



Awareness of Waste Management in Single-Family and Multi-Family Housing Estates on the Example of Olsztyn

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1. Introduction

The problem of the negative impact of man on the natural environment results first of all from the willingness to maintain a high pace of economic development. This is mainly the result of over-demand and supply-driving consumption accompanied by low environmental awareness. This results in an increase in adverse external effects, which generate higher costs and reduce social welfare, resulting in ecosystems not being able to assimilate damage. One of the main problems in the context of environmental protection is the increase in the quantity of all types of waste, which is becoming more and more challenging to manage. Undoubtedly, over the centuries, waste generation has been an inseparable feature of human economic activity. However, a big problem becomes their management without causing any damage to the natural environment. This forces the necessity of proper waste management by limiting the space for storage, elimination of nuisance caused by emissions of pollutants to the environment and saving resources (*Zarządzanie środowiskiem*, 2007). People often have to bear individual costs in order for the environment to benefit (Steg et al., 2014).

It should be noted that this increased consumption leads to an increase in waste generation (Malinauskaite et al., 2017). In addition, the level of waste generation significantly depends on economic development – the richer the country, the more waste it produces (Minelgaite & Liobikiene, 2019). Therefore, legal regulations are introduced, which influence the decisions of both economic entities and households, which are to carry out rational waste management.

On average, the EU countries produce around 482 kg of waste per capita per year. However, there is a significant difference between the Member States.

The "leader" in waste generation is Denmark, where residents generate about 777 kg per capita per year. In Cyprus, Malta and Germany, the amount of waste is also one of the highest and reaches over 600 kg per capita. In Romania, Poland, Czech Republic and Slovakia, the amount of waste was almost twice as small (Minelgaite & Liobikiene, 2019). However, also in these countries, including Poland, the amount of waste has been increasing for many years, and forecasts indicate that this trend is continuing. According to the latest data published by the Central Statistical Office (GUS) (GUS, 2019a), 283 kg of municipal waste per capita was produced in 2015. In 2016, there was an increase of almost 15% (to over 300 kg) to reach 312 kg per person in 2017. Each year, however, the level of waste segregation and recycling is increasing. According to the official data of the Central Statistical Office (GUS) (GUS, 2019b), in 2015 the waste collected selectively in relation to the total amount of waste is 23.4%, in 2016 25.2% and a year later it reaches the level of 27.1%.

The necessity of rational exploitation of natural resources and environmental protection was considered to be the critical factors for the future development of Poland (Gawroński, 2019). Significant progress has been made in reducing environmental pressures over the last 30 years, but despite improvements, further steps need to be taken to improve the eco-efficiency and greening of the Polish economy (*Stan Środowiska w Polsce*, 2014). Therefore, the recently introduced regulations adopted by the ministers of the environment of the EU member states set new targets for the reuse and recycling of municipal waste: by 2025, the EU countries are obliged to manage 55% of waste in this way, by 2030 – 60%, and by 2035 – 65%.

Households can minimise waste and increase recycling through proper segregation and behavioural change (Van der Werff et al., 2019). Therefore, education and constant increase in awareness of the inhabitants have an essential role to play in waste management (Deluga, 2018). Environmental awareness is not only knowledge about the environment, but above all recognition of the environment as values and active measures to protect it (Tuszyńska, 2017). Environmental awareness can be broadly defined as the attitude regarding environmental consequences of human behaviour. Starting from the typical definition of attitude, environmental awareness is a pre-disposition to react to environmental issues in a certain manner (Culiberg & Rojšek, 2008; Ham et al., 2016).

The most important source of information for the public in this respect seems to be the Internet, as well as free information brochures distributed by municipal companies and local authorities. A large part of the public is convinced that with proper waste management, it is possible to protect the environment. In those communities where residents are convinced of their recycling potential, a great many people are involved in such activities (Taberner et al., 2015). However, if

not for the appropriate actions influencing people's way of thinking, their awareness at this level would be at a much lower level. Of course, it should be remembered that many factors determine the level of the environmental awareness. Therefore, in this paper, the thesis was formulated that residents are aware of the problems resulting from the generation of waste in households, but in some areas, it is necessary to improve their environmental awareness. This results from the existing significant differences in the level of knowledge, awareness, and behaviour of the inhabitants, related to rational waste management in the household, related to the type of housing in the place of residence (single and multi-family housing).

