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The Economic Contribution of Recycling in Kahramanmaras

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ABSTRACT

Recycling is the process of collecting and processing materials that would otherwise be thrown away as trash and turning them into new products. The use of recycled paper in paper manufacturing is known to reduce air pollution by 74-94%, water pollution by 35%, and water use by 45%. Objectives of this study was to determine the consumer's point of view on recycling and pollution in Kahramanmaraş city center, increasing the awareness of consumers about recycling and determine the factors that are effective in informing consumers about the recycling. For this purpose, a face to face survey in 2017 was conducted with 268 people in the city center of Kahramanmaraş. Descriptive statistics and Chi-Square test were applied to analyze the data obtained from the survey results. According to results, 76% of consumers do not know the real definition of garbage, 81% of consumer do not know the definition of household waste, 70% of consumers have information on recycling, 26% of consumers separate garbage as recyclable and not recyclable, %78 of consumers know products that can be recycled, %23 of consumers looks for the symbol of recycling when buying a product and %78 of consumers are willing to buy recycled products. Moreover, according to results, the most important environmental pollution in Kahramanmaraş region is air pollution (%36), noise pollution (%31), soil pollution (%22) and water pollution (%11). According to the results of the analysis, the level of knowledge and awareness about the importance of recycling are increasing as the level of household income and education increases. Some of the recommendations from study are; adding more recycling bins in public spaces, explaining the benefits of recycling to consumers, share details about the recycling supply chain, educate the community by adding more informative banners or panels in public space, creating activities and organizing public platforms and events in schools to target the younger citizens.

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Kahramanmaraş İlinde Geri Dönüşüm ve Ekonomik Katkısı

ÖZET

Geri dönüşüm, herhangi bir şekilde kullanılarak kullanım dışı kalan ve çöp olarak atılabilecek atıkların toplanması, işlenmesi ve yeni ürünlere dönüştürülmesi sürecidir. Kâğıt imalatında geri dönüştürülmüş kâğıt kullanımının hava kirliliğini %74-94, su kirliliğini %35 ve su kullanımını %45 azalttığı bilinmektedir. Bu çalışmanın amacı, Kahramanmaraş il merkezinde tüketicilerin geri dönüşüm ve kirlilik konusundaki bakış açılarını belirlemek, tüketicilerin geri dönüşüm konusunda farkındalıklarını artırmak ve tüketicileri geri dönüşüm hakkında bilgilendirmek için etkili olan faktörleri saptamaktır. Bu amaçla Kahramanmaraş ili şehir merkezinde 2017 yılında 268 kişi ile yüz yüze anket görüşmesi gerçekleştirilmiştir. Anket sonuçlarından elde edilen verilerin analizinde tanımlayıcı istatistikler, frekans tabloları ve Ki-Kare testinden yararlanılmıştır. Araştırma sonuçlarına göre, tüketicilerin %76'sı çöpün gerçek tanımını, %81'i ise evsel atıkların tanımını yapamamıştır. Anket yapılan tüketicilerin %70'i geri dönüşüm

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Kahramanmaraş

Araştırma Makalesi

hakkında bilgi sahibidir ve % 26'sı geri dönüştürülebilir ve geri dönüştürülebilir olmayan çöpleri ayırmaktadır. Tüketicilerin %78'i geri dönüştürülebilecek ürünleri tanıyor, %23'ü bir ürün alırken geri dönüşüm sembolü olup olmadığını kontrol ediyor ve %78'i geri dönüşümlü ürün almaya isteklidir. Diğer taraftan, Kahramanmaraş bölgesindeki en önemli çevre kirliliğinin hava kirliliği (%36), gürültü kirliliği (%31), toprak kirliliği (%22) ve su kirliliği (%11) olduğu tespit edilmiştir. Analiz sonuçlarına göre, araştırma alanında hanehalkı gelir düzeyi ve eğitim arttıkça geri dönüşümün önemi konusundaki bilgi ve farkındalık düzeyi artmaktadır. Araştırma alanında, daha fazla geri dönüşüm kutusu eklenmesi, tüketicilere geri dönüşümün faydalarının açıklanması, geri dönüşüm tedarik zinciri hakkında ayrıntıların paylaşılması geri dönüşüm sürecinde farkındalığı arttıracaktır. Kamu kurumlarının daha fazla bilgilendirici afiş kullanması veya panel ve etkinlikler yaparak toplumu ve özelliklede okul çağındaki öğrencileri ve gençleri geri dönüşüm konusunda bilgilendirme faaliyetlerini hızlandırması gerekmektedir.

