables (17%); and dairy products (14%) determined to be wasted (Buzby ve Hyman, 2012). According to Premanandh, almost one-third of every food purchased in developed countries is a source of waste as household food waste. These loss rates are stated as 15% of total production in cereals and legumes and 35% in fruits and vegetables (Premanandh, 2011). It is reported that 5% of the food in consumption and household stage are waste or loss in Turkey (Tatlıdil et al., 2013). It is detected that although the students know about the waste, they did not know which food was wasted (PS %64). The reason is thought to be related to the age ratios of the students applied to the survey. . Although schools are selected as full-time schools, it is thought that the differences between the private school and the public school may be reason that they are not ate meal in public school (Although there is eating time). Meal time, snack number and waste reason is also an important factor in terms of waste. It is known that children do not like products with sugar-free food and create waste on their plates (Ünüsün, 2001; Terzi, 2005; Kobak and Pek, 2015). According to FAO's report, 95% of food losses occur at the stage of transport of products (FAO, 2013). In the questionnaire applied to students, 80% of the students in the private school, 66,70% of the students in the public school, answered the question of "which food can be wasted". Their answers were "all of them". With this question, it is concluded that students think that the products are waste in many areas such as transportation, storage, cooking, dish, service. In our study, the students think of waste as food, but those who read in private school think as money ($p < 0.05$ Table2).

According to the studies, many measures are taken to reduce food waste. Reducing waste with zero-waste regulations are planned in Turkey. "Inviting women with zero waste contact", "Environmental consciousness for generations on the way to 2023" ,"Zero waste", "Waste of bread," "food loss and waste food in food sector", "Zero waste in the table" such as projects with the aim to prevent has studied prepared and supported by the coordination of the Ministry of Environment and Urbanization in our country 2018 years. Many countries or regions, state policies are organized non-governmental organizations are working on the issue and taking measures together with the private sector such as in our country in order to reduce or eliminate the negative effects of this problem almaktadır (Sıfır atık yönetmeliği taslağı, 2018) (Figure 1).



Figure 1. Waste visuals (Sıfır atık yönetmelik taslağı, 2018)

Effective use of factors production and consumption, awareness raising of consumers, promotion of food production, promotion of local foods and minimization of losses should be supported by international funds. States has taken decisions to prevent food waste in their internal laws. For example in France, food is consumed by supermarkets thrown away but has taken measures (Artık et al., 2011). According to the results of the survey, although the knowledge level of children is limited about wastage according

to question 11 they think that food waste can be prevented ($F = 8.3$; $p < 0.05$). Furthermore, students of answer about whether of waste food is harmful to nature has created the perception that waste should be avoided (question 9) ($F = 8.66$; $p < 0.05$).

4. RESULT AND SUGGESTION

Accordingly, to reduce food waste;

- There may be wastes in every area should be taught in schools starting from early childhood,
- The implementation education curriculum should be taken to ensure that is the same in the State and Private schools,
- Food waste should be explained of people and nature; social, cultural and psychological as impacts,
- How the assessment to do in waste management should be supported by practical training,
- The menus should be planned by taking into consideration the hygiene rules when was made of food recycled,
- In this respect, it is thought that many fields such as national education, university, local administrations and media should work by supporting each other.