The aim of the paper is to evaluate the environmental awareness of city residents on the management of waste living in multi-family or single-family housing. The city of Olsztyn was chosen for testing due to the announcement of very high price increases for waste collection in 2019.

2. Method

2.1. Physical context

Two housing estates in Olsztyn were selected for the study, one in single-family housing - Brzeziny (B), the other in multi-family housing (primarily pre-fabricated buildings estates) – Osiedle Generałów (OG). Olsztyn is the capital of the Warmian-Masurian Region with a total population of 161291 permanent residents and about 30 000 temporary residents (including 20 126 students) (Adamska et al., 2018). The population of the analysed settlements is as follows: Brzeziny is inhabited by over 2 thousand people, which constitutes 1.28% of the total population of the city (respondents constituted about 3% of the total population of the estate), while Osiedle Generałów by 9 032 (5.52% of the total population of the city; respondents constituted about 0.7% of the total population of the estate)) (*Raport o stanie miasta Olsztyn za lata 2010, 2011*).

In Brzeziny, in 2017, over 993 Mg of waste was collected, which was about 0.48 Mg per capita. In turn, Osiedle Generałów was characterized by a level of nearly 2 887 Mg, which gave 0.32 Mg per capita.

2.2. Method of measurement

The primary variables were measured using a standardised interview questionnaire. It consisted of 21 closed and open questions, which concerned both socio-demographic variables such as gender, age, level of education and income, self-efficacy in relation to household and system waste management, satisfaction with the quality of services provided by waste collection companies and awareness of the costs of waste management.

2.3. Analysis of data

In order to compare the results of the study, a Chi-square (χ^2) test of the highest reliability (NW) was used, which tests the same hypothesis as Pearson's χ^2 statistics; however, its calculation method is based on the theory of the highest reliability:

$$\chi^2 = \sum_{i=1}^n \frac{(O_i - E_i)^2}{E_i} \quad (1)$$

where:

O – observed value,

E – expected value.

2.4. Respondents

The interview was conducted on one day (6 February 2019). Respondents were randomly selected because many of those who could potentially participate in the interview refused to respond. A total of 120 interviews were conducted with adults, 60 in each housing estate.

The largest group of respondents was between 36 and 45 years old, the smallest between 21 and 25 years old and over 65 years old (Table 1). On OG, respondents represented all age groups, which only slightly differed from each other in terms of numbers. On B, apparent domination of respondents aged 36-45 and 26-35 years was noted (Table 1).

Table 1. The age of respondents

Specification	Osiedle Generałów		Brzeziny		Total	
	n	%	n	%	n	%
21-25	9	15.0	5	8.3	14	11.7
26-35	6	10.0	22	36.7	28	23.3
36-45	14	23.3	30	50.0	44	36.7
46-65	17	28.3	3	5.0	20	16.7
above 65	14	23.3	0	0.0	14	11.7
Total	60	100	60	100	120	100

Source: own study

People with secondary education dominated both housing estates; however, a relatively large percentage of respondents with university education is noteworthy (Table 2).

Table 2. Education of respondents

Specification	Osiedle Generałów		Brzeziny		Total	
	n	%	n	%	n	%
basic education	4	6.7	1	1.7	5	4.2
secondary education	33	55.0	44	73.3	77	64.2
higher education	23	38.3	15	25.0	38	31.7
Total	60	100	60	100	120	100

Source: own study

The largest group of respondents declared monthly income in the range from 3 000 to 4 000 PLN, the smallest in the range from 1 500 to 3 000 PLN and from 6 000 to 7 000 PLN.