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INTRODUCTION

Recycling is the process of collecting old materials that's considered as trash and converting it into new products (EPA, 2016). There are three main steps of recycling which represents the continual loop in the known recycling symbol. These steps are: collecting and processing – manufacturing and finally the most important step purchasing new products made from recycled materials (EPA, 2016).

Recycling can help our environment and society by adding more benefits such as; minimizing the amount of trash sent to landfills and incinerators, saving natural resources, restraining pollution by minimizing the necessity to gather new raw materials, reducing greenhouse gas emissions, saving energy, increasing economic security and supporting manufacturing industries which helps create jobs (Anonymous 2005 and 2007; Kaya, 2008; EPA, 2016).

With the energy obtained from the recycling of a single metal beverage can, we can operate a 100 watt light bulb for 20 hours. Recycling 1 ton of paper and cardboard waste save 17 trees from cutting. Also we can save up to 95% of energy by recycling 1 ton of plastic waste. By recycling 1 ton of glass waste we can avoid using 100 liters of oil (TÜKÇEV, 2013).

In Turkey, waste management and recycling sector with the contributions of private sector and local governments is becaming a market with an average of 5 billion euros lately. The rate of recycling was 35% by 2010, and increased to around 40% in 2012 and after. Overall, 43% of recycled wastes are made of paper, 27% are plastic, 12% are glass, 8% are textile products, and 4% are metal (Yetim, 2014). The use of recycled paper in paper manufacturing is known to reduce air pollution by 74-94%, water pollution by 35%, and water use by 45% (Gencer, 2016).

With the recycling of paper, cardboard, wood and composite packaging wastes, 4 million 715 thousand trees, which correspond to approximately 94 thousand acres of forest area were saved. Prohibition of free supply of plastic bags to consumers will start in January 1, 2019 to make the people more conscious about recycling (ÇEVKO, 2018).

According to Turkey Statistics Institution (TUIK) data, the average of domestic solid waste by one person is 1 Kg in 2012 (Neyim, 203). An average, 68,000 tons of household municipal waste per day, and 25,8 million tons of waste per year was produced in Turkey (TUIK, 2015).

The average amount of solid waste produced per capita in Kahramanmaraş province with a population of 1.134.000, where recycling methods accelerated day by day, was calculated as 0.378 kg/day (Anonymous, 2017). In the province, about 500 tons of waste is produced daily, including metal, plastic and glass waste used in food, beverage packages, paper and cardboard etc.

Wastes are stored at the Aksu Transfer Station. Some of these deposits are irregular and randomly polluted, polluting the Aksu Stream and surrounding dam lakes, groundwater resources and land. It has also been observed that irregular incineration and exhaust fumes are causing air pollution, as well as causing color change in the products produced in the nearby textile factories, causing material damage (Anonymous, 2018).

In this context, it was important to determine the consumer's point of view on recycling and pollution in Kahramanmaraş city center, increasing the awareness of consumers about recycling and determine the factors that are effective in informing consumers about the recycling.

MATERIAL and METHOD

Consumers were surveyed face to face to determine the contribution of recycling to the economy in the city center of Kahramanmaraş in 2017. The number of consumers was determined as 268 by using the Proportional Sampling Method. Frequency tables, descriptive statistics and Chi Square test statistics were used to analyze the data.