REFERENCES

- 1- Ada, 1998, The pediatric nutrition dietetic practice group. nutrition mangement of the preschool child, USA, 87-95.
- 2- Artık, N., Konar, N. and Halkman, A. K., 2011, Gıda Bilim ve Teknoloji Dergisi.
- 3- Buzby, Jean C. and Jeffrey H., 2012, Total and per capita value of food loss in the United States, Food Policy, 37(5), 561-570.
- 4- Çelikoyar, Z., 1988, Sosyo-ekonomik düzeyi düşük bir grup kentsel çocuğun beslenme ve gelişim durumları, Yüksek lisans tezi, *İstanbul Üniversitesi Çocuk Sağlığı Enstitüsü*, İstanbul.
- 5- Demirbaş, N. and Evren, G., 2018, The utalization of food waste in feed and fertilizer production in Turkey: Needs and challenges, *9th International Agriculture Symposium*, AGROSYM.
- 6- Demirbaş, N., Niyaz, Ö.C. and Apaydın, Y. M., 2017, An evaluation on problems within food supply chain in Turkey in terms of food losses and waste, *IBANESS*, Edirne, March 04-05,
- 7- Demirezen, E. and Gülhan C., 2005, Adölesan çağı öğrencilerde beslenme alışkanlıklarının değerlendirilmesi, *Sürekli Tıp Eğitimi Dergisi* 14(8) 174-178.
- 8- FAO, 2013, Food waste harms climate, water, land and biodiversity, FAO report,
- 9- George, D., and Paul, M., 1986, SPSS for windows step by step: A simple guide,
- 10- Güneyli, U., 1986, Ankara'nın sosyo-ekonomik yönden farklı semtlerinde bulunan ilkokul çocuklarının beslenme durumları konusunda bir araştırma-II, *Beslenme ve Diyet Dergisi* 15 31(45).
- 11- <http://www.fao.org/news/story/en/item/196220/icode/>. Erişim Tarihi: 23.03.2015.
- 12- Kobak, C. and Hatice, P., 2015, Okul öncesi dönemde (3-6 Yaş) ana çocuk sağlığı ve anaokulundaki çocukların beslenme özelliklerinin karşılaştırılması, *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 30(2), 42-55.
- 13- Kutluay-Merdol, T., 1999, Okul öncesi dönem eğitimi veren kişi ve kurumlar için beslenme eğitimi rehberi, Özgür Yayınları, İstanbul.
- 14- Lipinski, B., Hanson, C., Lomax, J., Kitinoja, L., Waite R. and Searchinger, T., 2013, Reducing food loss and waste, Working Paper, Installment 2 of Creating a Sustainable Food Future. *Washington, DC: World Resources Institute*, Available online at <http://www.worldresourcesreport.org>.
- 15- Parfitt, J., Mark, B., and Sarah, M., 2010, Food waste within food supply chains: quantification and potential for change to 2050, *Philosophical transactions of the royal society B: biological sciences*, 365(1554) , 3065-3081.
- 16- Premanandh, J., 2011, Factors affecting food security and contribution of modern technologies in food sustainability. *J. Sci. Food Agric.*, 91(2707),2714.
- 17- Sindhu, R., Gnansounou, E., Rebello, S., Binod, P., Varjani, S., Thakur, I., and S., Pandey, A., 2019, Conversion of food and kitchen waste to value-added products. *Journal of environmental management*.

Proceeding Book of ISESER 2019

- 18- Şanlıer, N., Sormaz, Ü. and Güneş, E., 2019, Yiyecek-içecek hizmetleri bölümünde okuyan öğrencilerin aldıkları mesleki eğitimin besin tercihleri ve beslenme bilgi düzeyleri üzerine etkisi, Mehmet Akif Ersoy Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 8(15), 248-265.
- 19- Tatlıdil, F.F., Dellal, İ. and Bayromoğlu, Z., 2013, Food losses and waste in Turkey, FAO.
- 20- Terzi, A.Ö., 2005, Bir-üç yaş grubu sağlıklı çocuklarda beslenme alışkanlıkları ve günlük posa alım düzeyleri, *Sağlık Bilimleri Enstitüsü*, Hacettepe Üniversitesi, Ankara.
- 21- Ünüsan, N., 2001, Okul öncesi çocukların yeme problemlerinin incelenmesi, Çocuk Forumu Dergisi, 4.
- 22- Sıfır atık yönetmelik taslağı, 2018, https://webdosya.csb.gov.tr/db/cygm/icerikler/s-f-rat-kyontslk_20181022-20181023131043.pdf. Erişim tarihi: 01.01.2019