Table 3. Respondents' income per capita (PLN)

Specification	Osiedle Generałów		Brzeziny		Total	
	n	%	n	%	n	%
1500-3000	3	5.0	8	13.3	11	9.2
3000-4000	36	60.0	3	5.0	39	32.5
4000-5000	18	30.0	13	21.7	31	25.8
5000-6000	3	5.0	25	41.7	21	17.5
6000-7000	0	0.0	11	18.3	11	9.2
Total	60	100	60	100	120	100

Source: own study

3. Results

All respondents stated that they knew what the cost of collecting waste is per capita¹. The vast majority of the respondents stated that they spent PLN 10 to 15 per month per family member on waste collection. This proves (especially in the case of B) that the respondents did not know the rates of charges, because the majority of OG residents and all of B stated that they sort waste, and the price, in this case, was below PLN 10. The χ^2 analysis showed statistically significant differences in this respect between the investigated settlements. As can be seen from

¹ Rates until 31 March 2019 for residential properties: PLN 14.41 per month for a person living in a given property if waste is unsorted; PLN 9.80 per month for a person living in a given property if municipal waste is collected selectively.

the data in Table 4 for B, all residents indicated only this price range, as opposed to OG residents who declared charges in all price ranges.

Table 4. The monthly charge for waste collection per person

Specification	Osiedle Generałów		Brzeziny		Total	
	n	%	n	%	n	%
do 7 PLN	2	3.3	0	0	2	1.7
7-10 PLN	42	70.0	0	0	42	35.0
10-15 PLN	10	16.7	60	100.0	70	58.3
above 15 PLN	6	10.0	0	0	6	5.0
Total	60	100	60	100	120	100
Statistics		χ^2 test values		p		
7-10 PLN		54.72232		.00000		
10-15 PLN		71.34277		.00000		
above 15 PLN		5.755801		.01643		

Source: own study

According to Slavik and Pavel (2013), the place of residence (single-family houses or multi-family buildings) affects the efficiency of collection of municipal waste charges. The situation is much worse in housing estates consisting of multi-family houses, which is associated with higher density, the anonymity of tenants or very frequent changes of residents. According to more than 70% of respondents, the level of waste collection fees is a large or considerable expense in the context of their household budgets. Only one-third of the population described it as small or average. The χ^2 analysis showed statistically significant differences in the opinions of respondents from both housing estates. The data contained in Table 5 show that the level of fees is much more negative to the residents of B than to OG.

According to Malinauskaite et al. (2017), waste management solutions should be not only environmentally sustainable but also cost-effective and socially acceptable. Therefore, the respondents' opinion on the willingness to pay a higher price for waste collection for environmental reasons was interesting. This is particularly important in view of the announcements of price increases as of 1 April 2019. Although more than 42% of the surveyed group responded positively to this issue, the rest were more or less strongly opposed to it. The χ^2 analysis showed that there were no statistically significant differences between the opinions of the residents of both housing estates only in the case of lack of consent to increase the number of

waste collection fees. In both cases, one in ten respondents was strongly opposed to charging higher amounts for this service (Table 6).

Table 5. The opinion of respondents on the level of fees for the disposal of municipal waste

Specification	Osiedle Generalów		Brzeziny		Total	
	n	%	n	%	n	%
Small expense	45	7.5	3	5.0	8	6.3
Average expense	22	37.5	3	5.0	25	21.3
Considerable expense	27	45.0	8	13.3	35	29.2
Big expense	3	5.0	36	60.0	39	32.5
Very large expense	0	0.0	10	16.7	10	8.3
Hard to say	3	5.0	0	0.0	3	2.5
Total	60	100	60	100	120	100
Statistics	χ^2 test values				p	
average expense	13.95375				.00019	
considerable expense	8.870456				.00290	
big expense	31.17081				.00000	
very large expense	8.804787				.00300	

Source: own study

Table 6. The opinion of respondents on the allocation of more money to waste management for environmental reasons

Specification	Osiedle Generalów		Brzeziny		Total	
	n	%	n	%	n	%
Yes	36	60.0	15	25.0	51	42.5
No	6	10.0	6	10.0	12	10.0
Probably not	18	30.0	39	65.0	57	47.5
Total	60	100.0	60	100.0	120	100
Statistics	χ^2 test values				p	
Yes	10.26899				.00135	
No	.0014264				.96987	
Probably no	10.03859				.00153	