RESULTS and DISCUSSION

Based on the summary statistics in Table 1, 54.1% of respondents were male while 45.1% of respondents were female. According to survey results, 14.6% of the consumers have primary school education, 15.4% have secondary school, 30.7% have high school level, 35.2% have undergraduate level and 4.1% have graduate level education (Table 1). The average age of the surveyed consumers was 39.48. The youngest consumer was 20 and the oldest consumer was 70 years old (Table 2). The average age of the surveyed consumers at the decision-making age level shows that the data obtained were reliable. Average family size of consumers was 4.71, and the average household income per month was found to be 3181 TL.

Result shows that 76% of consumers answered wrongly while 24% of respondents answered correctly to the definition of garbage (Figure 1). Shorty we can define garbage as the waste left behind after the materials such as paper, glass, cardboard and plastic have been separated from the waste and cannot be used at all. We received almost similar answers for knowing the definition of household waste. Overall, 81% of the consumers gave the wrong answer while 19% responded correctly (Figure 2). It is known that household wastes are all wastes (such as glass bottles, fruit wastes, textile products) that are purchased by consumers and produced after consumption. In other hand, when asking about the definition of recycling which is the process of recycling wastes that are converted into secondary raw materials through various physical and/or chemical processes and included in the production process, 72% of the surveyed consumers were correct, 28% were incorrect (Figure 3). The majority of the participants in the present study 70% said they have knowledge about recycling, while 30% said they have no knowledge about recycling (Figure 4). Furthermore, we asked participants if they separate garbage as recyclable and not recyclable, 26% said they separate while 74% said they don't separate their garbage (Figure 5). Figure 6 shows that 78% of participants know products that can be recycled while 22% of the participants they don't know.

As results show in Figure 7, 52% of participants said they don't have recycling boxes in the neighborhood they live in while 48% said they have.

Table 1. Gender and education level of consumers

	Frequency	%
Gender		
Male	145	54.1
Female	123	45.9
Total	268	100.00
Education		
Elementary	39	14.6
Secondary	41	15.4
High school	82	30.7
Bachelor	94	35.2
Graduate	11	4.1
Total	267	100.0

Table 2. Average age of consumers, household size and income

	Mean	Std. Deviation
Age (years)	39.48	8.33
Number of family members (persons)	4.71	1.34
Total Family Income (TL/Month)	3181.09	1869.84

The majority of participants (87%) said there are no enough recycling boxes in their area while 13% said they have enough (Figure 8). As this survey took place in Kahramanmaraş city, 76% of participants said the local government or municipality doesn't give importance to recycling waste in the city while 24% said they give (Figure 9). Although most of the participants (99%) know the recycling symbol, 77% said they don't look for the symbol when buying a product while 23% said they look for it (Figure 10-11). Majority of participants (92%) said they will be pleased to have their wastes collected from their doorsteps (Figure 12).

From the information shown in Figure 13, 72% of participants said they don't come across recycled products in markets or grocery stores while 28% said they do. However, the evidence from Figure 14 shows that 78% of participants are willing to buy recycled products while 28% are not willing to buy these products. As shown in Figure 15, 72% of participants don't know a city or a country providing direct economic return through recycling while 28% said they know. The results from Figure 16 shows that, 59% of participants recognize symbols of environmental protection while 41% said they don't recognize these symbols.

According to results from Figure 17, the most important environmental pollution in Kahramanmaraş region is air pollution with 36% and with close results comes second noise pollution with 31%. However, soil and water pollution comes last with 22% and 11% in the same order, therefore this figure shows a clear variation in the most important environmental pollution in Kahramanmaraş region.