Source: own study

The research showed that the majority of residents of B and OG segregate municipal waste. However, the χ^2 compliance test showed that there were statistically significant differences between settlements. While in B segregation was declared by all residents, in OG more than every tenth respondent did not undertake such actions (Table 7). The higher tendency to segregate waste of single-

family house residents compared to people living in multi-family buildings is confirmed by research Triguero et al. (2016). According to these authors, suburban residents are much more likely to segregate waste than those living in city centres or large housing estates who cede the problem to waste collection companies or are "free riding". There are also financial issues in favour of waste segregation, as Kiepas-Kokot et al. (2015) claim that the only economic incentive for environmentally friendly behaviour in the current municipal waste management system is the lower fee rate for selective waste collection.

Table 7. Waste sorting

Specification	Osiedle Generalów		Brzeziny		Total	
	n	%	n	%	n	%
Yes	53	88.3	60	100.0	113	94.2
No	7	11.7	0	0.0	7	5.8
Total	60	100	60	100	120	100
Statistics	χ^2 test values			p		
Yes	7.265052			.00703		
No	7.265052			.00703		

Source: own study

The residents of both housing estates declared that they segregate mostly paper, glass, and plastic. They were the least interested in the selection of metal and batteries and accumulators. The χ^2 analysis showed statistically significant differences in the approach to waste management in both housing estates for all types of waste. In the case of paper, glass, and plastic, only residents of single-family homes reported 100% segregation, but unlike the respondents from OG, they did not sort second-hand clothes, metal, medicines, and batteries (Table 8). A separate issue is the selection of organic waste. While in the case of residents of single-family houses they do not pose a problem due to, e.g., the possibility of composting, in the case of multi-family houses they become troublesome due to quick spoilage, therefore their utilisation requires increasing the frequency of collection, as well as supplying and increasing the capacity of containers for selective collection (Lorek, 2015). Another issue concerns waste such as medicines and batteries and accumulators. As the Jakubus & Tatuško (2015) research shows, while the separation of the most popular fractions, such as paper, glass, metals or plastics, is not a problem, the remaining fractions of municipal waste are differently qualified by the residents.

Table 8. Type of sorted waste

Specification	Osiedle Generalów		Brzeziny		Total	
	n	%	n	%	n	%
paper and cardboard	53	88.3	60	100	113	94.2
glass	53	88.3	60	100	113	94.2
plastic	53	88.3	60	100	113	94.2
clothing and textiles	52	86.7	0	0	52	43.3
organic waste	8	13.3	25	42.5	50	41.7
metal	12	20,0	0	0	12	10,0
medications	8	13.3	0	0	8	6.7
batteries and accumulators	5	8.3	0	0	5	4.2
I don't do the selection	7	11.7	0	0	7	5.8
Statistics	χ^2 test values			p		
paper and cardboard	7.265052			.00703		
glass	7.265052			.00703		
plastic	7.265052			.00703		
metal	11.98108			.00054		
organic waste	0.000000			.0000		
clothing and textiles	79.50866			0.0000		
batteries and accumulators	4.275796			.03866		
medications	7.265052			.00703		
I don't do the selection	7.265052			.00703		

Source: own study

The vast majority of respondents from both housing estates stated that the waste collection and selection system is effective in their opinion (Table 9), which was confirmed by the χ^2 analysis.

Table 9. The opinion of respondents on the correct functioning of the waste collection system

Specification	Osiedle Generalów		Brzeziny		Total	
	n	%	n	%	n	%
Yes	47	78.3	53	88.3	100	83.3
No	13	21.7	5	8.3	18	15.0
Total	60	100	60	100	120	100
Statistics	χ^2 test values			p		
Yes	1.401510			.23647		
No	1.401510			.23647		

Source: own study

According to the majority of respondents (Table 10), municipal waste is collected systematically. The essential element of a well-designed system is "friendly and transparent" selective collection of waste "at source." Introduced systems should be intuitive and corrected for their effective functioning in a given area. In particular, this applies to multi-family buildings, where it is practically impossible to separate waste into several fractions into separate containers in an apartment (Banaszkiewicz et al., 2013). The χ^2 analysis did not reveal any statistically significant differences between the opinions of the inhabitants of both housing estates.