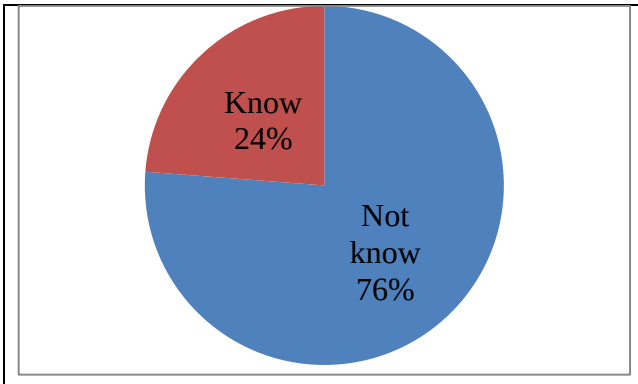

Figure 1. Knowing the Definition of Garbage

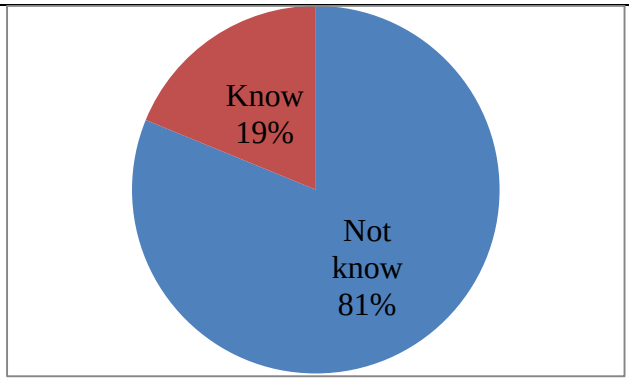

Figure 2. Knowing the Definition of Household Waste

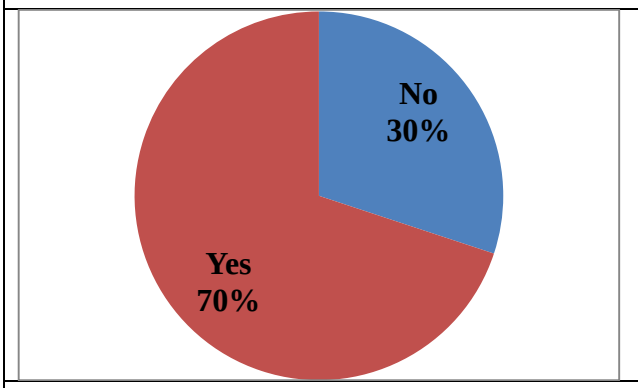

Figure 3. Having information on recycling

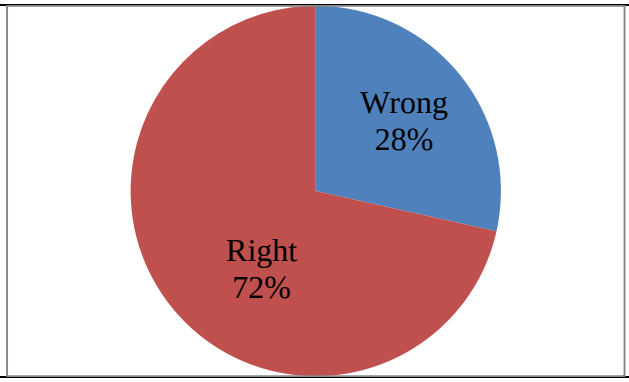

Figure 4. Definition of Recycling

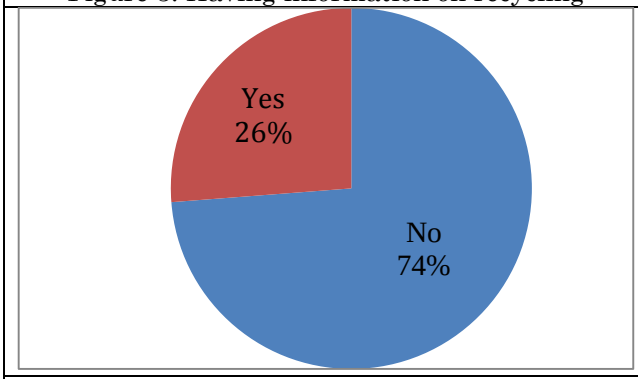

Figure 5. Separating garbage as recyclable and not recyclable

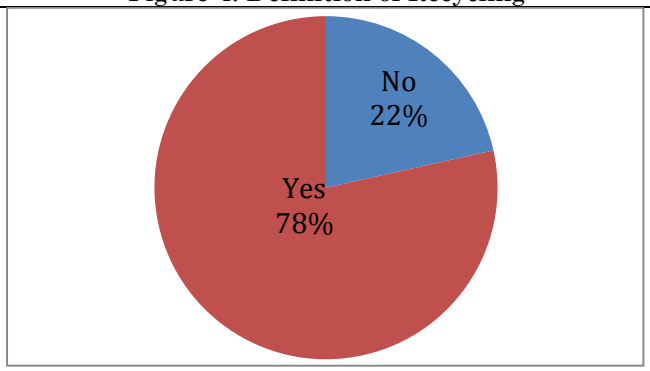

Figure 6. Knowing products that can be recycled

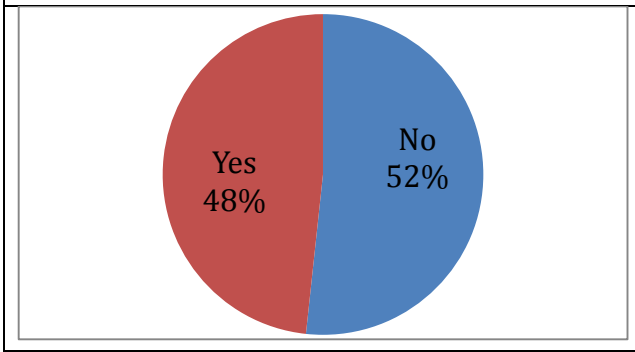

Figure 7. Having recycling boxes in the area consumers live in

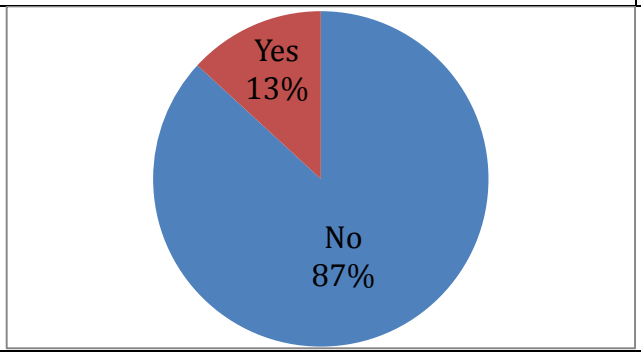

Figure 8. Having enough recycling boxes in the neighborhood consumers live in

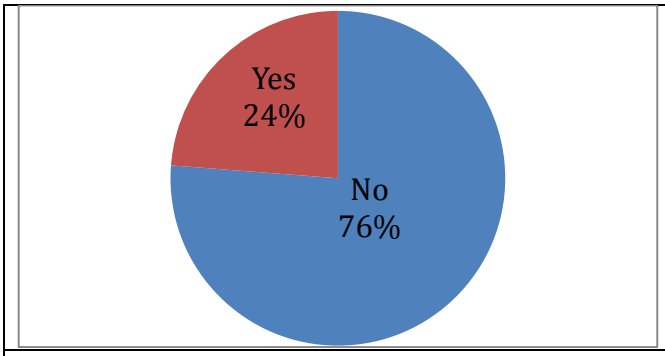

Figure 9. Giving importance to recycle waste in Kahramanmaraş

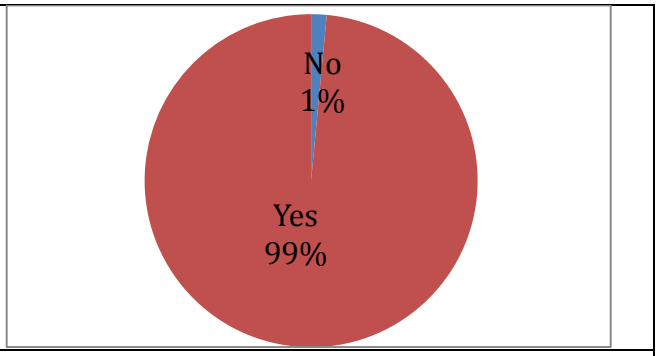

Figure 10. Knowing the symbol of recycling

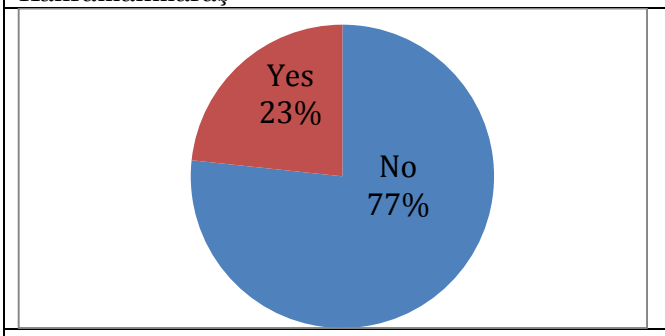