Table 10. The opinion of respondents on the regularity of municipal waste collection

Specification	Osiedle Generalów		Brzeziny		Total	
	n	%	n	%	n	%
Collected systematically	54	90.0	56	93.3	110	91.7
Is not collected systematically	6	10.0	4	6.7	10	8.3
Total	60	100	60	100	120	100
Statistics	χ^2 test values			p		
Yes	.1570461			.69189		
No	.2146889			.64312		

Source: own study

According to O'Connell (2011), although the level of social awareness related to the environment is still rising, it does not mean that it is possible to stop strengthening the solutions developed so far and searching for new ones. It was interesting to learn about the opinions of respondents on waste management activities in their place of residence. In the first place the respondents mentioned the improvement of the system of sorted waste management (mainly the frequency of waste collection), and in the second place - better information on issues related to the overall waste management system in their housing estate and the whole city (Table 11). The χ^2 analysis showed significant differences only in the case of information and education. The research carried out showed that the OG residents paid much more attention to this issue (Table 11).

The survey asked the respondents whether the number of waste bins was appropriate in their opinion. As shown in Table 12, nearly 70% of the residents of both housing estates believed that the situation is favourable in this respect. However, the χ^2 analysis showed significant differences between residents of single-family houses and multi-family buildings. The availability of waste containers was assessed much better by respondents from OG, where the lack of containers was noticed only by less than 12% of respondents, while the lack of containers was noted by 50% of respondents from B (Table 12).

Table 11. The opinion of respondents on the measures that are urgently needed for waste management

Specification	Osiedle Generalów		Brzeziny		Total	
	n	%	n	%	n	%
information and education of the local community	36	45.0	36	18.3	72	60.0
conducting efficient, selective waste collection	31	51.7	53	75.0	84	70.0
investments in infrastructure for waste management	1	3.3	3	6.7	4	3.3
Statistics	χ^2 test values				p	
information and education of the local community	7.224600				.00719	
conducting efficient, selective waste collection	4.436345				.03518	
investments in infrastructure for waste management	1.099134				.29446	

Source: own study

Table 12. The opinion of respondents on available waste containers

Specification	Osiedle Generalów		Brzeziny		Total	
	n	%	n	%	n	%
It's suitable	53	88.3	30	50.0	83	69.2
It is not suitable	7	11.7	30	50.0	37	30.8
Total	60	100	60	100	120	100
Statistics	χ^2 test values				p	
Yes	16.27988				p=.00005	
No	13.78043				p=.00021	

Source: own study

The question of the number of waste bins available to the respondents is related to the above. The research carried out showed that most often there were three containers in their place of residence, which was related to the segregation carried out (Table 13)². However, the χ^2 analysis showed significant differences between settlements. At OG dominated respondents indicating three containers for waste segregation and B by respondents indicating four containers for waste segregation. This may be due to the fact that the residents of single-family houses have a much larger surface area, and thus a higher possibility to have more containers

² As of March 2018, the amended regulations are in force and there should be at least five containers.

than those living in a multi-family building. It is also important that the residents of single-family homes are in charge of segregation themselves, while various types of management serve those living in multi-family buildings.

Table 13. Number of containers to which respondents have access

Specification	Osiedle Generałów		Brzeziny		Total	
	n	%	n	%	n	%
5 containers	8	13.3	8	13.3	16	13.3
4 containers	9	15.0	37	61.7	46	38.3
3 containers	39	65.0	15	25.0	54	45.0
2 containers	4	6.7	0	0.0	4	3.3
1 container	0	0.0	0	0.0	0	0.0
Total	60	100	60	100	120	100
Statistics	χ^2 test values				p	
5 containers	0.000000				1.0000	
4 containers	20.07688				.00001	
3 containers	13.31967				.00026	
2 containers	5.755801				.01643	