Figure 11. Looking for the symbol of recycling when buying a product

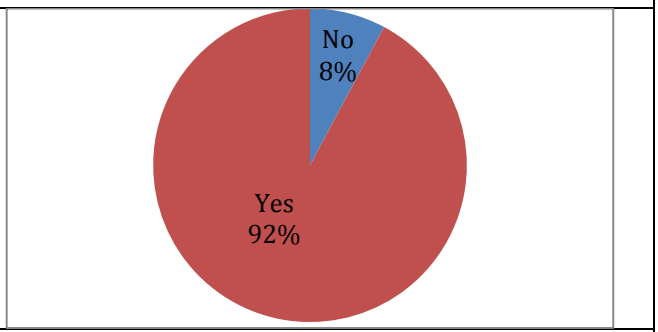

Figure 12. Collecting recyclable wastes from doorstep

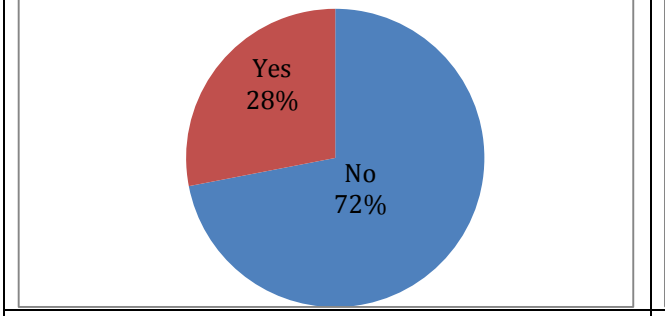

Figure 13. Coming across recycled products in markets or grocery stores

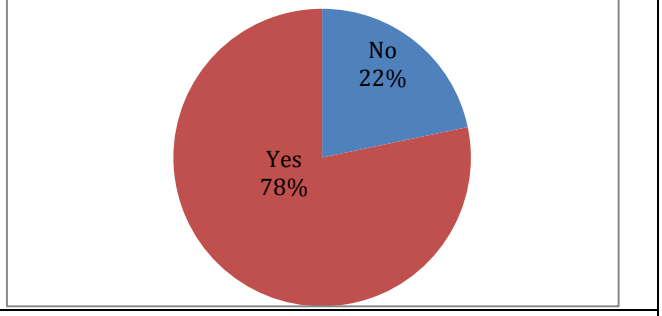

Figure 14. The willingness to buy recycled products

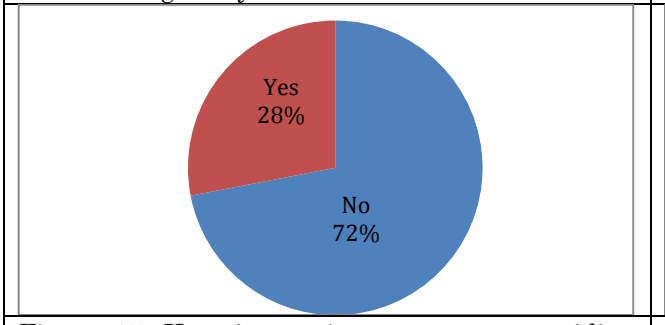

Figure 15. Knowing a city or country providing direct economic return through recycling

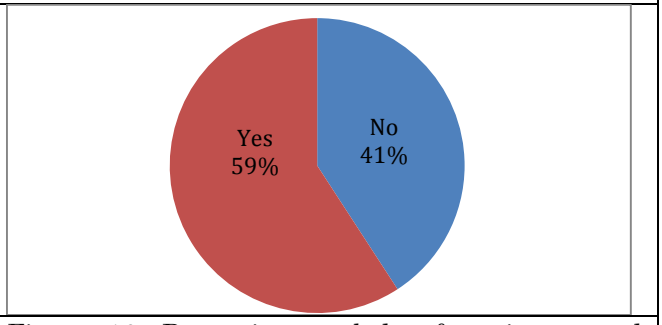

Figure 16. Recognize symbols of environmental protection

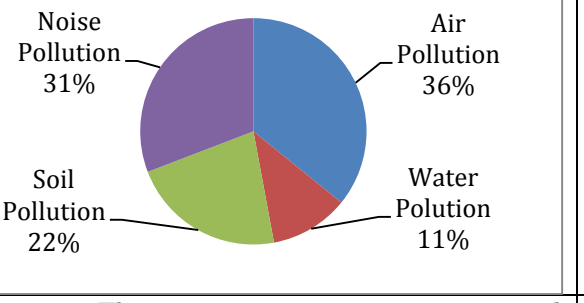

Figure 17. The most important environmental pollution in Kahramanmaras region

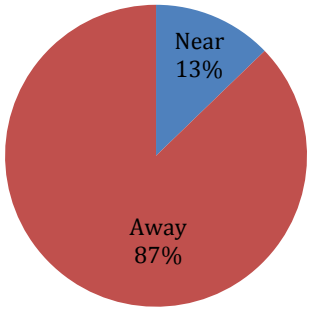

Figure 18. Wanting waste collection centers to be located near the city or away from the city

The pie chart from Figure 18 shows that the majority of participants (87%) want waste collection centers to be located away from the city while a small fraction of participants (13%) want waste collection centers to be located near the city.

According to chi square test results for separating garbage as recyclable and not recyclable decision, five out of 8 demographic characteristics of respondents were statistically significant at the 0.05 or 0.10 level of probability. Education level of respondents, household with working wife, household size, residential areas, household income were statistically significant, which indicates that socio-demographic characteristics of the respondents is important factors on respondent decisions. Higher income households, large households, higher educated household head, household with working wife and family lived in apartment are separating their garbage more than other households. For example, while 26,5% of university respondents separate garbage as recyclable and not recyclable, average 17% of middle school graduated respondents separate garbage. Similar results found also for income level of respondents. Results indicated that households with higher incomes were more likely to separating garbage (41,8%) as recyclable and not recyclable than lower-income households (17,4%). Moreover, according to results, larger households are more likely to separate their garbage as recyclable and not recyclable than smaller households.

The findings from Table 4 show the consumed and discarded quantities for some products in the household. For example, the consumption amount of frying oil was determined as 2,34 L/monthly while almost half of the amount of frying oil 1,61 L/monthly was discarded. On other hand, the consumption amount of glass bottles was determined as 4.56 unites weekly, while the discarded amount was found to be 3.11. Also, the consumption amount of bread about 2.07 pieces/daily while the wasted amount determined as 5.90%. Furthermore, the consumption amount of fruit-vegetables was determined as 7.75 Kg/weekly while 4.05 Kg/weekly was discarded.