Source: own study

The assumption of the selective collection system of municipal waste is to obtain the largest possible amount of high-quality raw materials suitable for recycling. This objective can only be achieved with a high level of public involvement. In order to encourage residents to segregate waste, it is not enough just to provide them with access to containers. An essential element is the environmental awareness of the society and the conviction that selective collection has a measurable impact on the state of the natural environment (Pasicznik et al., 2016). Research carried out in two housing estates in Olsztyn showed that the majority of respondents found the information on waste segregation sufficient. However, it is worth noting that more than one-third of respondents were of the opinion that their environmental awareness was still limited (Table 14). The χ^2 analysis showed that there were significant differences between settlements. Much better environmental awareness was assessed by OG residents, among whom only one in ten had some doubts about this issue. Similar results were obtained by Pietrzyk et al. (2014), who researched one of the municipalities in Lesser Poland Region. According to them, only half of the municipality inhabitants were of the opinion that educational activities were conducted on a large scale, while 29% of the respondents were unable to answer such a question. It is, therefore, necessary to increase the emphasis on education in this area, especially since, as Ma and Hipel (2016), Song et al. (2016) and Siedlecka (2017) claim, knowledge is a key factor

influencing public awareness in the context of waste management systems and, consequently, environmental protection.

Table 14. The opinion of respondents on information on waste segregation

Specification	Osiedle Generałów		Brzeziny		Total	
	n	%	n	%	n	%
It's suitable	54	90.0	24	40.0	78	65.0
It is not suitable	6	10.0	36	60.0	42	35.0
Total	60	100	60	100	120	100
Statistics	χ^2 test values			p		
It's suitable	20.79234			.00001		
It is not suitable	23.74389			.00000		

Source: own study

4. Conclusions

Over the last three decades, significant progress has been made in reducing human pressure on the environment. Despite the improvement of the situation, further actions should be taken to improve the effectiveness of waste management in Poland. As mentioned in the introduction, the main objective of the research was to assess the level of the environmental awareness of residents of multi-family and single-family housing in Olsztyn on waste management on the example of two housing estates. Although the research is not representative, the results obtained indicate certain tendencies indicated in the works of other authors (Deluga, 2018).

Based on the research, conclusions were formulated that could be used by city authorities in the future:

1. Residents are aware of the waste problems, but some issues require improvement of the environmental awareness and actions at the household level. This is particularly important against the background of numerous information indicating the need to reduce the amount of waste, especially those that are very difficult to manage effectively.
2. The majority of respondents did not know the level of waste collection fees. This concerned mainly people living in single-family houses. This is surprising, as most of them declared to sort waste, which is associated with a lower price. It is important that at the time of field measurements, a very high (over 100%) increase in rates was already known, and according to over 70% of respondents, the level of per capita fees related to waste was already a high expense, especially for the residents of single-family houses. Most respondents were sceptical about the increase in waste fees, but more than 40% were willing to pay more for environmental reasons.

3. The majority of the respondents stated that they segregated waste, but the inhabitants of single-family houses were more inclined to do so. This may be due to the fact that waste management in single-family houses is more transparent and easier to control, which limits abuse. In turn in multi-family buildings, inhabitants are decisively more anonymous what can cause even the so-called "free riding".
4. The residents of both settlements segregated mainly paper, glass, and plastic. However, only the residents of single-family houses showed full segregation. Despite this, unlike the respondents from multi-family housing, they did not declare sorting of used clothes, metal, medicines or batteries. Organic waste (BIO) was not a problem for the inhabitants of single-family houses (possibility of composting), but in the case of a multi-family building, it can be troublesome, as evidenced by a small percentage of respondents undertaking such actions.
5. In the opinion of respondents from both housing estates, the waste collection and selection system is effective, and waste is collected systematically. This is at odds with the expectations of respondents regarding investments in waste management in their place of residence. The majority of respondents mentioned (especially those living in single-family houses) the increase in the frequency of waste collection in the first place and the optimisation of the waste management information system in the second place. Even though since March 2018 the regulations on increasing the number of containers have been in force, respondents from multi-family buildings usually had three containers, while respondents from single-family houses had four.

The research carried out confirmed the thesis made at the beginning of the article. An important element of waste management is the environmental awareness of society and the conviction that selective collection has a measurable impact on the state of the environment. The majority of respondents considered the available information on waste segregation sufficient. However, it is worrying that more than one-third of them felt that their environmental awareness was too limited. It is, therefore, necessary to intensify the efforts of institutions responsible for waste management in order to inform all the inhabitants of the city about it adequately.

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Abstract

One of the main problems in the context of environmental protection is the increase in the quantity of all types of waste, which is becoming more and more challenging to manage. The aim of the paper is to evaluate the environmental awareness of city residents on the management of waste living in multi-family or single-family housing. The city of Olsztyn was chosen for testing. Two housing estates in Olsztyn were selected for the study, one in single-family housing – Brzeziny, the other in multi-family housing – Osiedle Generałów. The primary variables were measured using a standardised inter-view questionnaire. It consisted of 21 closed and open questions. A total of 120 interviews were conducted with adults, 60 in each housing estate. Surveys have confirmed that residents are aware of the waste problems, but some issues require improvement of the environmental awareness and actions at the household level. Most of the respondents did not know the level of waste collection fees. This concerned mainly people living in single-family houses. The majority of the respondents stated that they segregated waste, but the inhabitants of single-family houses were more inclined to do so. The residents of both settlements segregated mainly paper, glass, and plastic. However, only the residents of single-family houses showed full segregation. Organic waste (BIO) was not a problem for the inhabitants of single-family houses (possibility of composting), but in the case of a multi-family building, it can be troublesome, as evidenced by a small percentage of respondents undertaking such actions. In the opinion of respondents from both housing estates, the waste collection and selection system is effective, and waste is collected systematically.

Keywords:

waste management, environmental awareness,
single-family and multi-family housing estates, waste sorting, costs

Świadomość dotycząca gospodarowania odpadami mieszkańców osiedli w zabudowie jednorodzinnej i wielorodzinnej na przykładzie Olsztyna**Streszczenie**

Jednym z głównych problemów w kontekście ochrony środowiska jest zwiększanie się ilości wszelkiego rodzaju odpadów, które są coraz trudniejsze do zagospodarowania. Celem artykułu jest ocena poziomu świadomości ekologicznej mieszkańców miasta na temat gospodarowania odpadami mieszkającymi w zabudowie wielorodzinnej lub jednorodzinnej. Do testowania wybrano miasto Olsztyn. Do badań wytypowano dwa osiedla mieszkaniowe w Olsztynie, jedno w zabudowie jednorodzinnej – Brzeziny, drugie w wielorodzinnej – Osiedle Generałów. Do pomiaru pierwotnego zmiennych wykorzystano standaryzowany kwestionariusz wywiadu. Zbudowany był z 21 pytań zamkniętych i otwartych. Przeprowadzono 120 wywiadów z osobami dorosłymi, po 60 w każdym z osiedli. Badania potwierdziły, że mieszkańcy są świadomi problemów związanych z odpadami, jednak w niektórych kwestiach konieczna jest poprawa stanu wiedzy oraz

działań na poziomie gospodarstw domowych. Większość respondentów nie znała wysokości stawek opłat za odbiór odpadów. Dotyczyło to przede wszystkim osób zamieszkujących domy jednorodzinne. Większość badanych stwierdziło, że segreguje odpady, przy czym większą skłonność do takiego działania mieli mieszkańcy domów jedno-rodziny. Mieszkańcy obu osiedli segregowali przede wszystkim papier, szkło i plastik. Pełną segregację wykazali się jednak tylko mieszkańcy domów jednorodzinnych. Odpady organiczne (BIO) nie stanowiły problemu dla mieszkańców domów jednorodzinnych (możliwość kompostowania), jednak w przypadku budynków wielorodzinnych bywa to kłopotliwe o czym świadczy niewielki odsetek badanych podejmujących takie działania. W opinii respondentów z obu osiedli system odbioru i selekcji odpadów jest efektywny, a odpady odbierane są systematycznie.

Słowa kluczowe:

gospodarka odpadami, świadomość ekologiczna, osiedla w zabudowie jednorodzinnej i wielorodzinnej, segregacja odpadów, koszty