CONCLUSION and RECOMMENDATIONS

In this study, it was aimed to determine the consumer's point of view on recycling and pollution. Also the factors that makes recycling important by conducting a face-to-face survey with consumers. According to the results of the analysis, the level of knowledge and awareness about the importance of recycling are increasing as the level of household income and education increases. In addition, it was determined that the income in the recycling products contributes to the economy.

The results of the study will contribute to the economy of the region through the sale of the products that are recycled by supporting the recycling campaign initiated by the Municipality of Kahramanmaraş. In addition , attention will be paid to the recycling concept and products of the producers and positive developments will be made towards the environment. Furthermore, it is observed that Kahramanmaraş Municipality give more importance to advertisement and panel works about the importance of recycling to the regions with high income level. Moreover, the most important problem is the air pollution. But when the income level decreases, the problem changes towards water and soil pollution. According to the results of the analysis, it was determined that the level of knowledge, awareness, consciousness and the importance given to recycling increased in Kahramanmaraş province as the income and education level increased.

In order to attract more attention to recycling, municipality should add more recycling bins in public spaces and share metrics of success, explain the benefits of recycling, share details about the recycling supply chain. Moreover, community should be educated by; using public space to advertise by adding more informative banners or panels, creating activities and organizing public platforms and events in schools to target the younger citizens. In order to attract more attention to recycling, municipality should add more recycling bins in public spaces and share metrics of success, explain the benefits of recycling, share details about the recycling supply chain.

Table 3. Separating garbage as recyclable and not recyclable

	Not Separating	Separating	Total	Chi square (P-value)
Gender of respondents				1.098 (0.295)
Man	76.4	23.6	100.0	
Women	70.7	29.3	100.0	
Marital status of respondents				1.014) (0.314)
Single	82.6	17.4	100.0	
Married	73.0	27.0	100.0	
Education level of respondents				10.421** (0.015)
Elementary school	76.9	23.1	100.0	
Middle school	82.9	17.1	100.0	
High School	81.7	18.3	100.0	
University	63.5	36.5	100.0	
Age of respondents				0.144 (0.930)
<36	74.2	25.8	100.0	
36-45	72.3	27.7	100.0	
>45	74.6	25.4	100.0	
Working status of mother				7.029** (0.008)
Not working	81.3	18.8	100.0	
Working	66.2	33.8	100.0	
Residential house				9.590** (0.002)
Apartment	68.7	31.3	100.0	
Detached house	87.5	12.5	100.0	
Household size				2.931* (0.087)
≤4	68.8	31.2	100.0	
>4	78.2	21.8	100.0	
Household income group				11.322** (0.003)
≤ 2000 TL	82.6	17.4	100.0	
2001-5000 TL	72.5	27.5	100.0	
>5000 TL	58.2	41.8	100.0	

* and ** indicate statistical significance at the 0.10 and 0.05 levels, respectively.

Table 4. Consumed and Discarded Quantities

	Consumption amount	Discarded amount
Frying oil (L / Monthly)	2.34	1.61
Glass bottle (Unit / Week)	4.56	3.11
Plastic packaging (Pieces)	8.13	6.58
Paper, packaging (fruit juice, milk)	9.38	8.21
Metal (cans, oil cans, cola boxes, canned food, pots, pans)	5.51	4.62
	Amount	Wasted (%)
Bread (Pcs / Day)	2.07	5.90
Cooked food	2.10	4.53
Fruit-vegetables (Kg / Week)	7.75	4.05

Moreover, community should be educated by; using public space to advertise by adding more informative banners or panels, creating activities and organizing public platforms and events in schools to target the younger citizens.

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